DAIKIN

Shaping the Future: The 90-Year History of Daikin Industries 1924–2014

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The Japanese character on this book's cover is read "taku" or "hiraku," and means "to open" or "to cultivate" in English. It symbolizes the efforts the companies in the Daikin Group made and will continue to make in the future to create new technologies and businesses.

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DAIKIN INDUSTRIES, LTD.

Aspire for Higher

To Our Readers

Daikin Industries celebrated the 90th anniversary of its founding on October 25, 2014.

During these 90 years, we have continuously taken on new challenges, which is the corporate spirit passed down from our founder Akira Yamada. Another characteristic we have inherited from our founder and carried on to this day is our management stance of constantly evolving as we strive to achieve ambitious goals based on our belief in people's infinite potential. Even so, we certainly know that the history of our development has not always been smooth.

When we look back, we remember the series of mass layoffs we were forced to implement early in the post-WWII recovery period and the three ordeals faced by the Chemicals Division, including an anti-dumping lawsuit concerning fluororesins. The blows we suffered in the aftermath of the collapse of Lehman Brothers in 2008 are also still fresh in our memory. We have repeatedly overcome trials such as these to become the company we are today.

Over the latest 20 years, we have robustly developed business around the world, aiming to turn Daikin into a truly global and excellent company. We have achieved results by facing each management issue that emerged head on. In 2010, we realized our goal of becoming the No. 1 global air conditioner manufacturer. This achievement is thanks to the concerted efforts of all employees in the Daikin Group and based on the management decisions taken with foresight by Chairman Noriyuki Inoue. In the end, business is done by people, and our corporate culture of maximizing the contributions of our people has laid the foundation for the Daikin spirit we continue to nurture.

On this occasion commemorating our 90th anniversary, we are pleased to publish The 90-Year History of Daikin Industries.

This book serves as a record of the business and other reforms taken by the Daikin Group, looking one step ahead in the future and implementing strategy through teamwork exercised by all of our employees around the world. We aim to reach even greater heights in the future as we look to our 100th anniversary. While setting ambitious goals and acknowledging the gap between our goals and our current situation, we will make continuous efforts to move forward and reach ever-greater heights.

A number of people have watched over Daikin's growth for many years, and I would like to take this opportunity to express our gratitude to our customers, shareholders, business partners, and the many people outside our company who have supported us in our business endeavors. I hope this book facilitates a deeper understanding of the Daikin Group and our history. In closing, I ask for your continued support and guidance as we continue to develop and evolve in the future.

November 2015

Masanori Togawa

Masanori Togawa
President and CEO,
Member of the Board
Daikin Industries, Ltd.

Create 世界 New Worlds

Daikin has steadily opened new global markets over the past decade to expand business. As of 2015, we do business in 145 countries around the world.

Create New Worlds

82 manufacturing sites and 210 Group companies in 145 countries

Entering the 21st century, Daikin Industries has achieved a level of success unparalleled in its history. In fiscal year 2014, we recorded annual net sales of 1.915 trillion yen to approach the milestone of 2 trillion yen. We do business in 145 countries through 210 Group companies and 82 manufacturing sites. Our success reflects an advanced management approach and a dedicated global workforce which puts strategy into continuous action.

*The figures above represent the number of Group companies.

Create New Worlds

Five independent regions to lead our growth

Daikin develops an independent marketing strategy for each global region and performs localization of production and sales corresponding to the individual needs of local markets. Strategy focuses primarily on the five regions of Europe, China, Asia/Oceania, the United States, and Japan.

In Europe, we acquired sole agent distributors and transformed them to our wholly-owned affiliates. In China, we created our own independent Daikin sales network, and in Asia/Oceania we launched a product lineup customized to local needs and preferences. In the United States, we utilize products and sales channels obtained through acquisitions of local companies. Meanwhile, Daikin Industries in Japan serves as the global headquarters.

Each region generates annual sales exceeding 300 billion yen.

Daikin Europe N.V. celebrates 40th anniversary (2013)

Event recognizing distributors held by Daikin China (2014)

Daikin Industries (Thailand) Ltd. celebrates 20th anniversary (2010)

Goodman Global Inc. begins production of "VRV systems" in the U.S. (2014)

Training camp in Japan for new employees (2012)

Create New Business 事業

Daikin is continuing to hone its strengths to break new business ground in an era of constant change.

Heat exchanger manufacturing line at McQuay Air-Conditioning & Refrigeration (Wuhan)

Create New Business

Creating business through acquisitions and alliances

Daikin has made a series of strategic acquisitions and business alliances over the past decade. Among them, two major acquisitions and one major alliance have become key drivers behind our global strategy.

In 2006, we acquired OYL Industries and with it the McQuay applied air conditioning business, OYLM's low-cost room air conditioning business, and American Air Filter's filter business. The acquisition also offered a stepping stone to reenter the North American market. In 2008, we formed business ties with Gree Electric Appliances, China's largest air conditioner manufacturer and are working to set a new standard for energy-efficient air conditioning in China by supplying rival Gree with our innovative inverter technology. We also are setting our sights on establishing global standards. In 2012, we acquired U.S. company Goodman and are using its sales network to launch our own unique ductless-type air conditioners into the North American market and to make a full-scale entry into the duct-type unitary residential air conditioning business. Daikin aims to be a truly global and excellent company by succeeding in the increasingly expanding U.S. market where our global rivals are gathered.

Creating new markets

Even during the global economic downturn, Daikin never spared investment in growing markets. In 2020, the global heating, ventilating, and air conditioning (HVAC) market is expected to grow to about 30 trillion yen, and we are leading the industry in establishing footholds in emerging markets. In India, we have launched the "VRV system," HFC32 room air conditioners, and applied systems. In Turkey, inroads were rapidly made, and business there serves as a base of operations for expansion into the Middle East market. In Brazil, air conditioner production has begun in Manaus. With management foresight, we are creating new markets.

Announcing the Goodman Global Inc. acquisition

Ceremony for signing business alliance agreement with Gree Electric Appliances Co., Ltd.

Daikin Applied Americas's Staunton Factory

AAF's Columbia Factory

OYLM's air conditioner inspection room

Daikin exhibition in Brazil

Daikin organizes PROSHOPs in Turkey

Sales outlet in India

Create New Business

Creating new domains

Environment and after sales service are new growth fields for Daikin. With an approach seeking both business growth and contribution to a sustainable society, Daikin has made substantial human and capital investments in environmental fields. Part of our environmental contribution has been the reduction of greenhouse gas emissions during the manufacturing process and worldwide promotion of inverter products. We have also developed heat-pump technology and an energy-saving solutions business featuring our "AirNet." Recently, we have developed the "DESICA" air treatment unit and acquired an air filter company. "Daikin Alterma," our heat-pump type hot-water supply and heating system, has globally expanded from Europe to China. Our air purifier business, meanwhile, has extended from Japan to China. We are combining a diverse range of businesses to expand our domains worldwide.

Energy-efficient solutions business leveraging "AirNet"

Ventilation and humidity control business featuring "DESICA"

Hot-water supply and heating business featuring "Daikin Altherma"

Creating new standards

Daikin offers information on next-generation refrigerant at the Montreal Climate Change Conference

HFC32 air conditioner manufacturing line at Thai Plant

HFC32 promoted at exhibition in Milan, Italy

With its low warming potential, the next-generation refrigerant HFC32 has been receiving attention for its potential to help mitigate the impact of global warming. Daikin was the first company in the world to adopt HFC32 to its residential- and commercial-use air conditioners. In aiming for both environmental contribution and business growth, Daikin is steadily increasing results and establishing new industry standards by promoting new environmental initiatives around the globe.

Create New Business

Tablet using Daikin's anti-fouling surface coating agent

Pursuit of business expansion in every field

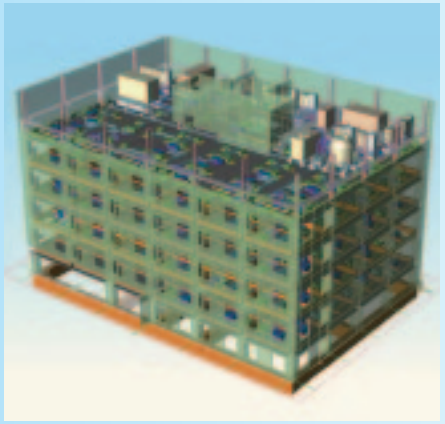
With a fixed gaze at the changing times, Daikin has pursued a wide range of new business opportunities. Our Chemicals Division has also been actively investing in the growing market of China and enlarging its product lineup to become the No. 1 chemicals company. At the same time, it has been building on its success in the semiconductor and automobile industries, expanding sales in the textile and IT (LAN cables) industries, and developing new applications in the information terminal and new energy industries to stimulate future growth.

In the oil hydraulic business, we are leveraging our hybrid oil hydraulic units in aiming for the No. 1 position in the Japanese industrial machine tool market. We are also strengthening our global presence by entering the U.S. market and seeking opportunities in Southeast Asia.

We are also globalizing our mobile oil hydraulic business including hydrostatic transmission (HST), mainly through growth in the United States and China.

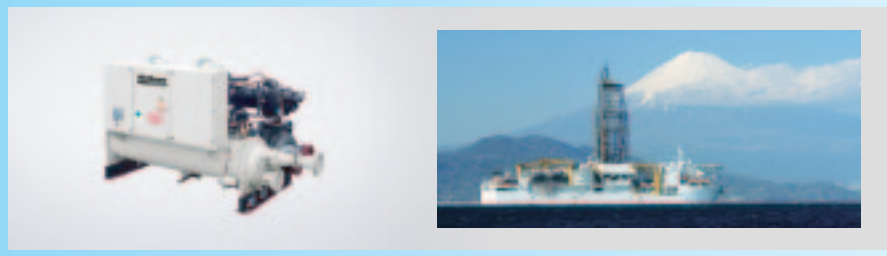
A turbocharger hose with a fluoroelastomer inner coating

"Oil Cooling Unit" and "Super Unit," key industrial hydraulics products



Building structural diagrams made with CAD system for facility design

In the refrigeration business, we are developing new markets with a lineup of marine container refrigeration units, marine air conditioning systems, and deck units in addition to the "Conveni-Pack" refrigeration system. In the electronic systems business, we support the manufacturing innovation and advanced R&D initiatives of manufacturers.



Deep sea drilling vessel CHIKYU *equipped with our refrigeration equipment*

Create Technology 技術

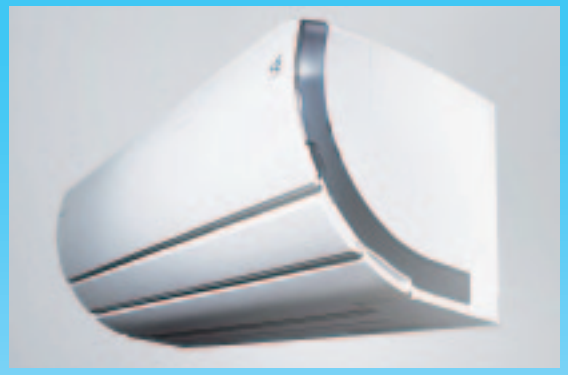
Anticipating future needs to create new value

Broadly expanding fields and continually innovating to develop new technologies

Daikin's technological innovation started with radiator tube metal processing. We then broadened our technology scope to encompass fluorochemicals, refrigerators, and electronics to become the world's only company involved in both refrigerants and air conditioning. In the air conditioning industry, we expanded from commercial systems to residential systems to hot-water supply systems. In recent years, we have taken our technology a step further to include air quality control through such products as air purifiers and the "DESICA Home Air" (heat pump desiccant humidity control Outdoor Air unit). Our fluorochemicals technologies, which initially yielded refrigerants, have also generated PTFE resins, fluoroelastomers, and many other new applications. With machinery, chemical, and electronics technologies, Daikin has continued to evolve with the aim of leading the world in technology innovation.

Focusing everything on future needs

In 2010, Daikin issued a declaration reestablishing the "Daikin Technology Statement." The declaration was a three-pillared commitment to reform technical capabilities, assure product quality, and strengthen human resources capabilities that aimed to improve product innovation and quality. The "Urusara 7" air conditioner received the Prime Minister's Award at the 5th Monozukuri Nippon Grand Awards sponsored by the Ministry of Economy, Trade and Industry in 2013, reflecting the progress we had made putting our declaration into practice. Many other initiatives, including the widespread adoption of "DESICA Home Air" control unit for humidity and ventilation control, have also borne fruit.

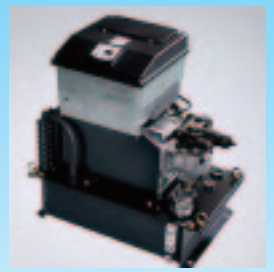


"Urusara 7"

"DESICA Home Air"

Oxygen concentrator

"OPTOOL"



"EcoRich R"

Create Technology

Through the fusion of technology and intelligence, spark new dreams through the collaboration of diverse talent

In November 2015, we open the Technology and Innovation Center (TIC) within the Yodogawa Plant site. The center will consolidate our R&D function and accelerate the pace of technological development through collaborative creation, or *kyoso*, inside and outside the company. This will be the breeding ground for both technological innovation and value creation through the fusion of machinery, chemicals, and electronics. We will strive not only to develop core technologies, but to combine them with technologies from other fields of research and look to contribute to sustainable societies to create healthy air and spaces. The center will also leverage rapidly evolving information and communications technologies (ICT) aiming for innovations in manufacturing systems. To achieve this vision, we will deepen collaboration with global universities and research centers, including Kyoto University, Osaka University, and Tsinghua University, along with private enterprise in different industries. The center will be a hub for the promotion of collaborative creation combining technologies and knowledge.

Technology and Innovation Center under construction

Create Human Potential

Release human potential by believing
in the infinite potential of people
Then, people come alive.

Create Human Potential

"Daikin Altherma" development meeting at Daikin Europe N.V.

Glad to be part of the team

Daikin's growth is the cumulative growth of each individual employee.

The relationship between a company and the individuals who work there must be one based on mutual preference. The company draws out people's motivation, gains understanding and acceptance, has people make efforts to improve themselves, and gives them opportunities for them to demonstrate their full potential to achieve growth. This style of human resources development is what we call People-Centered Management.

Driving growth through diversity

As the pace of globalization accelerates, it is even more important to accept people who are viewed as "the nail that sticks out" and demonstrate teamwork that mobilizes the talents of diverse individuals to become a driving force of the organization. We offer opportunities to people who take on challenges because people have always been the source of Daikin's growth in every part of the world.

Group Management Meeting

The Daikin Global Skills Competition beckons entrants from around the world

An electronic parts assembly area at Daikin Sunrise Settsu Factory

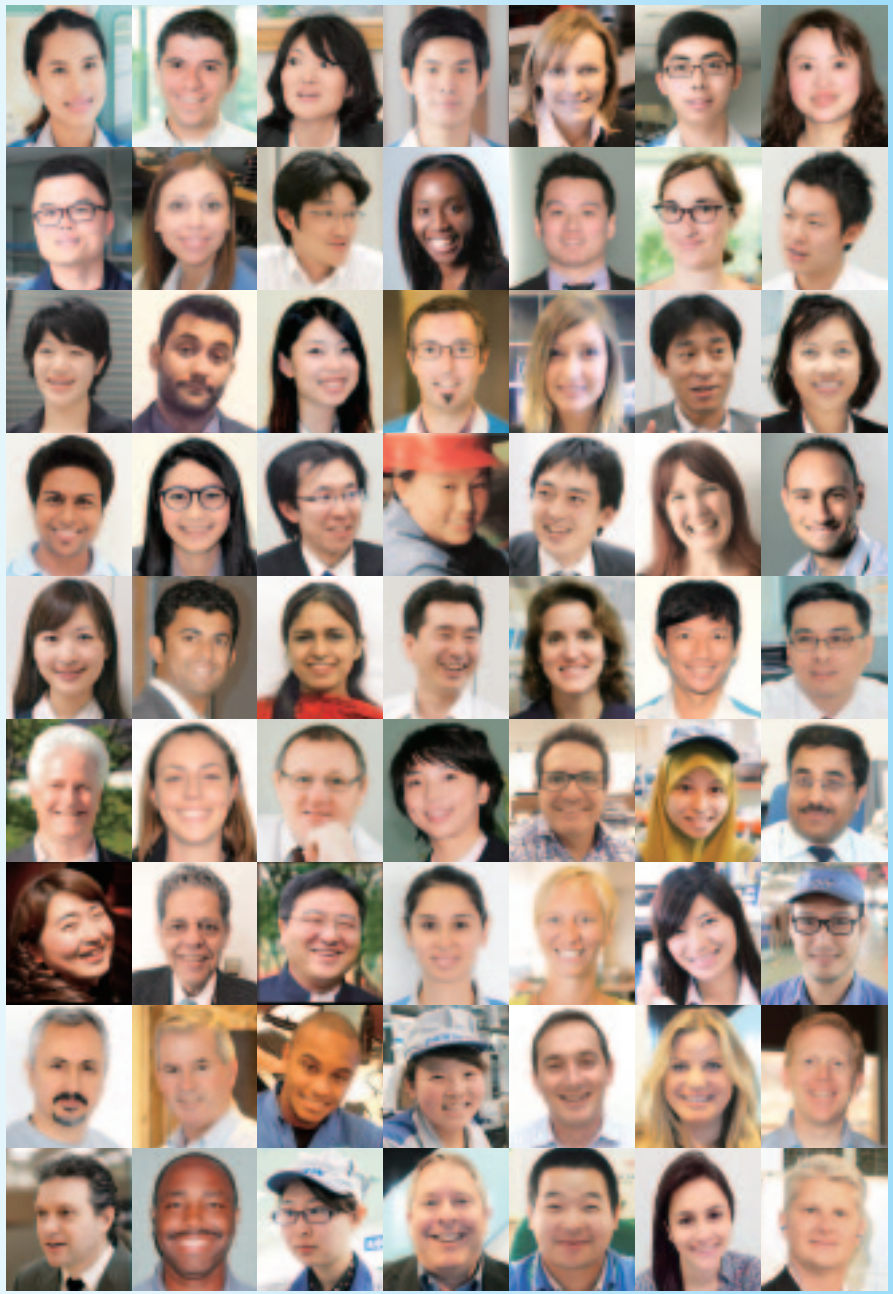
Create Human Potential

"Fast & Flat" decision-making and execution as a team accelerate Daikin's growth

When Daikin people gather together, that is the time for us to recognize a common direction, and this enables us to execute under pressure with astonishing speed.

With each one of us playing an important role and taking flexible action, we can maximize our abilities and rapidly realize great success.

Event recognizing distributors held by Daikin China



Create Dreams

Fulfill your ambitions
and realize your dreams.
The future is up to us.

Contents

Preface

Aspire for Higher v

To Our Readers vi

Prologue

Akira Yamada, Founder of Daikin Industries 1

Chapter I

Establishment of Osaka Kinzoku Kogyo Co. (1934–1972)

Establishment of Osaka Kinzoku Kogyo Co. 15

Toward Reopening of Plants after Chaotic Postwar Period 27

Acquisition of "Freon" Patent 33

Resumption of Business Ties with Sumitomo Metal Industries 39

Establishing Foundation for Air Conditioning Business 50

Evolution of Fluorine Chemical Technology, and Development of Overseas Markets 61

Chapter II

Oil Crisis and New Business (1972–1987)

Coping with Oil Crisis 73

Aiming for "Daikin, the Technology Company" 85

Diversification of Air Conditioning Business 93

Global Production of Air Conditioners 102

Construction of Rinkai Factory and Kashima Plant 106

Chapter III

Recovering from Managerial Crisis (1986–1994)

Establishing Managerial Principles and Daikin Management 117
Domestic Air Conditioning Business Turns Favorable, and Overseas Developments 127
Three Trials of Daikin's Chemical Business 141
Reduction of Working Hours, and Social Contributions 160

Chapter IV

Challenging Globalization (1994–2000)

Series of Reforms 169
Shift toward Emphasis on Strategy of Three Pillars of Air Conditioning Business 180
High-Cycle Production System and Development of "Ururu Sarara" 187
Leap Toward becoming Global Company in Air Conditioning Business 197
Global Strategy of Chemicals Division 206
Business Restructuring and Business Withdrawals 214
Corporate Social Responsibility and Improved Business Results 218

Chapter V

Becoming an Attractive Company (2000–2006)

Fusion 05: Aiming for True Blue-Chip Status 223
Noriyuki Inoue Assumes Chairmanship 229
Aggressive Expansion of Air Conditioning Business in Japan 237
Daikin Technology Statement and Production System for Changeable Models and Volumes 245
Transfer of Skills, and Development of New Products 251
Toward Building Eight-Polar Markets for Global Air Conditioning 256
Development of Strategy for Chinese Market 267
Aiming for World No. 2 Position in Fluorochemicals 275
Business Results and New Developments in Diversification 282
Corporate Ethics and Environmental Response 288

Chapter VI

Challenging New Heights (2006–2014)

Achieving Global No. 1 Position in Air Conditioning 301
New Developments in the Chinese Market 315
Bolstering Business Operations in Europe, the Mideast, and Africa 323
Bolstering of ASEAN Business 332
Buy Out of Goodman, and Third Attempt to Enter U.S. Market 343
Sophistication of Technical Developments 351
Reorganizing Chemical Business, and Challenging Global No. 1 Position 359
Changes in Japanese Market, and Reorganization of Business Structure 363
Response to Global Environmental Issues, and Pursuit of Diversity 371
Looking Toward Future 377

Appendices 383
Chronology 391
Index 405

The calligraphy is by Ishitobi Hakko.
Ishitobi was born in 1941. At the time of his entry to Tokyo Gakugei University, he also began to study under renowned Japanese calligrapher Otei Kaneko. Ishitobi has written many calligraphy books, including introductory guides and handbooks. His work is highly regarded for its modern style, which is easy to read and adapts familiar content.

Prologue

Akira Yamada, Founder of Daikin Industries

Daikin was established in 1924 in Osaka, one of Japan's oldest commercial centers. The company's Head Office is still located there today.

Osaka Castle was built in the center of Osaka in the late sixteenth century, and afterward traders steadily set up business quarters there. The city's early development was thus as a commercial center. By the mid-seventeenth century, however, after Japan emerged as the world's leading copper producer, Osaka became an industrial center. In line with the feudal Tokugawa government's policy, all the copper mined and refined in Japan was transported to Osaka for smelting and casting. Most of the finished copper was then shipped to Chinese and Dutch traders

Akira Yamada as Young Engineer in Osaka Artillery Arsenal

in Nagasaki for export to China and Europe. In that process, Osaka became Japan's center for technology related to the smelting, casting, and processing of copper.

Daikin's founder, Akira Yamada, began his professional career as an engineer in the Osaka Artillery Arsenal (OAA). That was in 1870, just two years after the Meiji Restoration. The Japanese Army had established the Army Materiel Command (AMC) in Osaka because of the high level of metalworking technology available there. They later changed that name to the Osaka Artillery Arsenal (OAA). As a government-operated company, the OAA produced artillery shells, bullet casings, and other items for the Army. During the Sino-Japanese War of 1894-95, the OAA also began producing aluminum products, thus making it a pioneer in Japan's aluminum industry. The next opportunity for the Japanese military to improve its equipment substantially was during the Russo-Japanese War of 1904-05. One improvement was changing the color of field cookware from black to brown. Unknowingly, however, the brown paint used contained arsenic sulfide, a toxic substance, and after the oversight was pointed out, the military ordered the OAA to develop a non-toxic brown paint for the cookware. The OAA invested a full year of research into the project but still did not succeed in developing a usable paint.

After graduating in 1908 from the Technological School of

Kokura in Kyushu, Akira Yamada, the founder of Daikin, served a year in the Army before joining the OAA in 1909 as an engineer. He was 24 years old. At that point, about 18 months had passed since the OAA had begun research into a non-toxic brown paint for the Army cookware. Yamada's entry into the OAA thus coincided with that ongoing internal research. That particular research was outside Yamada's special field of metal engineering, but he became interested when he learned about the problem, and on his own he conducted research into paints that might be used with the cookware. He eventually located a non-toxic paint at a pharmaceutical wholesaler in Osaka that did not change color during the baking/coating process. After he told his manager about the paint he located, the company decided to use the paint for the cookware. Yamada's success at that time was due largely to his enthusiasm as an engineer in tackling a technical difficulty outside his special field of expertise. He faced the cookware problem head on and to solve it he conducted steady basic research apart from his special field. From that experience he learned that if a person conducts the necessary research with clear goals and a wide vision, it is possible to challenge problems successfully even in a new field and to gain increased personal confidence.

Yamada was later transferred to the Cartridge Case Factory inside the OAA. There he analyzed the production processes and established prices for components based on the number of processes it took to produce them. Concerning the drawing process of the cartridge cases as well, Yamada assembled data related to the tensile strength and expansion ratio of brass, and then personally designed the tools he would use. Japan at the time still did not use scientific process control and was incapable of engineering tool designs. Yamada thus introduced various innovations based on his original thinking. He changed the OAA's work processes, in-

troducing a more scientific approach to the areas the foremen were in charge of, thus greatly increasing workplace productivity. His superiors eventually recognized his abilities and in 1918, his ninth year in the OAA and while still only 33 years old, he was appointed the first civilian manager of the Cartridge Case Plant.

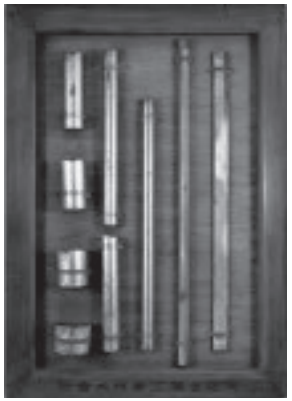
While working in the OAA, Yamada met General Manager Tsunesaburo Matsui a man destined to influence him immensely throughout his life. Matsui eventually left the OAA to participate in founding the wrought copper company Osaka Shindosho Limited Partnership. He also became one of its directors. Yamada, meanwhile, sensing his small chance of rising any higher in the OAA because he had not graduated from a prestigious university, decided to leave the OAA and join Osaka Shindosho. Not long afterward, Osaka Shindosho merged with Toyo Yasuri to form Toyo Yasuri Shindo (TYS) Co., Ltd. The new company was expanding its business when Yamada joined it in 1919. One year later he was appointed plant manager, his first major step to a higher level of responsibility. His new position let him once again work with Tsunesaburo Matsui, the person who knew Yamada best, starting from his years in the OAA, and who Yamada totally respected and trusted. Later in life, Yamada referred directly to Matsui when he said, "Life depends to a great extent on special persons you happen to meet." Throughout the rest of his life, Yamada referred to Matsui as the person to whom he owed the most.

Three mottoes marked Akira Yamada's managerial philosophy: "make bold decisions", "identify clear solutions", and "act with all one's heart". Two of his bold decisions were his above-mentioned personal research into a lead chromate paint that did not change color in the baking/coating process, and his decision to leave the OAA and enter TYS. Those two decisions succeeded in opening a new path in life for Yamada, and showed how in his

Tsunesaburo Matsui

scientific approach toward managing work processes he identified clear solutions before initiating action.

Even afterward, Yamada continued making bold decisions. In 1923, for example, Nakajima Aircraft asked TYS to produce radiator tubes for use with aircraft. Japan was a member of the Entente (Allied) Powers during the First World War, and one of its most important national goals at the time was the domestic production of aircraft. Nakajima Aircraft was aware of TYS's copper processing technology for producing radiators to cool aircraft engines, and it wanted to have the radiators produced domestically. TYS faced a business crisis at the time, however, and hesitated to accept the order from Nakajima Aircraft because the radiator business would almost certainly end up in the red. Yamada had personal confidence in the company's technology, however, and in the end the company accepted the order from Nakajima Aircraft and Yamada accepted personal responsibility for the results. He then rented a vacant factory in the Namba section of Osaka and began preparing a prototype radiator using equipment he personally designed. Although he initially produced many defective products in the design process, and production costs soared, Yamada persisted, personally bearing losses in the process before completing the order. Years later he admitted that the losses reached 2.5 times his annual income. Despite the losses, however,



Radiator Tube Production Process

Yamada persisted in his development efforts together with seven employees. He thus acted "with his whole heart," and in the development process he earned the solid trust of those around him.

In January 1924, on the occasion of winning a second order for radiator tubes from Nakajima Aircraft, Yamada left TYS. He independently established his own company, Osaka Kinzoku Kogyosho Limited Partnership (OKK) on October 25, 1924. He kept the company, the forerunner of today's Daikin Industries, in Namba. It was capitalized at 15,000 yen and had 15 employees, including Yamada. Its business aims were the manufacture and sale of aircraft components, the pressing and drawing of metals, electroplating, and the machining of various types of precision metal parts. Although Namba is one of the largest entertainment areas in modern-day Osaka, in the 1920s it was still in the outskirts of the city and many small manufacturers had production facilities there. Yamada had his back to the wall, and decided to invest all his assets in his own business, an example of his ability to accept risk and act boldly.

The Treaty of Versailles, signed in June 1919, marked the official end of the First World War. From the following year, Japan

experienced a reactionary economic downturn. It faced intensified competition with Western companies as well, and generally suffered from chronic economic depression. A little over three years later, on September 1, 1923, the Great Kanto Earthquake struck Tokyo. Osaka was not directly affected by the earthquake, but suffered seriously from the economic aftereffects. Yamada established OKK in Osaka less than four months later, in January 1924. Although the earthquake mainly affected the Tokyo-Yokohama area, its negative effect on the general Japanese economy caused Yamada's business to be in continuous deficit. Reduced naval spending related to the Washington Treaty also negatively affected his business. The general environment for increased military spending, therefore, was not favorable. Yamada made it safely through this difficult period mainly because he benefitted from the enthusiastic support of persons he had known since his days with TYS. At the time, moreover, radiator tubes were increasingly used in aircraft, and were considered to be one of the world's most technically advanced military products. From those beginnings, and except for occasional business slumps, Yamada's company continually received orders from aircraft manufacturers for radiator tubes for 21 years, until the end of the Second World War in August 1945. Those orders contributed greatly toward bolstering OKK's managerial foundation.

After Tsunesaburo Matsui, who had done so much for Yamada, retired from TYS, he worked in China to oversee construction of the Mukden (today's Shenyang) Military Arsenal. Based on Matsui's recommendation, the Arsenal requested OKK to develop a quick-igniting fuse. Yamada accepted the order, and OKK's resultant product was highly praised, reflecting well on the company and leading to increased business. Orders from the military were uneven, however, making it difficult to predict changes in

work volumes. For that reason, Yamada introduced steps to increase orders for drawing products from the civilian sector. And to process those products, he introduced stamp forging technology in OAA to manufacture cartridge cases. It was unusual at the time for a private company to be utilizing such advanced technology. Using the same technology, OKK also received orders from the private sector for items such as plugs for oxygen and nitrogen tanks, and from the Japanese Navy for high-pressure processed parts used aboard ships. The company also received orders for processing a wide variety of drawing products, while concurrently improving its profitability.

After Yamada heard that the Japanese military was placing orders for weapons production with private-sector companies, he had OKK also begin producing weapons from 1929. Yamada was highly trusted personally inside the OAA, and OKK had earned a fine reputation for its advanced technology. Therefore, although OKK was a private company, it succeeded in winning an order from the Army Arsenal for cartridge cases. From late 1929, meanwhile, a severe economic depression—later called the Great Depression—struck the U.S. first and then other countries around the world. It lasted for ten years. The Japanese economy began feeling its effects from early 1930. Just prior to those events OKK was fortunate in having obtained a steady flow of new work through a dependable military route that contributed greatly to the company's growth.

That new work included increased orders from the Navy. In 1929, meanwhile, OKK successfully reproduced an automatic fuel delivery system originally made by Bosch of Germany for ship engines. OKK called the product a "Rational Lubricator(s)." By that time Osaka had developed industrially and was being called the "Manchester of the Orient." A wide variety of small and

"Rational Lubricator(s)"

medium-size companies located their facilities there, including companies in the metal and machine processing industries. OKK collaborated with some of those companies by having them specialize in processing parts while OKK itself assembled products and conducted final inspections. In those ways, OKK expanded and developed its business further.

By 1928, OKK had doubled in size to 30 employees. In the process of growth the Namba Factory had served the company well but it had no room for expansion. At that point, in May 1928, Yamada moved all the company's facilities and equipment to the new Imamiya Factory, which had ten times the space of the Namba Factory. OKK received the order from the Army Arsenal for cartridge cases a year later, in 1929, and progressively monopolized all Army orders for those cartridge cases. As order volumes increased, moreover, the company raised its prices, and the profitability of that business improved substantially. The company steadily enhanced its equipment and was gradually able to supply the Army with highly precise fuses. OKK later used the superior technology it accumulated related to developing those fuses to provide similar products to the U.S. military forces stationed in postwar Japan.

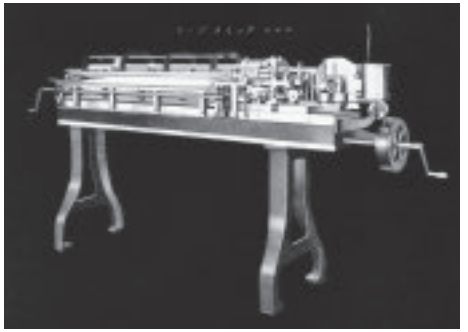
From around this same time, companies in the private sector in Japan began requesting OKK to develop various new products.

No. 1 Imamiya Factory

They included newspaper companies, printing plants, and paint factories, where much oil mist is generated. OKK developed and sold the SS-type fire extinguisher and carbon dioxide fire extinguishers. After that business expanded, however, the person in OKK most responsible for developing the carbon dioxide extinguishers broke faith with Yamada. He and some followers left OKK to sell the products independently, taking away OKK customers. Yamada and several of OKK's directors visited all the customers who purchased the fire extinguishers and explained the situation to them. As a result, he recovered that business, and safely managed his way through the crisis. Based on that experience, Yamada felt a serious need not only to bolster OKK's internal organization and to educate its employees, but also to build strong relationships of trust between OKK and its customers. The company thus made renewed efforts to modernize its management practices and to strengthen the bonds with its customers.

In June 1934, OKK completed construction of its Imamiya No. 2 Factory. The company made special efforts to bolster the new factory's equipment and machinery and to strengthen its inspection processes. It also pressed its outside suppliers to modernize and augment their own production equipment, supporting them

Solid-ring Type Bobbin (left) and Wire-ring Type Bobbin (right)



Warp Tying Machine

by providing both financing and technical guidance. As its business expanded, OKK came to be called the "No. 1 machine shop in Osaka." "Machine shop" was a term used locally for any company that used lathes produced machinery and equipment. Around this same time, Toyo Cotton Spinning Co. (TCS), Japan's largest spinning company, approached OKK for assistance in automating its cotton weaving machines. Specifically, it wanted OKK to develop a solid-ring type bobbin for winding weft. The request was important in order for OKK to develop demand in the private sector. If successful, the business could be expanded afterward into the production of parts for spinning and weaving machines. The solid-ring type bobbin that OKK produced at that time performed surprisingly well, and as promised TCS came through with large orders to OKK for producing solid-ring type bobbins. That solid-ring type became one of OKK's mainstay products, ranked with radiator tubes and instantaneous explosion fuses. Also, based on introductions from TCS, OKK received orders for extruder pumps—used for melt spinning machines—and bobbins used for rayon weaving machines. Further, based on a recommendation from TCS, OKK tackled the production of a warp tying machine. The machine it developed was less expensive than im-

ported machines, performed just as well, and delivery time was much shorter. OKK sold these machines not only to TCS but also to Nittobo, Naigai Menka, Toyo Rayon, and other rayon and spinning companies, and expanded its sales routes to include mainland China. As OKK's business expanded, Yamada reminded himself of the old saying that "Trust is an important asset that cannot be replaced by anything else."

The make-up of OKK's sales for 1932-33 included non-military products 25 percent; products for spinning and weaving machines, 11 percent; and "Rational Lubricator(s)", 10 percent. From 1930, when signs of a wartime order in Japan strengthened, the overall percentage of products to satisfy wartime demand, such as cartridge cases, bullets, and fuses, rose rapidly. Yamada was already thinking that OKK should begin preparing early for a period of postwar peace, and began making efforts to develop products for use in peacetime. In the background to the success of those preparations was OKK's technical capability to produce its own machinery and equipment. Initially, OKK purchased second-hand lathes, presses, and other equipment. OKK personnel disassembled those products and then rebuilt them to fit the requirements of OKK's processing lines. OKK also built specialized equipment in-house, adding various innovations to make the equipment more useful. Based on the accumulation of such technology, OKK was able to build most of the equipment it needed in-house.

Being able to fabricate equipment in-house was helpful during the war, a time when purchasing machinery anywhere was almost impossible. The idea of designing needed equipment in-house thus became part of Daikin's approach to technology. That thinking was seen years later in the company's efforts to develop new technology and new products. President Yamada

viewed the main aspects of business strategy—research, and diffusion—much like the wheels of a vehicle. "If research is successful," he said, "something new will be born. And whether that new something lives on or dies depends on the efforts made to spread its use." Basic to Yamada's research and its diffusion was a deep compilation of mechanical engineering technology. That basic technology continuously supported Daikin. In particular, Daikin's founder Akira Yamada established the tradition of always challenging new technology and sharing business difficulties with those inside the company. He also enjoyed the support of those outside the company with whom the company had business ties. That managerial stance of taking care of people inside the company, while people outside supported the company, was realized during the long period that Yamada was at Daikin's helm.

Chapter I

Establishment of Osaka Kinzoku Kogyo Co. (1934–1972)

Establishment of Osaka Kinzoku Kogyo Co.

An international system that promoted naval disarmament was in place during the years between signing the Washington Naval Treaty in 1922 and holding the London Conference in 1930. In the backdrop of an international consensus, a main aim of that system was to contain Japan's military expansion. Until the late 1920s, Japan faithfully downplayed its military while conducting its foreign affairs. Gradually, however, the Japanese Navy introduced a series of plans to foster advanced technology and improve the structure of its fleet. By carrying out those plans, the Japanese Navy strengthened its fighting capabilities, put its air wing into order, and introduced specialized warships. Those plans included

a system for cultivating designated civilian suppliers to support the Navy's in-house production activities.

In 1931, the Navy designated Osaka Kinzoku Kogyosho (OKK) an official supplier of compressed products. Besides products OKK marketed in the past, such as the "Rational Lubricator(s)", steam heating units, water cooling units, and carbon gas fire extinguishers, it also began selling to the Navy products such as aircraft components and brass piping for radiators. Next, in 1933, after the Army also designated OKK an official supplier, the company began selling a wide range of products, including cartridge cases, fuses, and radiator tubes for aircraft. The Army and Navy designated about thirty companies nationwide as official suppliers, including Hitachi, Ltd., Mitsubishi Aircraft Corporation, and Sumitomo Copper Works (later Sumitomo Metal Industries, Ltd.; today's Sumitomo Metal Corporation). Most of the Army or Navy designated suppliers were large, highly respected corporations. It was a distinct honor, therefore, for a small limited partnership such as OKK to be an official supplier.

Osaka Kinzoku Kogyo Co., Ltd. (OKK Co., Ltd.), meanwhile, was established on February 11, 1934. The driving force for establishing a stock corporation alongside OKK was a request to President Yamada from Sumitomo Copper and Steel Piping (SCSP) in September 1933 concerning possible capital ties. At the time, OKK was purchasing bronze sheets and bronze bars from SCSP to produce cartridge cases, fuses, radiator tubes, and other products. SCSP likely favored OKK as an Army and Navy designated supplier producing specialized products that required sophisticated technology. The new company, OKK Co., Ltd., meanwhile, had to think carefully about the possibility of having capital ties with a major company in the Sumitomo zaibatsu with a long history of smelting copper dating back to the early seventeenth century.

Also, SCSP's paid-in capital was 50 times the size of OKK's capital, and when the company merged with Sumitomo Steel Works a year later and became Sumitomo Metal Industries, Ltd. (SMI), the new company's capital jumped to 80 times OKK's capital, making it one of the largest corporations in Japan. Viewed from President Yamada's eyes, capital ties with SMI offered two especially attractive points: one was an increase in the company's social credibility; the other was the support that could be expected from SMI if business floundered. After careful consideration Yamada decided it was best to take advantage of this exceptional opportunity. He established OKK Co., Ltd., not long afterward, and set three conditions for SMI's participation in the new company: 1. SMI would not own more shares than President Yamada; 2. the number of Sumitomo directors sitting on the board would not exceed the number of OKK directors; and 3. SMI would not interfere with the technical or business policies of OKK Co., Ltd. All three conditions were important matters to Yamada for ensuring the managerial integrity of OKK Co., Ltd. Sumitomo accepted the three conditions, and its board approved the agreement for capital ties. Seven months later, in July 1934, OKK Co., Ltd. increased its capital from 250,000 yen to 1 million yen. Of that total, Sumitomo participated with equity of 495,000 yen. Seven months later, in February 1935, OKK Co., Ltd. merged with and absorbed OKK. The paid-in capital of OKK Co., Ltd. (OKK) at that time was 1.5 million yen; Sumitomo's equity remained at 495,000 yen.

OKK hired many new technical personnel. Besides experts in weapons production who moved from Osaka Artillery Arsenal (OAA) and Toyo Yasuri Shindo (TYS) to the company right after its establishment, two men with especially colorful backgrounds who also joined OKK were Kazuo Okamura from Onoda Cement Co. in 1931 and Gosuke Kato from Kisha Seizo Co. in 1933.

Posing with First Prototype Cooling Unit

OKK received a new request from the Ministry of the Navy in 1933 related to providing heating and cooling units for use aboard warships. The equipment the Navy was using at the time was bulky and performed poorly. OKK engineers immediately began to study the development of new units. The company already had much experience producing radiator tubes, and had developed products such as an instantaneous gas water heater. Its customers highly evaluated the company's technology and experience related to radiation, cooling, and heating equipment. Technicians in OKK decided that the main problem with heating and cooling units the Navy was currently using was related to the heat exchanger's structure. To alleviate the problem, OKK engineers inserted a spiral-shaped plate into the copper pipe, which increased the heat efficiency substantially and contributed to reducing the volume and weight of both the heating and cooling units. Doing so also tied to reduced operating costs, a clear response to the Navy's request for improved heating and cooling units. OKK applied for a patent to cover the spiral construction, and in 1933 completed prototype equipment for a heating unit and a year later for a cooling unit. The heating unit used steam as its source of heat, and the cooling unit used water cooled to between 4 and 10 degrees centigrade. OKK called the functions of the cooling and heating units "air conditioning," leading-edge wording at the time. The heating

units were installed mainly to heat the crew's berthing space; the cooling units were installed both there and in the ammunition storage area for cooling and refrigeration. Although the Ministry of the Navy required competitive bidding for items to be installed aboard its newest warships, OKK won many of the bids.

OKK utilized the same technology it used with the military to develop heating and cooling units for non-military use. In spinning plants, for example, it installed heating and cooling units from around 1929 to prevent the spinning thread from breaking and to improve the product quality. Customers used well water for the cooling units and exhaust air from their plants for the heating units. OKK sales engineers recognized those needs and promoted installation of the heating and cooling units. Also, based on requests from the Navy, OKK developed a lubricant oil heating system for use with aircraft. At the time, the use of spiral tube technology was helpful. Use of the lubricant oil heating system made it possible during the winter and in cold regions for military aircraft to take off before their own engines warmed up. The lubricating oil was heated in advance and pumped into the aircraft engine for starting. Sets of such equipment were loaded on flat carts for easy transfer.

After the London Conference of 1930, Japan and the United States both made strong efforts to improve their submarine fleets. In that same year, a research team of Frigidaire Co. developed a refrigerant called fluorocarbon. Frigidaire was a home appliance manufacturer wholly owned by General Motors. Frigidaire and DuPont then established a joint venture to begin commercial production of fluorocarbon. Around that same time, a U.S. submarine experienced an accident caused by leakage of ammonia gas or carbon dioxide from cooling units. Upon learning about the safety of fluorocarbon the Navy decided to switch immediately to using

Kazuo Okamura

fluorocarbon as its refrigerant of choice. Tomio Ohta, a retired Japanese rear admiral serving as an adviser to OKK, happened to read an article about fluorocarbon in a U.S. Navy publication. He immediately recognized the importance of fluorocarbon and passed on the information to President Yamada. Meanwhile, Kazuo Okamura, manager of OKK's sales department, told President Yamada that he wanted to tackle the fluorocarbon business as his lifetime work. He also recommended to OKK that if it intended to develop fluorocarbon it should also develop a refrigerator.

Even as militaristic colorings rapidly strengthened in Japan, Yamada began thinking ahead, of the days when peace would come, and about developing products for use by ordinary Japanese consumers. He decided that in aiming for future popular demand, freezers would be one of the most appropriate products. In that backdrop, OKK began its R&D of fluorocarbon in 1933, and around the same time also began developing a freezer. A close look at that situation reminds one of the days many years earlier when President Yamada, a mechanical engineer by trade, challenged on his own the development of a non-toxic paint for military field cookware. That showed how Yamada viewed matters from a long-term perspective. In effect, OKK's business foundation of air conditioning and fluorine chemicals had its start back then.

Toru Iwaki (left)
Masato Hirata (right)

Toru Iwaki, meanwhile, a researcher in Shionogi Pharmaceutical, found time outside his own job responsibilities to work closely beside Okamura in developing fluorocarbon. Using tools from a test lab, the two men purchased a small volume of 3-fluorinated antimony at a pharmaceutical wholesaler in Doshomachi, Osaka. In December 1935, after a series of trial-and-error experiments, they finally succeeded in synthesizing Japan's first fluorocarbon R12. In the process, holding two jobs proved to be too much for Iwaki, and shortly afterward he collapsed from exhaustion. OKK then hired a researcher named Masato Hirata in January 1937 and assigned him to work with Okamura. OKK established a Chemical Research Section not long afterward. Three months later the company provided the Ministry of the Navy with a written report on its research, together with product samples. That same November, OKK produced and successfully tested a 10kg batch of fluorocarbon 12, thus taking the company a step further toward volume production.

Concerning development of a refrigerator, meanwhile, the first steps included purchasing an American-made unit to use for reference. It was a 1hp unit that used methyl chloride as its refrigerant. In order to prepare an in-house product, the first step was to disassemble the sample product and sketch the various parts. Kazuo Okamura, who worked so assiduously on the fluorocarbon

project, was placed in charge of the refrigerating equipment development project. OKK produced its first refrigerator in 1934 and sold it under the trademark "Mifujirator." In 1936, a cooling unit was installed in a commuter train of the Nankai Electric Railway in Osaka on an experimental basis. The unit performed well, and from 1937 Japan's first air conditioned express made its debut run between Nanba in Osaka and Wakayama City. In that same summer, Nankai Electric Railway began operating air conditioned sightseeing buses.

In July 1937, however, war broke out with China, and from September the Japanese government introduced strict wartime controls. In that stringent situation, the Railways Ministry informed Nankai Electric Railway that air conditioning was an unnecessary luxury and must not be used aboard trains or buses. Japan's initial air conditioning operations aboard trains and buses thus ended after one summer. As an aside, a Japanese-style restaurant located in the Shinsaibashi part of Osaka installed one 2hp "Mifujirator" on an experimental basis and it became popular. But customers in a department store in the Nanba part of Osaka showed little interest in the air conditioning equipment on display for use in homes. Leisure facilities accounted for the majority of "Mifujirator" installations, followed by those in use aboard merchant ships and various other types of ships.

Those successes became the background to the installation in February 1938 of "Mifujirator" equipment using fluorocarbon in the Kure Arsenal of the Japanese Navy, located not far from Hiroshima. At the time, Kure was a key naval port facing the Seto Inland Sea. The test operation of the "Mifujirator" equipment, held at the Kure Arsenal, was successful. The equipment was also successfully tested at sea aboard a submarine. General Motors in the U.S., meanwhile, owned the patents in Japan related to producing

Yodogawa Plant, 1952

and using fluorocarbon, and they refused to let either OKK or the Japanese Navy utilize those rights. In the end, in January 1941, the Minister of the Navy in Japan decided to expropriate GM's rights to "Freon" in Japan, and ordered it to be produced locally. Actually, the expropriation was not carried out until right after war broke out between Japan and the U.S. on December 8, 1941.

Production of fluorocarbon at the Imamiya Factory was only 430 kg/month, which made it impossible to meet the rapidly rising demand from the Navy. In that situation, the Navy decided to install and directly oversee the chemical facilities inside the new Yodogawa Plant. After completion of the new plant in July 1942, the chemical facilities in the Imamiya Factory were immediately transferred there, and the plant began producing fluorocarbon. The "Mifujirator" freezers using fluorocarbon were built at the Sakai Plant, and deliveries to the Navy began from there in 1941. Initially, a priority was placed on installing "Mifujirator" equipment aboard submarines and aircraft carriers. Afterward it was installed aboard all newly built vessels. At the same time, the non-military demand for fluorocarbon rose dramatically. OKK expanded the Yodogawa Plant to accommodate demand, and its fluorocarbon production reached 2.95 tons/month in the autumn of 1943 and 4.75 tons/month one year later. Shortages of materials,

Sakai Plant, 1952

however, caused expansion difficulties soon after. And when U.S. planes began bombing Osaka from March 1945, fluorocarbon's production volume dropped sharply.

The No. 2 Imamiya Factory began producing fuses, bullets, and lubricators from June 1934. It was a large plant fitted with the most up-to-date equipment, such as processing machines equipped with motors. The Japanese economy, meanwhile, recovered quickly from the worldwide depression of the time. Following the Manchurian Incident in September 1931 and Japan's subsequent invasion of mainland China, the nation's economic recovery progressed rapidly based largely on military demand. That time coincided with OKK's search for a location for a new plant. Sakai City, meanwhile, located on the coast just south of Osaka, was preparing a large tract of land for industrial use, and that's where OKK purchased land in late1935. The new plant would thus not be very far from the Imamiya Factory. In February 1937, OKK officially named the new plant the Sakai Plant. By 1938, ten buildings were gradually erected, including a forging plant, a repair plant, an office, warehouses, and a dormitory for employees. The production of freezers, fuses, shells, warp tying machines, lubricators, and other items was moved there from the Imamiya Factory. Based on an order from Mitsubishi Heavy Industries, the Sakai

Plant began developing its first new product, a device to fit aboard land-based fighter planes to absorb shocks to the landing gear during take offs and landings.

For some time the plant received orders from Kawasaki Aircraft Industries to produce airplane tail assemblies and various other body parts. Then, in 1940, it received substantial orders from Kawasaki for landing gear shock absorbers, which contributed toward increasing the plant's production of shock absorbers.

Two years earlier, in 1938, OKK received orders from Army Air Force Headquarters for control parts and finished parts for army aircraft. To complete that order, OKK rushed to build another plant for producing aircraft components. It thus purchased 660,000 square meters of wet paddy land northwest of Osaka along the Yodogawa River. That facility was named the Yodogawa Plant. It is still in operation today and includes a chemical plant and a plant producing hydraulic equipment and defense systems. Prior to starting operations there, a trade school was established on the site in April 1940 complete with a training plant for young workers. The first class had 350 workers. Around this same time OKK also established a 5-year trade school and a facility for training technical personnel. Those efforts were aimed at educating young workers in order to cover the severe shortage of technicians. In November 1940, just prior to completing construction of the Yodogawa Plant, OKK moved its headquarters to the mainstay Sakai Plant. Fluorocarbon's production, meanwhile, was moved from the Imamiya Factory to the Yodogawa Plant. The company thus concentrated its main production businesses in the Sakai and Yodogawa plants.

OKK began its all-out production of diesel engines in 1942. The company also began producing Hesselman engines for use in oil exploitation. In October 1943, even as the war situation wors-

ened, those engines were used aboard Army submersibles. The Army, meanwhile, issued a strong directive for increased aircraft production. For its part, OKK built a new plant in Kanzakigawa and began producing airplane tail assemblies there. OKK also greatly increased its production of propeller governors for use with Army aircraft. The quality of the governors was said to relate directly to the aircraft's performance. For its part, OKK practically monopolized the production of hydraulic governors. Also, based on a direct order from the Army, in August 1944 OKK began assembling fighter planes at the Yamatogawa Aircraft Assembly Plant. In conjunction with the increased production to meet military demand, it became necessary to maintain close communication with public offices, and OKK thus also opened an office in 1942 in the Abeno part of Osaka. That office was moved in 1944 to Kitahama in Osaka, and administrative departments such as sales and accounting were moved there from the Sakai Plant. The building in Kitahama was the first building that OKK purchased on its own. Although air raids during the war almost totally leveled the downtown part of Osaka, the OKK building in Kitahama was unscathed.

Because of its experience producing for the military and developing fluorocarbon, OKK was able to establish a strong foundation for doing business in the chemical industry. At the same time, the company's technical expertise for producing machines skyrocketed as well. The technical foundation built through production to meet military demand later served the company well in the postwar period when it switched to meeting private-sector demand. In scale as well, the company expanded its operations steadily after its start in 1934, building plants and increasing production mainly to accommodate military demand. When the war ended in 1945, OKK had grown to become a leading medium-sized

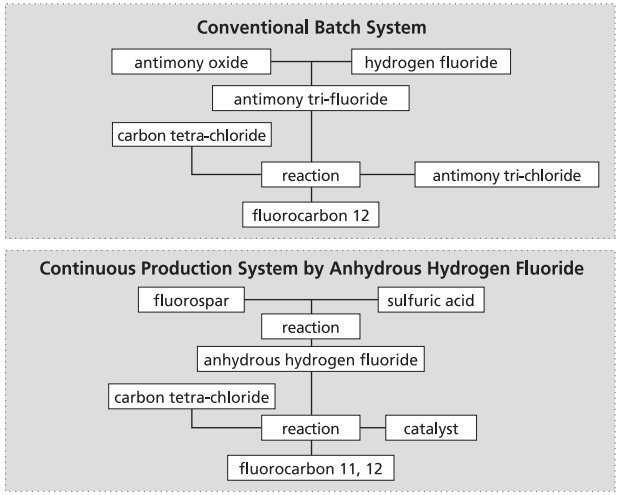
company in Japan's machinery industry. It was listed on the Second Osaka Stock Market in 1941, and that same year its profit versus sales ratio was 24 percent. Observers viewed OKK as a quickly growing, highly profitable company.

In 1930, Frigidaire in the U.S., owned by General Motors, developed a safe refrigerant that included fluorine. In August that year, DuPont and GM jointly established the Kinetic Chemical Company to market the product. They called it "Freon." In 1949, DuPont bought out GM's share in the joint venture. At the time, the product was known worldwide as "Freon". DuPont registered the "Freon" name in Japan in 1953. Daikin, meanwhile, used the brand name "Daiflon" gas (registered in 1961). Though "Flon" is a trademark of Daikin registered in 1960, Daikin informed the Japan Freezer Association that same year that it did not object to the word "Flon" being used as a comprehensive name for the product. Since then, "Flon" is the name that has been used in Japan.

Toward Reopening of Plants after Chaotic Postwar Period

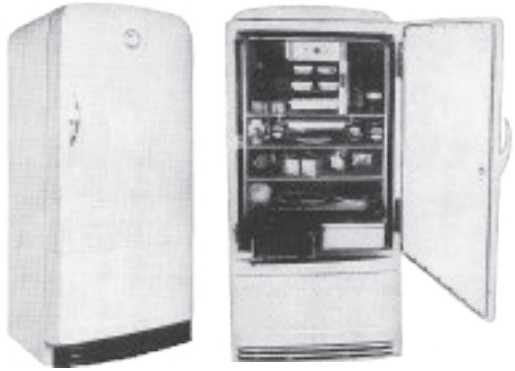
On August 14, 1945, Japan accepted the conditions of the Potsdam Declaration and surrendered unconditionally. The employees of OKK gathered at the Sakai, Yodogawa, Kanzakigawa, and Yamatogawa plants to listen to the Emperor's speech over the radio at noon the following day. The factory managers thanked the employees at each plant for their cooperation. Besides expressing the company's appreciation, the managers promised the employees payment of their salaries and severance pay at a later date. There were 16,500 employees, including 4,800 at the Sakai Plant, 7,400 at the Yodogawa Plant, 1,800 at the Kanzakigawa Plant, and 2,500 at the Yamatogawa Plant. Of that total number, 10,000 were employees of OKK, and 6,500 were students mobilized to work at factories, part-timers, and transfers from other companies. Other than

Outline of Fluorocarbon 12 Production Process



a section of the Sakai Plant producing air conditioners, freezers, and engines for naval vessels, all the plants had gradually turned toward specialized production of artillery shells, bombs, aircraft, and some other military items, and with the end of the war it was impossible to continue production. In late August, the plants laid off all their employees except for a select few to deal with whatever business remained. The Occupation Forces then took over the Yamatogawa and Yodogawa plants, the Tokyo Office, and the Head Office Building, marking a start to the difficult postwar period in Japan.

On August 30, 1945, General Douglas MacArthur and the Occupation forces landed and began establishing U.S. Occupation policies in Japan. In the immediate postwar years, most of Japan's munitions factories used leftover materials to produce pots and pans for use in homes, as well as hoes, sickles, and other farm implements. They also produced a variety of general goods, and moved quickly to adapt to production to meet civilian demand.



Electric Refrigerator for Occupation Forces in Japan

OKK was no exception. Its plants used leftover aluminum alloy and other materials to produce pots and pans, office desks and chairs, and household furniture. Employees, meanwhile, utilized vacant lots on the plant premises to grow vegetables. Though barely subsisting, they made it safely through the difficult postwar period. In October 1945, the Occupation Forces requisitioned the Yodogawa Plant. Only afterward was it learned that OKK was the only company in Japan with the technology for producing fluorocarbon. Subsequently, in March 1946, the Yodogawa Plant received its first order for fluorocarbon 12 from the U.S. military, and in July the plant was returned to OKK. Earlier, in February, the Sakai Plant was permitted to shift to production of consumer goods, and it received orders in April to produce refrigerators for use by U.S. military personnel and their dependents. Afterward, the company gradually added the production of freezers, lubricators, internal combustion engines, and various types of valves. OKK's creative technology turned out to be indispensable in the daily lives of the Occupation Forces. That made it possible for OKK to recover relatively quickly during the chaotic postwar period, and the company shifted production to meet domestic demand.

Sadaji Masuda

Vicious domestic inflation exacerbated the economic difficulties Japan experienced after losing the war. In line with the wartime Law Concerning Companies Supplying the Military, the government compensated Japanese companies that supplied the military for losses they incurred. For that purpose, large amounts of paper money had to be printed. That additional money in circulation served to accelerate the already worsening inflation. In November 1945, GHQ ordered an all-out freeze on compensation to companies for wartime production, and established a new property tax to eliminate wartime profit and set Japan's finances in order. Upon receiving that directive from GHQ, the Japanese government officially decided in August 1946 to end compensation paid to companies that sold products and services to the military during the war. As for corporate losses incurred based on that decision, the government introduced interim measures, such as the Corporate Rebuilding and Reorganization Law. In line with that and other laws, OKK divided its books into old and new accounts, and liquidated its old accounts. GHQ, meanwhile, designated OKK's Sakai, Yodogawa, and Kanzakigawa plants as reparation assets to the Allied Powers. At the time, however, OKK asked that the Yodogawa Plant be removed from that list because it had begun utilizing its facilities to supply the Occupation Forces with fluorocarbon. President Yamada's son-in-law Sadaji Masuda and

other younger employees successfully negotiated with GHQ. Actually, Masuda had been a director in Daido Steel Works but left that company to join OKK. He travelled frequently between Osaka and Tokyo to negotiate with GHQ and Japanese government authorities. Unfortunately, he had a fatal accident on the way back to Osaka from Tokyo in March 1948. He was only 41 years old.

In 1949, the Cold War relations between the U.S. and U.S.S.R. worsened, and the requisition of facilities in Japan as reparations to the Allied Powers was halted. Prior to the halt, four presses from OKK facilities had been removed and handed over to the Occupation authorities. Even afterward, all facilities designated as reparations payments were placed under the supervision of the Japanese government. They were not removed from the reparations list until after the Peace Treaty of San Francisco went into effect in April 1952.

Prior to that, in April 1946, the Yodogawa Plant began producing fluorocarbon 12 for delivery to the Occupation Forces. The plant also obtained permission in September to provide fluorocarbon 12 for civilian use as well, thus allowing partial operation of the Yodogawa Plant. Fluorocarbon 12 OKK delivered to the Occupation Forces was a special procurement and was assessed at a high price. Fluorocarbon 12 was a most important business for OKK and accounted for about half of the company's sales between 1947 and 1949.

GHQ's Occupation policies promoted Japan's democratization. Dissolution of the zaibatsu and agricultural reforms were soon followed by democratization of the labor movement. In December 1945, the Labor Union Law, modeled after U.S. labor laws, came into effect, thus liberating the labor movement from wartime governmental suppression. In OKK as well, labor unions were organized in 1946 one after the other in the Sakai, Yodoga-

wa, and Kanzakigawa plants. Those three unions, plus the Head Office union, joined together to form the OKK Union Alliance. In 1947, the company and the Union Alliance signed a labor agreement.

Even as those events were unfolding, severe domestic inflation struck directly at the daily lives of OKK's workers. Negotiations between OKK and the labor union became extremely difficult. Besides business turning terribly sluggish, in November 1948 the Occupation authorities ended all orders to OKK for refrigerators. Not long after that, OKK introduced its First Business Reorganization Plan, and laid off about 200 excess personnel. At the end of 1948, the OKK Labor Union demanded a special year-end payment, and its members went on strike. OKK responded by locking down all its plants. The two parties eventually reached an agreement in which OKK paid workers a special year-end bonus equal to 150 percent of what the company proposed. Afterward, however, the union was unhappy with the company's inability to recover its business, and the relations between the two parties continued to be confrontational.

Although the fluorocarbon business was vital for OKK's business recovery, in June 1949 the Occupation forces informed the company that it would not be ordering any more fluorocarbon, and would not accept deliveries of back orders. The reason for such a move lay in the nine basic rules GHQ had presented to the Japanese government in order to combat the inflationary spiral of the time. Those rules resulted in GHQ introducing strict restrictions on their own orders for goods and materials. OKK had expanded its facilities to handle large orders from GHQ, and suddenly faced highly adverse circumstances. In that situation, OKK introduced its Second Business Reorganization Plan. Following a severe labor struggle the company laid off 267 workers in September 1949. The company faced a dire financial situation, and was placed under the supervision of the Osaka Bank in 1949. It was also forced to dispose of assets in order to repay its borrowings. While under tremendous financial pressure, OKK could not avoid delays in the payment of employee salaries. The company set itself apart from other companies, however, by never failing to pay their workers, even though payment might be tardy. Such company efforts ultimately led to creation of a relationship of trust between management and labor. After the second round of business reorganization, relations improved further between the two parties, leading to bolstered production.

The deflationary economic policies of Joseph Dodge introduced In March 1950 in Japan brought about a serious economic depression. OKK once again found itself facing the danger of bankruptcy. In response, the company introduced five rationalization items and laid off 250 workers. That was the third time for OKK to lay off workers. As a result, the total number of workers in April 1950 dropped to 438, a reduction in two years to less than one-third the size of the original work force. After experiencing the three layoff periods, Minoru Yamada (later, president) said: "I could not help but be filled with a sense of futility and I felt unsettled. I wondered whether it was proper for companies to continue the cycle of laying off workers when business was bad and hiring them when business was good. My conviction was to make OKK into a company that never again had to restructure itself and lay off workers."

Acquisition of "Freon" Patent

In September 1949, OKK received orders for fluorocarbon 11 from the U.S. military for use on American bases being built on Okinawa. That occasion marked OKK's first production of fluorocarbon

11. In 1950, however, Mitsui Chemical won the bid for supplying the U.S. military on Okinawa with fluorocarbon 12. In April 1951, however, OKK won the bid over Mitsui Chemical by a slight margin of $1.00 per pound. Although DuPont owned the rights to "Freon", special laws were in effect in Japan during the war and those rights were ignored. In August 1949, however, the Allied Powers reinstated DuPont's ownership of "Freon" in Japan. Not long afterward, DuPont contacted OKK about marketing "Freon" in Japan. OKK recognized the great opportunity, and the two companies negotiated an agreement in June 1951 that gave OKK the right to produce and sell "Freon" in Japan. The initial agreement was effective until March 1957, and during that period OKK was the sole company in Japan responsible for manufacturing and selling fluorocarbon.

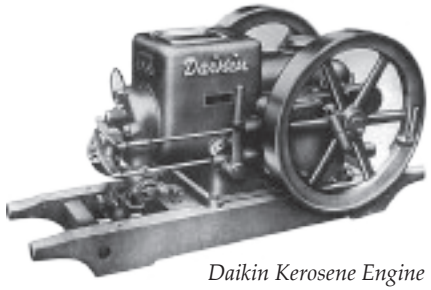
From around the time that OKK obtained the right to produce and sell fluorocarbon in Japan, members of the Occupation Forces started bringing aerosol-type insecticides from the U.S. into Japan. The use of fluorocarbon shifted from use only as a refrigerant to being an aerosol product as well. Refrigerants also gradually shifted away from methyl chloride to fluorocarbon, and the demand for fluorocarbon expanded afterward. In response, OKK started producing fluorocarbon 11, 12, and then 22. The company hired more young workers and assigned them to study and conduct research in the fluorine industry. With a keen eye on the future, this type of forward thinking by the company soon came to life as R&D in fluororesins.

In January 1946, meanwhile, the company in charge of importing goods and materials for the Occupation Forces asked OKK if it could develop an ice-making machine. OKK responded positively to that inquiry, and immediately began designing and preparing a prototype machine at the Sakai Plant. Related to that,

the company resumed production of compressors. OKK subsequently received an order for 55 ice-makers and delivered them in August 1946. Also, after receiving orders for electric refrigerators, OKK developed a mass-production system that started operating from March 1947. November 1948, however, saw the beginning of a reduction in U.S. forces in Japan, and the halting of all new orders for refrigerators. Fortunately, prior to that reduction in forces OKK had begun developing the domestic market for refrigerators and other cooling/freezing equipment. In June 1949, the company delivered freezers to the Telephone and Telegraph Office in Toyonaka, Osaka Prefecture, and the Telegraph Office in Mito, Ibaragi Prefecture. With those sales as a start, telephone and telegraph offices throughout Japan began ordering similar equipment.

One major development that directly contributed to alleviating the difficult postwar food shortage in Japan was resumption of deep-sea fishing. With this came ships built larger and faster, and the development of specialized freezers for storing fish while at sea. The cooling and freezing equipment that OKK developed using fluorocarbon was deemed expensive at first but proved its worth aboard training ships and ships that guided fishing vessels. Demand from shipping and shipbuilding companies increased greatly afterward. Among the best-known customers was Nihon Suisan in 1951 for use aboard the Tonan Maru, a whaling ship, and Osaka Shosen (today's Mitsui O.S.K. Lines) in 1954 for use aboard the Brazil Maru, a passenger ship. Both ships were leading representatives of Japan's commercial vessels at the time. Ships flying foreign flags also used OKK equipment, and fitting ships with cooling and freezing equipment developed into a major business.

To support its overall operations, OKK challenged other new businesses in the postwar period. One such business was kero-



Daikin Kerosene Engine

sene engines used on farms. Japan faced an extremely serious food shortage in the immediate postwar period, and an increase in food supplies was a critical government goal. During the war, OKK had begun researching diesel and Hesselman engines, and engineers at the Sakai Plant tackled the development of kerosene engines, closely following technical specifications obtained from the Agriculture and Forestry Ministry. OKK began producing the kerosene engines in September 1947, and in 1949 consigned their sales to the sales agents of an agricultural tools manufacturer. Consumers appreciated the solid performance of the engines, and their sales gradually improved.

The development of agricultural chemicals was another new business that OKK expected to contribute to the increased production of food. In the immediate postwar period, OKK had turned the trade school at the Yodogawa Plant into a combination agricultural and industrial school. In line with postwar agricultural reforms, however, the land was confiscated. OKK then established the Yodogawa Science Institute, mainly using former staff members of the industrial school as instructors. Based on an idea presented by the school's principal, Masaaki Tokunaga, and encouraged by Professor Yoshiyuki Inoue (father of Daikin Chairman Noriyuki Inoue) of the Agricultural Department of Kyoto University, OKK began the development and sales of agricultural

chemicals. Those operations began in 1948 with a mercury-based agricultural chemical and the selective post-emergent herbicide 2,4-D, but immediately faced difficulties such as product quality and patent problems. In that trying situation the company decided instead to develop fluorine-based agricultural chemicals to utilize basic technology it already owned.

In that way, in February 1950 the company developed a pesticide for killing rats using monofluorine acetate natrium. Called "Furatol", it proved to be a superior product for killing rats in rice fields, wooded areas, and food storage warehouses, thus contributing to Japan's agricultural production recovery. As OKK developed products in the agricultural chemical industry that made good use of fluorine technology, that business expanded to become an important part of the company's overall chemical products business.

A close relationship developed between OKK and the Agricultural Department of the University of Kyoto based on agricultural chemicals, thus opening a new page in the company's technological tradition. At the time, the University of Kyoto boasted of the most advanced research in high-polymer chemistry in Japan. With introductions from Professor Inoue, graduates of the university's Chemistry Department joined OKK and became a strong force in the development of fluororesins. In the identical way that graduates from the Engineering Department of the University of Tokyo joined Minoru Yamada in the old OKK and carried the company forward, the young graduates from the Chemistry Department of the University of Kyoto formed a pillar in the area of chemistry in the new OKK.

In terms of business results, OKK faced continual difficulties in the postwar period. In July 1949, for example, the government approved OKK's Reorganization and Readjustment Plan as a spe-

cial accounting company, thus allowing the company to report extraordinary losses by disposing of assets to cover losses and reducing its capital. As a result, the company's capital was reduced to 45 million yen. Meanwhile, loans from banks increased considerably, and from 1949 to March 1953 the company was placed under the control of the Osaka Bank (later called the Sumitomo Bank; today's Mitsui Sumitomo Bank). Assets that OKK obtained during the war were disposed of and the resultant funds were applied to paying off the bank debt. Of total sales of 512 million yen recorded between August 1946 and July 1949, the Chemicals Division accounted for 55.7 percent of sales and listed profits of 71 million yen. During the same period, the overall company reported a loss of over 23 million yen. Business results during the immediate postwar period fluctuated because of unstable orders from the U.S. military, and sales of fluorocarbon produced at the Chemical Works inside the Yodogawa Plant narrowly managed to keep the company afloat.

In 1950, companies in Japan faced trying financial circumstances related to rampant inflation. In that situation, the Japanese government enacted legislation that allowed companies to reevaluate their assets. In that backdrop, OKK created a reevaluation reserve account that let it to compensate for carried over losses and finally regain normalcy in its accounting system. Around that time, the Japanese economy began to improve in the context of increased demand related to the Korean War that started in June 1950. Business with the U.S. military increased, including sales of fluorocarbon, and OKK's business results finally turned toward recovery. For the period ending in September 1951, the company reported a profit of 5.4 million yen, signaling an end to the long and difficult postwar period. It was as if the sun had started shining again.

Resumption of Business Ties with Sumitomo Metal Industries

The Japanese economy recovered from the misery of the Second World War around 1955, almost exactly ten years after the war ended. Following the signing of the Peace Treaty of San Francisco in 1952 between the Allied Powers and Japan, Japan returned to being a member of the international community of nations. As well, based on the Japanese government's aggressive fiscal policies, business conditions then turned brisk. Riding the wave of worldwide business expansion starting in 1954, Japan's gross national product (GNP) expanded at the highest rate in the world. From around 1955, the substantial production value of many industries in Japan recovered to their prewar levels. In fact, they did not stop with merely recovering to prewar levels but technological innovations led to economic growth and, subsequently, to high economic growth that then continued for over 20 years.

Through the import of technology from other countries, existing industries such as the metals, chemicals, and machinery industries that had fallen behind moved to catch up to their counterparts in the advanced industrial nations of the West. Industries that utilized technology developed during and after the war, meanwhile, such as high polymer chemicals, electronics, and nuclear power, introduced advanced technology and in a single leap modernized themselves. The prewar Japanese economy depended mainly on light industry, and cotton spinning in the top position among all industries, but prolonged periods of capital investment in technological innovation led to great leaps forward in the chemical and heavy industries. Once into the 1960s, exports from the electrical home appliance and shipbuilding industries led an economic upturn, and Japan subsequently caught up with the advanced industrialized nations.

In August 1951, soon after talks began to end the Korean War,

OKK learned that the U.S. military planned to procure artillery shells from Japanese companies. Based on renewed orders for fluorocarbon, OKK was gradually moving toward recovery, but business remained difficult and it viewed orders from the U.S. military as a chance to break from its business dilemma. OKK had experienced difficulties in the past related to the instability of such procurements, but in the context of the challenging circumstances facing the Japanese economy, President Yamada was firmly convinced that the company should accept the orders. He said, "This is the sole chance we have to break through the current situation and rebuild our company." He met with the company's top managers, who were concerned about the danger of accepting orders for special procurements from the U.S. military, and he took the lead in pulling together OKK's overall capabilities while moving forward with preparations for accepting the order. In the end, two companies, OKK and Komatsu Ltd. won the orders. To fill the orders it was necessary to invest at least 150 million yen in new equipment. OKK's main bank at the time, the Osaka Bank, told OKK that the upper limit for any loans was 50 million yen. In the end, OKK borrowed that 50 million yen, and won cooperation from the trading companies handling the raw materials to assume the 10 million yen cost of the materials until after OKK received payment. The remaining 90 million yen needed would be raised through recapitalization. Just about that time, OKK approached Sumitomo Metal Industries (SMI) about renewing the former equity ties they had. SMI was on the verge of postwar recovery, and moved to bolster ties with companies in its former group. OKK, meanwhile, hoped the ties would be the springboard for breaking from the shell of family management and strengthening its corporate foundation. Director Minoru Yamada (eldest son of President Akira Yamada; third president of Daikin) wanted to establish the

ties with SMI and made a proposal at a Board of Directors meeting saying "Rather than depending on old blood, we should inject new blood into the company." Those words expressed his strong conviction that renewed ties with SMI were in OKK's best interest. Meanwhile, SMI's Board members opposed the proposal at first but at the end of August voted to accept it. OKK's Board voted to recapitalize in November, and in the context of the renewed ties, SMI kept 800,000 of OKK's total shares, about 30 percent of the increased capital. Despite OKK's generally unfavorable business situation, investors viewed news of the renewed relationship with SMI favorably and the tripling of capital progressed smoothly.

OKK purchased the material to produce casings for a U.S. military mortar shell order from SMI and Kokura Steel. It produced the fuses at the Sakai Plant, the shell casings and fin assemblies at the Yokogawa Plant, and separately commissioned Nippon Oil & Fats Co., Ltd. (today's NOF Corporation), to produce the explosive powder. In order to make effective use of its limited plant and equipment investment, OKK approached the order for mortar shells by first analyzing the necessary processes, then establishing average processing times, and finally rearranging all the processes to meet the average processing times. For that purpose, OKK introduced innovations and technology to complete its assembly operations, including the improvement of machine tools and specialized jigs. It also developed important technology that utilized high-frequency waves for instantaneous tightening of the mortar shell heads, painting using a conveyor belt, and an electrostatic painting device using infra-red drying. The ability to establish the foundation for production technology based on trial and error efforts in process control and technology development can be called a part of OKK's corporate DNA. Production of the mortar shells progressed smoothly, and the first

prototypes completed in February 1953 passed inspection. OKK completed delivery of all orders, including the additional ones, by December.

The high grades the U.S. military gave OKK for the first order of shells led to further orders, including those for different types of artillery shells. The total reached an amazing 1.7 million mortar shells. One step that OKK took to respond to the military orders for additional shells was extensive expansion of its Yodogawa Plant. Also, in December 1953 the company increased its capital to 270 million yen. The special procurements to the U.S. military, however, ended with deliveries completed in July 1956. Based on OKK's previous experience with the sudden end of special procurements by the Occupation Forces in the immediate postwar period, the ending of special procurements in 1956 was not entirely unexpected. In fact, being able to meet the requirements of the U.S. military in the mid-1950s enabled OKK to improve its production management capabilities in both tangible and intangible ways, such as by cost management, cost reductions, modernization and rationalization of production facilities, and delivery management. The company also grew rapidly in size: its capital in 1956 was 600 million yen, and it had 2,000 employees. In 1954 its rate of dividends payments was 20 percent, making it an outstanding corporation.

Management of the large-scale business that accompanies rapid growth could not be accomplished by the methods in place at the time. It became essential for OKK to introduce business reforms, including new internal organizations, new labor relations, the rationalization of administrative work, and the education and training needed to develop human resources capable of responding to new technology. In November 1952, Hiromu Kasuga was elected chairman of the board of OKK, and Yoshio Tsuchiya was

elected senior managing director. Both men had been seconded from Sumitomo Metal Industries, and they were crucial for introducing modernized American-style business management technology to OKK's operations. The main emphasis of the reforms was strengthening top management, and to that end a series of measures was introduced, including the holding of regular board meetings, establishing a modernized control organization, and clarifying management's authority and responsibilities. At the time, moreover, because there was much work that required tough price controls it was necessary for employees to have a sharper awareness of what price controls meant. OKK studied this matter thoroughly and introduced many new ideas to its employees.

During that period, meanwhile, OKK developed two advanced products. One was air conditioners from the freezing equipment division and the other was fluororesins from the fluorine-chemical division. Although the end of orders from the U.S. military affected OKK negatively, the influence on the company was minimized by its ability to switch gears consistently to meet private-sector demand.

From the second half of the 1950s, the Japanese economy entered a period of high-level growth, best described in the government's annual economic white paper as "Investment begetting investment." Based on plant and equipment investment, technological innovations progressed rapidly. Volume production of new products and automation of production were the two main factors supporting that growth. Based on those two factors, home appliances such as television sets, electric refrigerators, and electric washing machines were supplied in large volumes at low prices. The daily lives of ordinary Japanese people changed in a short while and became more sophisticated. Amidst high-level economic growth, wages and income rose and both became standardized.

Under the slogan "The consumer is king," a society emerged based on mass consumption.

OKK's products were not necessarily aimed at mass consumption, but in response to business trends the company switched its focus to consumer demand and modernized its management. OKK established a comprehensive budget system and was soon benefitting from it. From 1959, the company focused on improving production management and quality control management by forming study groups on production control methods and establishing QC circles. From 1960, management and labor representatives met regularly for discussions, using the occasion to have labor union perspectives reflected in management. It was around this time that labor councils began appearing in Japanese companies, a system that contributed significantly to the maturing of labor-management relations, to the greater democratization of management, and to closer cooperation between labor and management.

In January 1960, moreover, OKK established a long-term business plan that aimed at doubling the company's labor force to 5,000 workers by the end of 1964, tripling the company's capital to over 5.4 billion yen, and increasing sales five-fold to 25 billion yen. In the backdrop of the highly favorable business conditions that continued from 1959 to 1961, the company's financial results during the first half of the long-term business plan proceeded smoothly. From July 1961, however, the government introduced a tight money policy, and business conditions turned sluggish. In that new situation, the company's total sales languished, reaching only 75 percent of the business plan's goals.

As the company shifted its sales goals in the postwar period toward meeting private-sector demand, its mainstay products became widely diversified, including fluorochemical products, vinyl

Party to Celebrate Name Change of Company on 40th Anniversary

chloride construction materials, air conditioning and refrigerating equipment, agricultural machinery, and products related to hydraulic equipment. Although the company's sales network expanded to cover all of Japan, meanwhile, the company's official name continued to have "Osaka" in it. The Osaka name seemed to be negatively affecting sales in the Kanto area, including Tokyo, the company's largest domestic market. Actually, the name Osaka Kinzoku Kogyo Co. had been shortened to "Daikin," and it was often used as the company's trademark, such as in Daikin Airconditioner. In 1963, on the company's 40th Anniversary, its official name was changed from Osaka Kinzoku Kogyo Co., Ltd. (OKK) to Daikin Kogyo Co., Ltd. (changed again in 1982 to Daikin Industries Co., Ltd.) Unifying the company name and trademark was a good PR move, and achieved the overall objective of raising the company's corporate image.

With the new name, Daikin also broke from its image of being a family company. In January 1965, President Akira Yamada, the founder of Daikin, assumed the company's chairman position, and Executive Vice President Yoshio Tsuchiya became president. Tsuchiya entered Daikin from Sumitomo Metal Industries as senior managing director, and for 13 years he was at President Yamada's right side, handling important responsibilities such as


Chairman Akira Yamada (left), Second President Yoshio Tsuchiya (right)

modernizing the company's business. After assuming the presidency, Tsuchiya exerted even greater reform efforts in two areas. One was the company's withdrawal from the unprofitable agricultural machinery and construction material businesses. Daikin entered the agricultural machinery business in 1947 and for close to twenty years realized solid profits. The company's construction materials business, meanwhile, began in 1947 when Daikin was supplied with materials from Sumitomo Chemical and commercialized vinyl chloride pipe. From the mid-1960s, however, many other manufacturers entered these two businesses and competition heated up dramatically, leading to a sharp drop in prices and worsened business results. Daikin decided to withdraw from these businesses around 1970. At that time, the company did not call for early retirements and did not lay off any employees. Instead, the company concentrated its personnel and capital investments in the air conditioning and other machinery divisions, two areas experiencing considerable growth within the company. By doing so the company aimed to strengthen its overall structure.

Daikin's second major business reform was the introduction of a new system of labor affairs management. Labor and management relations were confrontational and strained in the past but after the company overcame its management crisis in 1952, the two groups established and maintained a cooperative relationship. After the Osaka Kinzoku Kogyo Federation of Labor Unions was established in 1951 (reorganized as Daikin Roren in 1960), labor and management built a new system of cooperation that centered on agreements reached at the Labor Management Council. The supply of special procurements to the U.S. military and the smooth transition toward meeting private-sector demand, as Akira Yamada later said, "… were accomplished only because of the vigorous cooperation of the labor union." In the second half of the 1960s, management proposed and subsequently introduced a system of monthly salaries for all employees, abolished the time card system in 1968, and as a measure prior to introducing a five-day work week, the company introduced a system of not working on designated Saturdays. A qualification system was introduced next, in 1969, as a first step toward adopting a performance-based personnel system. Qualifications were linked to job evaluations, leading to a new system of wages that considered both job evaluation and the seniority system. These human resources and labor management systems were quite progressive when compared to the systems in Japan's major corporations at the time. Minoru Yamada, director at the time and later president, was responsible for building those systems. Yamada was widely recognized for his strong character and insightfulness. From 1970 he served for many years in the Kansai Association of Corporate Executives (KACE) as chairman of the committee on labor issues.

Introduction of the foregoing systematic measures, however, did not mean that labor/management relations turned completely amicable. In divisions such as agricultural machinery and construction materials, where business turned unprofitable and production was halted, workers were reassigned to new jobs, leading to instability in the work environment. As is the fate of chemical plants, society grew more critical of environmental pollution

caused by mishaps in the manufacture of fluorocarbons, and nearby farmers began to intensify their demands for compensation. Such events caused distrust in management to develop among employees. For its part, the labor union was unable to fully grasp the developments. From 1965, the Vietnam War and the second revision of the Japan-U.S. Security Treaty caused a movement to spread among students and young workers protesting the war and criticizing the political party in power. Mirroring the events in society, the Democratic Youth League called on young workers in the Yodogawa Plant to organize and block the production of artillery shells, causing labor regulations to lose their effectiveness. As well, anti-war demonstrations were held on the plant grounds by non-Daikin protestors, escalating the feeling of uneasiness among the company's employees. Daikin moved to resolve these various problems from around 1966. Heading that move was General Affairs Section Manager Noriyuki Inoue (today's Chairman). Inoue's first step was to improve communication with young workers at the Yodogawa Plant. He listened to what made them uneasy at work and to dissatisfactions they had, and then moved to resolve their problems, thus also promoting the normalization of labor union activities at the Yodogawa Plant. Inoue also worked closely with the local community to respond sincerely to grievances related to accidents at the plant. Meanwhile, although Daikin normally guarded its plants closely against visitors, Inoue arranged to open the grounds to the local community for plant tours and for summer festivals, including Bon Odori Dancing. In these and other ways, Inoue steadily promoted mutual understanding between the company and local residents. Anti-war protests, meanwhile, passed their peak around 1969, and labor and management relations at the Yodogawa Plant began moving toward a resolution. The anti-pollution measures that remained,

Bon Odori Dancing Festival at Yodogawa Plant

however, had to wait until after 1970 for implementation. Even as the Oil Crisis worsened, affecting business negatively, Daikin allocated 13 percent of its total investments toward controlling wastewater and emissions.

In 1964, Japan became an Article 8 member of the International Money Fund (IMF) and joined the Organization for Economic Cooperation and Development (OECD), thus winning recognition as a member of the international community. Next, from the mid-1960s Japan entered its second stage of high economic growth, and its GNP became the second largest in the world next to the U.S. On the one hand, Japan was valued highly in the international community because of its rapid growth. At the same time, however, it became the object of international bashing. Additional time was thus needed before Japan could be truly evaluated as an advanced industrial nation. Domestically, meanwhile, Japan's rapid industrialization contributed toward realizing an affluent society but also led to distortions that developed into social problems. A series of court cases related to environmental pollution, establishment of the Environment Ministry, and the popularity of the consumer movement fueled widespread criticism of large corporations. In response to those social changes, in November 1970 Daikin announced its Second Seven-Year Long-Term Busi-

ness Plan. Under the theme of "Challenging Change in the 1970s," the plan listed seventeen items that required attention, including the direction in which the corporation should grow, the development of human resources, cost reductions, establishing a business management information system, and preservation of the environment. For 1977, the plan's final year, Daikin established numerical goals of 200 billion yen in sales, ordinary income on sales of 8.5 percent, and a total of 7,700 employees. Actually, however, with the so-called "Nixon shock" of August 1971 as a turning point, the yen was evaluated upward and business languished, thus frustrating Daikin's long-term business plan. Total sales in 1972 were under 60 billion yen, and the company's profit ratio dropped from 7.7 percent in fiscal 1970, the year the plan was introduced, to 4 percent in 1972. The curtain thus rose on a period of tribulations for Daikin.

Akira Yamada, the founder of Daikin, passed away in February 1973 at the age of 88. As the company's third president, his eldest son Minoru had assumed the company's presidency in 1972, and President Yoshio Tsuchiya had become chairman. In the Preface to his autobiography, Yamada said, "My life was the life of an individual at the same time that it was the life of a company called Osaka Kinzoku Kogyo." It was exactly because Yamada was always able to make bold and rational decisions when facing important situations that he was able to build the foundation for Daikin. That was also why he was able to cultivate for many years a corporate culture filled with a venture spirit.

Establishing Foundation for Air Conditioning Business

The "Mifujirator" that Osaka Kinzoku Kogyosho (OKK) developed in 1951 was Japan's first packaged type air conditioner. In the postwar years, the Ministry of Electric Communications (MEC;

Daikin's First Packaged Air Conditioner, 1951

later became Nippon Telegraph and Telephone Public Corporation [NTTPC], privatized in 1987 to become today's NTT) was conducting the most advanced research into temperature and humidity regulators. OKK was providing MEC with cooling equipment and was benefitting to the fullest by advertising that fact widely. The company also supplied government offices and the private sector by selling and installing cooling equipment for central systems, and heat-pump type cooling and heating equipment. In the fall of 1950, the Japanese economy began breaking from the Dodge Line-related inflation, and a demand for heating and air conditioning equipment emerged from theaters, high-end Japanese restaurants, and other places. But large-scale centralized heating and air conditioning equipment was expensive to install and to operate. A need thus arose for simpler, packaged air conditioning equipment. Besides the freezer equipment from OKK, the Ministry of Electric Communications also imported packaged air conditioners made by Chrysler in the U.S. and installed them in the Honjo Telephone Office in Tokyo. Inspired by the new technology in this packaged air conditioner equipment, OKK immediately established a group headed by Chief Designer Hiroshi Fujioka in the Design Section of the Sakai Plant, and began developing a packaged type air conditioner. In May 1951, the group completed

development of a high-speed compressor first and then a packaged type air conditioner. The first prototype was displayed in the cafeteria of the Osaka Gas Building in Hirano-cho, Osaka, and drew widespread interest.

In 1952 Mitsubishi Electric, and in 1953 Hitachi Ltd. and the New Mitsubishi Heavy Industries, all began producing packaged air conditioners, leading to intensified competition in the domestic market. OKK had previously been supplying NTTPC with central air conditioning systems, but won an order for packaged air conditioners in 1953 for installation in a telephone relay station in Fukuoka Prefecture. That marked the first time for NTTPC to switch from central air conditioning systems to packaged air conditioners. Afterward, OKK products came to account for 70 percent of all air conditioners that NTTPC installed. NTTPC's stringent inspection process contributed much toward improving OKK's air conditioning technology. For compressors, OKK used the Chrysler air conditioner compressor equipment in U.S. military facilities in Japan as a reference, and in 1953 developed a semi-hermetic type in which the motor was mounted inside the compressor casing. Compared to the open type, the semi-hermetic type had less vibration, operated more quietly, and had fewer maintenance problems. Air conditioners marketed in the following year with the semi-hermetic type compressors proved to be popular. R-12 was used as the refrigerant for the 5 hp motor and the more chemically active R-22 was used for the 7.5 hp motor. Because the latter caused more accidents, a side-type hermetically sealed compressor was developed for using the R-12 and it was mounted in 7.5 hp air conditioners. It took 4-5 years before R-22 appeared again. Because of the error in shifting to R-22, the production of compressors was short-lived. Such trials and errors, however, were a first step in technological innovation toward developing a hermetic-type compressor.

Another major air conditioning market that emerged around this time on a par with NTTPC was banking. The Sumitomo Bank and The Sumitomo Trust & Banking Co., Ltd., in particular, were in the same Sumitomo Group and gave priority to OKK in their procurement of air conditioners. Sales also increased to banks in other groups. There were few sales agencies in Japan at the time and most of the company's business was directly with customers. Following the increased sales to banks, business with trading companies expanded, boosting OKK's sales capabilities in the air conditioning field. OKK then quickly took steps to bolster its air conditioning sales organization. In 1956, for instance, OKK selected 52 dealers it was especially close to among those providing air conditioner services, and not long afterward sponsored the First OKK Dealership Convention. The company also contracted with "super dealers" that had nationwide sales networks covering Japan's major cities, thus in a single step expanding the company's sales network to cover the entire country. During the business slump in 1965, however, OKK shifted to a policy of working with special dealers designated as important agents. The company also nurtured new types of agents with design and service capabilities related to the installation of air conditioning equipment, so-called specified sales and installation agents, and agents with trading company functions, such as those conducting wholesale sales. The first such agent was Joyo Daikin Airconditioning Company. Later, other such sales companies were established that also used the wording "Daikin Airconditioning Company" in their names. These were combination dealers and special installation offices. The ten such "special" dealers who emerged by 1972 became key companies in OKK's sales network.

In Japan's first period of high-level growth, changes were

"Cab Cooler" Airconditioner

seen in the demand for freezers. In terms of existing freezers and refrigerating equipment aboard ships as well, a demand emerged for equipment that also controlled temperature and humidity, and cooling and heating. Even in the area of freezing equipment for use in plants, a variety of needs emerged. One such need was for extremely low temperature equipment. In 1952, OKK developed a two-stage compression type device capable of cooling to -45 degrees C. It was delivered to Nihon Suisan's freezing plant. With this as a turning point, OKK received numerous orders for ultra-low temperature cryogenic units, from -40 to -70 degrees C, from the steel and chemical industries. Standards were set for that unit, called "Sub-zero", in 1954. The new product's capabilities expanded rapidly, including for use in tests of metal, rubber, and plastic materials, the freezing of blood plasma and penicillin, the rapid freezing of food products, and the cold storage of chemicals and medicines. An air conditioning unit was also developed for use in the cabins of crane operators. Called a "Cab Cooler" when it was introduced, many units came to be used in the cabs of ceiling cranes in steelworks.

In the medium-size air conditioning equipment market, sales increased for small chillers and single-unit packaged air conditioners for use aboard ships and in plants and large warehouses.

OKK held such a strong position in the market for ai conditioning equipment used aboard ships that no other company could compete effectively. In 1965, for example, OKK installed cooling and freezing equipment aboard the Fuji, the first Japanese ship—a Maritime Self-Defense Forces ship—to participate in new expeditions to the Antarctic. During the shipbuilding boom in Japan around this time, many merchant ships installed Daikin air conditioning equipment. Also, together with the increased use of containers, OKK won an order from Nippon Yusen Kaisha (NYK) in 1967 for refrigerating equipment installed in seagoing containers. The containers were to be stored aboard the Hakone Maru, NYK's first full-container vessel. Other marine transportation companies followed suit and OKK received many orders for similar equipment, making refrigerating units for reefer containers a mainstay product. Demand also emerged for air conditioning equipment aboard buses and freezing equipment aboard trucks. OKK actually developed a wide variety of products, including low-temperature containers for sale to cold chains for storing and transporting vegetables. In these ways, OKK used middle-size and small air conditioners to build a solid business foundation.

At the time, meanwhile, the demand for large air conditioning equipment, as represented by turbo freezers, was steadily increasing in the backdrop of a construction boom for larger and higher-rise hotels and office buildings. But OKK was late in entering this business. Its first product was a large-size turbo freezer it installed in the Ibaraki Plant of Sumitomo Chemical in 1962. While other companies had already developed hermetic-type air conditioning equipment, OKK's products were open-type and did not provide adequate performance. OKK barely secured a foothold in the turbo freezer market. Between the second half of the 1960s and the early 1970s, on the occasion of the Olympics being held in

3,000-Ton Turbo Freezer

Tokyo in 1964, there was a building construction rush. Centered in and around Tokyo, large buildings with underground parking lots were being built one after the other. One result was that air conditioning equipment was located on the roofs of buildings, and the demand was for small-size, lightweight equipment. OKK was late in entering this market and in order to respond quickly to the emerging demand the company in 1964 entered into technical ties with Worthington Corporation of the U.S. and introduced technology for developing a small, light, hermetic-type turbo unit that produced little vibration or noise and was simple to operate. Worthington was ranked among the world's top manufacturers of centrifugal chillers and owned original technology. Through the technical ties with Worthington, the performance of OKK's turbo freezer improved greatly and sales quickly increased. In 1966, OKK built a plant inside the Kanaoka Plant and prepared a system for volume production of the turbo units.

At Expo '70, the World Exposition held in Senri, Osaka, in 1970, OKK installed a 3,000-ton open-type centrifugal chiller for the Festival Plaza, the main gathering spot at the exposition, fitted with a 30-meters-high roof. That success secured OKK's name in the market for industrial-use centrifugal chillers. A year later, in

1971, OKK entered into technical ties with Frigo Scandia Contracting of Sweden related to a device for the rapid and continuous freezing of food products. OKK also entered into technical ties with Bolsig Co. of West Germany for a low-temperature absorption-type freezer plant. Although OKK aimed to catch up technologically in the area of large-size freezers, its actions did not produce the desired results.

Sales of products in OKK's air conditioning division, its leading products at the time, increased about 20-fold between 1955 and 1964, Japan's first high-level growth period. Later, between 1965 and 1972, Japan's second high-level growth period, sales increased again about 5-fold. The Sakai Plant, where the air conditioners, freezers, and heating equipment were being produced, experienced a greater diversification of production, related mainly to an expanded demand for air conditioning. Also, because of an increase in the size of products, such as turbo-type freezers, the plant was continually expanded and new equipment installed until it reached a point of saturation. In 1960, therefore, the company decided to build a new factory for producing cooling and heating equipment, and for that purpose purchased 96,000 square meters of land in the Kanaoka-cho, Sakai City, Osaka. In November 1960, OKK increased its capital to 3 billion yen, and in November 1961 increased it again to 5.5 billion yen. The first stage of construction of the new plant, the Kanaoka Factory, was completed in December 1962 and the start of operations there served to increase 1.5-fold the company's capabilities for producing cooling and heating equipment. In the middle of all this activity, the company changed its name in 1963 to Daikin Kogyo Co., Ltd. ("Daikin"). In 1966, Daikin also moved the production of turbo equipment to the Kanaoka Factory and in 1967 expanded the production capabilities there to about triple the plant's original capabilities.

During Japan's first stage of high-level growth, the market for home electric appliances expanded greatly, including television sets, electric refrigerators, and electric washing machines, at the time called the "Three Sacred Treasures." OKK aimed to enter the home appliance market and to that end developed various products. In particular, because sales of its mainstay products such as air conditioners and freezers tended to be concentrated in the summer months, OKK also aimed to standardize its production by developing and marketing small-size heaters for use in homes. In the second half of the 1950s, most Japanese homes used traditional heating equipment such as kotatsu (a traditional Japanese heater used under a table) and hibachi (a charcoal brazier) in the winter months. Air conditioners and gas stoves were not yet used widely. In that situation, OKK developed and sold a gas fan heater in 1958 that blew warm air to heat a room. As a small heater for use in homes, this gas heater was the first ventilation-type heater used in Japan. From the outside, the modern design looked much like a television set; its body was red, and the grill and hot air exit were cream colored. It was an innovative product for its time. To increase sales of the gas heater, OKK entered into a sales agreement with Matsushita Electric in 1959. Sales, however, failed to expand. The cause of the poor sales performance was an ineffective customer service system. Ordinary homes in Japan at the time were generally drafty and it was difficult to heat an entire room. That led to so many customer complaints that production of the heater was halted in 1961. Actually, the product was too early for its time, much as OKK's hand dryer was too early in prewar Japan. But OKK can be evaluated highly for its optimistic posture in developing new technology.

During the second half of the high economic growth period, three of the main durable consumer products that ordinary Japanese were purchasing were color TV sets, air conditioners, and automobiles. OKK began producing a window-type air conditioners in 1958 but the company's sales agencies at the time were concentrating their sales activities on commercial-use air conditioners and they were ineffective in their sales approach to ordinary households. In that situation, OKK, besides its own brand, provided the window type to OEM for Japan's four largest manufacturers of household electric products, all of whom had their own sales networks for approaching ordinary households. OKK's window-type air conditioner was the first such product that used a rotary compressor, and sales personnel emphasized the product's small size, light weight, dual use for ventilation, and ease of operation. Initial sales progressed smoothly. After a while, though, customers began complaining and the product's price had to be lowered, leading to decreased profits. In 1966, Daikin (name changed to Daikin in 1963) halted sales to the four electric products companies, and reduced production of the window-type air conditioner. At the time, the spread of air conditioners for use in homes had not reached 3 percent. But Daikin saw an increased demand for room air conditioners in the future in Japan and decided to move all out in the market. For that purpose the company built a new plant in 1967 to produce only air conditioners for

Shiga Plant Around Beginning of Operations, 1970

homes in an industrial park in Kusatsu City, Shiga Prefecture. Completed in 1970, the modern Shiga Plant was totally rationalized, and included a conveyor belt system for mass production of home-use air conditioners.

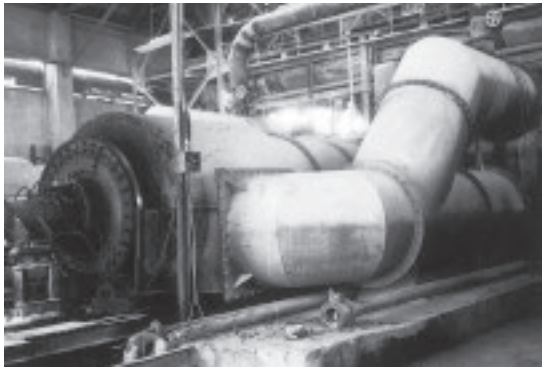
Back in 1965, meanwhile, Daikin produced a small-size, high-performance window-type air conditioner at the Sakai and Kanaoka plants, fitting it with a compressor based on technology it previously imported from Whirlpool in the U.S. The consumer magazine "Kurashi no Techo," known widely for its fair testing of commercial products in Japan, including imports, tested Daikin's product and various other air conditioners, and evaluated it as an A- class product. That improved the brand image of Daikin's air conditioners and led to increased sales. In 1972, moreover, Daikin introduced an innovative multi-room air conditioning system that when mounted outdoors cooled several inside rooms at once. Sales of the product were explosive. Daikin also developed and began marketing in 1970 a home-use combination heater/air conditioner that utilized a refrigerant heater for which Daikin held patents in eight countries. Other companies had similar double-use equipment but their products caused many accidents, which led to a halt in production. Daikin's product, on the other hand, utilized a unique mechanism and caused no problems. It was also power efficient and it continued to sell well. In such ways, Daikin was successful on its second entry into the air conditioning market.

Concerning heaters as well, Daikin developed a variety of products, including a hot water fan blower, a water boiler, and a system boiler, expanding the market from the previous commercial-use machines to those used in ordinary homes. The percentage of heating and hot water central systems used in ordinary homes in Japan was still low but Daikin viewed them as promising next-generation products and promoted the development of a variety of products.

Although Daikin played a pioneering role in the air conditioning field in Japan, its production and sales efforts failed in the areas of drinking water coolers, Japanese tea coolers, and other products used in homes. Even in the company's principal business of air conditioning, competition heated up and other home electronic product manufacturers that turned into major corporations developed high technical capabilities, forcing Daikin into heated competitions. Especially in the field of technical development of hermetic turbo freezers and absorption-type freezers, Daikin lost out to other companies. The Daikin products that had competitive power were chillers and small and medium-size freezers. By building a firm foundation in those areas, Daikin was able later to succeed in the packaged air conditioning field.

Evolution of Fluorine Chemical Technology, and Development of Overseas Markets

Daikin's main business pillar during Japan's period of high-level economic growth was the air conditioning business. From about the mid-1950s, however, fluorine chemicals emerged and gradually propelled the company's growth. In fact, it was around this time that Daikin fashioned its current business structure, with air conditioning and chemicals as its two main pillars. The demand for fluorocarbons began increasing rapidly from 1953, the same year that Japan's home electric appliance manufacturers began switching the refrigerant they used in refrigerators from methyl chloride to fluorocarbon. By 1955, they accounted for 90 percent of all refrigerants used. Besides CFC11 and 12 used as refrigerants—and used with aerosols—two new products, CFC22 and 113, were introduced in response to the diversified needs for use in large



Rotary Kiln for Producing "Daiflon" in Continuous Reaction Process

freezers and as cleaning lotions for semiconductors.

Major innovations were introduced in the production of fluorocarbons. In prewar years, CFC11 and 12 were produced using the batch method with antimony oxide and hydrofluoric acid as the raw materials. Because Daikin procured those chemicals outside the company, it was difficult to reduce prices. In that situation, Daikin began researching how to make changes to produce anhydrous hydrofluoric acid from a continuous response from fluorite. The company had to handle the acid carefully, however, because it was toxic and highly corrosive, and there were also problems related to handling the strongly adhesive gypsum created as a by-product. But through cooperation between the company's chemists and the equipment technicians the difficulties were overcome and volume production of anhydrous hydrofluoric acid began in 1954. Besides reducing production costs considerably, the quality of the "Daiflon" gas (Daikin's product name for fluorocarbon) was stabilized, a problem area since the days when Daikin was doing business with the U.S. military in Japan. The technology Daikin developed at its Yodogawa Plant for continuous production was highly advanced for its time, and combined with the industrialization of fluororesins Daikin won the Seventh Mainichi

Industrial Encouragement Award. The anhydrous hydrofluoric acid was not only used in-house for producing "Daiflon" gas but was increasingly sold externally for uses such as for refining uranium and etching semiconductors. Concerning "Daiflon" as well, in 1963 when the problem of aerosol's combustibility surfaced, Daikin developed and marketed Airflon, a gas combining fluorocarbon and butane. Sales of Airflon expanded quickly.

In March 1957, after DuPont's Japanese patent ran out, Nitto Chemical Industries began producing fluorocarbon, marking the start of a period of competition among fluorocarbon manufacturers, although Daikin continued to hold an overwhelming market share because it was the first company to market it. Besides Nitto Chemical, Asahi Glass also applied to the government to import technology from overseas. The Ministry of International Trade and Industry (MITI) was promoting powerful industrial policies at the time, and did not hesitate to take the lead in developing Japanese industry. Based on the anti-monopoly law, it aimed to improve the monopolistic situation regarding fluorocarbon. At the same time, MITI also considered contributing to the improvement of Japan's foreign currency position, in effect killing two birds with one stone. It thus recommended that Daikin provide Asahi Glass with fluorocarbon technology. In 1962, based on that recommendation, Daikin and Asahi Glass agreed to technical ties, thus introducing a period of fluorocarbon competition among three companies.

Meanwhile, DuPont was successful as early as 1945 in industrializing Polytetrafluoroethylene (PTFE). It was called "Teflon", and DuPont began producing it commercially from 1950. Daikin, meanwhile, used "Daiflon" 113 as the raw material and successfully developed PCTFE (product name "Daiflon"), and in 1955 also successfully developed PTFE. It then began selling molding pow-

der. The price for domestically produced molding powder was very high at 7,000 yen/kg. In comparison, the starting salary in banks for a university graduate was 5,600 yen/month. The major U.S. companies Kellogg and DuPont had worked with fluorochemicals, and found that product quality was not the only problem: price competition was also intense. In order to defeat its competitors, Daikin knew it was necessary to expand the use of this new resin and to reduce cost based on volume. Fluorocarbon, however, was entirely new and much of its molding technology was still undeveloped. Daikin, meanwhile, had in-house molding facilities and researched and developed related technology on its own. It also nurtured and guided other companies starting in the business. In 1954, Daikin organized a group to study fluororesins with the fluororesin processors. The group received subsidies from MITI's Institute of Advanced Industrial Science, and studied production and processing technologies and applications. Daikin not only received an award from the Mainichi Newspaper for its industrialization of fluororesins in 1955, but it also received the Third Agency of Industrial Science and Technology Director- General's Award in 1956. Even at that point, however, numerous issues remained related to the practical application of fluororesins, including improvement of production processes and development of molding technology. Next, in 1958, a group of companies centered on Daikin, proposed official standards for the plastics industry to be disseminated by the Japanese Industrial Standards (JIS) organization. Daikin also played a key role in establishing molding technology and standardizing products. As well, in 1962 Daikin played a prominent role in establishing the Japan Fluororesin Industry Association and spreading the use of established standards.

In April 1955, Daikin successfully developed tetrafluoride ethylene chloride, calling it "Polyflon", and began its all-out production. Together with "Daiflon", meanwhile, the company also began selling fluororesins, eventually turning those sales into a profitable business. "Polyflon" competed with "Teflon", produced by Mitsui Fluorochemicals using technology it imported from DuPont. Then, in 1959, a third company, Nitto Chemical, developed and marketed a similar product it called Tetraflon", leading to competition in the Japanese market by Daikin, Mitsui Fluorochemicals, and Nitto Chemical. Daikin's capabilities for developing technology and its many business successes, however, were recognized internationally. In 1963, for example, Daikin provided the technology for producing "Polyflon" to Thiokol in the U.S., and the technology for producing "Daiflon" gas to Racon, also an American company. At the time, Japanese manufacturers still relied mainly on the import of technology from companies in Europe and the U.S. In that situation, to have a Japanese company export fluorocarbon technology to the U.S., fluorochemical's birthplace, can indeed be called a significant event.

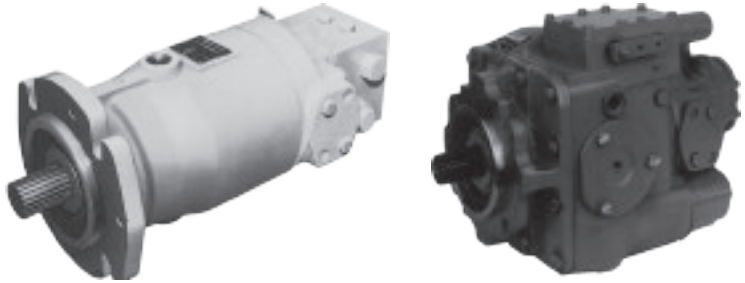
Products Made from "Polyflon"

The year 1963 also saw Daikin successfully develop technology that proved to be a turning point for the rapid growth of its fluororesin business. The technology was developed jointly by Daikin and Professor Haruo Shingu of the University of Kyoto. It differed from the dry method of Du Pont and marked the first

FU-25L Centralized Lubrication Device

time in the world for producing "Polyflon" using the superheated steam method. Daikin applied for a patent in that same year and began producing "Polyflon" from 1967. At the time that "Polyflon" was being developed, fluoropolymers were still highly expensive. Because of the successful development of "Polyflon", however, much lower prices became possible, and a firm business base for the product was finally established. Around this same time, ICI in England filed a protest against Daikin's "Polyflon" patent, but it was struck down.

The diversification of business, using high-level economic growth as a springboard, also applied to the oil equipment business. In December 1949, Hirohata Works of Fuji Steel (later Shin Nihon Steel; today's Nippon Steel and Sumitomo Metal Corporation) requested OKK to repair and replenish OKK's "Rational Lubricator(s)" and imported lubricating devices in strip mills made by Furval Lubrication System, Inc., of the U.S. Based partly on a suggestion by Hirohata Works, OKK developed a completely automatic Furval-type centralized lubrication device. Taking advantage of the boom at the time in constructing water-generated power stations, the company monopolized sales of the lubrication device for supplying oil to a water mill used for generating electricity. Together with the company's oil pressure equipment, the



Hydraulic Transmission: Piston Motor (left) and Piston Pump (right)

lubrication device became a mainstay product in the Oil Equipment Department. In 1953, meanwhile, one lubricating device related to an order OKK received from Kawasaki Works of Nihon Kokan (today's JFE Steel Corporation) was able to reuse previously used oil. Based on that device, OKK developed an improved "forced circulation" oil supply device. It was around the mid-1950s that companies in the steel and paper industries were earnestly investing in the rationalization of their manufacturing equipment. OKK won many of those orders and its sales expanded quickly.

As the demand for Japanese hydraulic equipment increased rapidly, influential overseas manufacturers entered the Japanese market and competition heated up. In addition, since by its nature the industrial equipment field was quickly affected by changes in business conditions, sales decreased in the context of the business recession in the mid-1960s. So it can be said that the industrial equipment field was not stable at that time. In that situation, Daikin (name changed from OKK in 1963) promoted market development in industries other than steel and developed new products. Concerning hydraulic transmissions, for example, in1968 Daikin and Sundstrand Corporation (today's Sauer-Danfoss) signed an agreement for importing technology into Japan. Sundstrand was

the top manufacturer of transmissions in the U.S., and while Daikin paid dearly to introduce Sundstrand's technology into Japan, the times were a period of high economic growth and the market demand was robust for large-size cranes and other vehicles used in the construction industry, including also construction machinery, and industrial-use vehicles and machinery, providing Daikin the opportunity to enter a new field.

Japan's private trade reopened in 1946, while the country was still occupied and generally administered by GHQ of the U.S. Daikin turned to its first postwar exports in the early 1950s, comprising kerosene engines and small-size diesel engines developed for agricultural machinery and sent to the Philippines, Taiwan, and Brazil. The first export of air conditioners was for orders received in 1954 for 150 units of the compact 2hp air conditioner to be sent to Myanmar as part of Japan's war reparations. The first exports of the mainstay 7.5hp air conditioner were in 1957 when Daikin sent two units to Okinawa. With those exports as a start, OKK held an exhibition of refrigerator equipment on Okinawa in 1958 and established a sales agency there. Afterward, the company's export markets expanded to Taiwan, South Korea, and other countries. In the area of fluorine products as well, the company exported fluorocarbon to Okinawa to display in 1958 at an exhibition of refrigerating equipment. With those exports as a start, OKK shipped "Daiflon" gas to Taiwan, Hong Kong, Singapore, and South Korea. A little later, in 1961, the company received an order from Kuwait for "Daiflon" gas.

Daikin's exports began to expand in earnest from 1960. The total value of exports in 1960 was 37 million yen, but two years later the value jumped to 156 million yen. To cope with the increased exports, the company established an Export Section in 1963, and tackled the development of overseas markets. Daikin

was the company's new name by that time and in 1963 the company established an export section and began developing overseas markets. In 1966, Daikin established a technical assistance agreement with Delta Motors, the agent in the Philippines of a major Japanese automaker, and began the knockdown production of window-type and split-type room air conditioners. Its sales of those air conditioners proceeded smoothly and later the two parties agreed to broaden the product range of the technical agreement to cover Daikin's entire product line. Next, in 1969, Daikin entered into a technical agreement with Fred Clark Ltd., a kitchen equipment manufacturer in Australia, and established Clark Daikin Co. a joint venture for expanding the sales of Daikin products in Australia. In the following year, 1970, Daikin entered into a technical assistance agreement with Sung Juong Co., q1 a manufacturer of switches in South Korea, and began exporting the main components for packaged air conditioners for assembly production. The company's market share increased afterward until it eventually came to exceed 60 percent. By 1970, Daikin was selling not only air conditioners but also hydraulic equipment and had expanded its sales network worldwide.

In 1966, an Englishman named R. C. Higgs, the owner of an agency handling home electrical appliances, visited Daikin's head office and presented an enthusiastic and convincing case for Daikin to enter Malta. That visit tied directly to Daikin's entrance to the European market. Up to that point, Daikin had not considered entrance to markets in the Western countries, but the demand for air conditioners was expanding rapidly in Malta and if Malta were developed into a base of operations it would become possible to export to Western Europe and northern Africa. With the backdrop of that future potential, Daikin decided to invest in operations in Malta. As a result, Higgs established Daikin Airconditioning

R.C. Higgs at Osaka World's Fair in 1970 (left)
Daikin Airconditioning Company (right)

(DAC) in 1966. Then, in 1968, Daikin invested equity in DAC and the company became a joint venture. Daikin then began exporting air conditioners, water chilling units, and other items to DAC. Afterward, sales of air conditioners to countries in Europe expanded steadily, eventually accounting for a higher percentage of the business in Daikin's export division.

DAC conducted vigorous sales activities and established sales agencies in fifteen European countries, including Belgium, France, Great Britain, Italy, the Netherlands, West Germany, and nine other countries. Total sales in 1970 were 510 million yen. When the Expo '70 Osaka World Fair was held in 1970, Daikin hosted its first convention for overseas distributors, also in Osaka. Representatives from thirteen countries attended the convention, allowing them to deepen their business relationships. Around this same time, Daikin began considering building a plant for the knockdown assembly of air conditioners in Ostend, Belgium. EC unity was being strengthened and the outlook was clear that restrictions would be placed on exports into Europe from outside the EC area. For those reasons, and because it considered building a plant there, Daikin began an analysis of the situation.

There were many incentives for Daikin to enter Ostend at the time, including favorable tax treatment from the Belgian government. Also, the location Daikin was considering was conveniently located close to an expressway that cut across Europe, and a ferry connection was available from there to England, Daikin's main market in Europe. Land prices, meanwhile, were almost one-tenth the price of land in Japan where prices were increasing rapidly, and a quality labor force resided in the surrounding area. In 1972, Daikin and DAC jointly established Daikin Europe N.V. (DENV), capitalized at 25 million Belgian francs (175 million yen). Daikin provided 80 percent of the total capital. After President Nixon of the U.S. announced a halt to the direct convertibility of U.S. dollars to gold in August 1971, the Japanese yen appreciated rapidly. Since the yen appreciated versus the Belgian franc as well, the timing of Daikin's investment was outstanding

Newly Established Daikin Europe N.V. (DENV)

In January 1973, DENV completed construction of a plant with 5,000 square meters of floor space. The company then immediately began production of small packaged air conditioners, both water and air types. Because winters in Europe are mostly cold, the demand for air conditioners there is generally weak, and in the early 1970s no dominant European air conditioning manufacturers had yet emerged. As well, it would be a tremendous task to prepare the ducts and water piping required for air conditioning in the many historical buildings in Europe. Among its products,

however, Daikin had non-duct, separate type air conditioners, providing it a fine opportunity for an all-out entry into the European market. In these ways, entry into the EC market, centered on DENV, was shaping up to be the first step for Daikin to spread its air conditioning business globally.

Chapter II

Oil Crisis and New Business (1972–1987)

Coping with Oil Crisis

In January 1972, Yoshio Tsuchiya became chairman of Daikin and Minoru Yamada, the eldest son of founder Akira Yamada, became president.

A year earlier, after the U.S. removed the dollar from the gold standard, the Japanese yen appreciated significantly versus the dollar. The change of presidents at Daikin thus took place in difficult circumstances as the yen's appreciation led to a low level of private investment in plant and equipment. There was no way for the company to prevent a decline in its business. Chairman Tsuchiya expressed his main expectation regarding the new president by saying he would like to see him break from tradition and

Minoru Yamada named Third President

build a new Daikin. President Minoru Yamada emphasized three management principles at that time: the first was to create a new Daikin atmosphere filled with youth and vitality; the second was to expand and widen the company's business fields to contribute to its growth and development; and the third was to maintain the autonomy of the Daikin group's unity through mutual trust.

Minoru Yamada graduated in 1944 from the Engineering Department of the Imperial University of Tokyo where he majored in aircraft engines. He entered Mitsubishi Heavy Industries after graduating and was assigned to the company's aircraft assembly plant. Before long, however, he was called up for military service. When the war ended in 1945 he was a navy lieutenant in a technical position. Because GHQ prohibited Japan from producing aircraft, the Japanese aircraft industry was dealt a damaging blow in the postwar years. Yamada decided to enter his father's company after leaving the navy. He also convinced several outstanding technicians with whom he was friendly in his university years to join the company with him. Those technicians contributed much toward Daikin, which later became widely known for its technical competence. Over the years, those technicians in turn nurtured many young technicians who entered the company.

As one of his management principles, Minoru Yamada emphasized the need "to form a network of people." He practiced

that principle himself through his activities in the Kansai Association of Corporate Executives (KACE) and other organizations, and he urged the company's higher executives to practice the same principle. KACE is a local association of the Japan Association of Corporate Executives (JACE), an organization for business executives established after the war. Soon after its establishment JACE spoke out and acted forcefully concerning economic issues both inside and outside Japan. Minoru Yamada joined KSCE in 1954, around the time Daikin had largely recovered from its chaotic postwar period. He learned much at that time from exchanges with KACE members such as Hosai Hyuga, president of Sumitomo Metal Industries, Ltd. (today's Nippon Steel & Sumitomo Metal), Norishige Hasegawa, president of Sumitomo Chemical, and other members of the Kansai Association of Corporate Executives, a group of dynamic company leaders who represented Kansai business circles. In 1972, Yamada headed the first group of top-level businessmen in KACE who toured six countries in Southeast Asia, and acted forcefully to assuage increasing anti-Japan sentiments in the area. KACE members continued to make efforts afterward as well to promote exchanges between Japan and Southeast Asian countries, effectively bolstering private-sector diplomacy. Yamada's wide-ranging activities contributed toward building a "network of important persons" at home as well. Vice President Yoshikuni Inoue, Senior Managing Director Noriyuki Inoue, and other Daikin executives promoted those activities further and firmed up Daikin's position in Kansai business circles.

In October 1973, not long after Minoru Yoshida assumed Daikin's presidency, the Fourth Middle East War broke out and the oil-producing Arab nations reduced their oil exports while greatly raising prices. The economies of the world's advanced nations, meanwhile, had based the success of their industrial operations

on a continuous supply of inexpensive oil. Japan was no exception, for its domestic oil reserves were not sufficient to meet the country's needs. Compared to European countries, Japan was slow to switch from oil to other energy resources. Oil was not only used as a fuel in Japan but was also the key raw material responsible for the tremendous expansion of the country's petrochemical industry. At any rate, the twin concerns of a shortage of goods and increased inflation caused an economic panic situation to develop in Japan. The prices of consumer goods mushroomed and the government introduced measures to suppress demand, raised the official discount rate, and reduced its expenditures. This marked the outbreak of the First Oil Crisis.

In Japan, where spring is the time for labor negotiations, the negotiations that took place in the spring of 1974 were against a backdrop of sharply rising consumer prices. Most companies ended up paying wage increases of 30 percent or more, and it was important afterward for companies to adjust their product prices quickly upward to absorb the higher costs. They also had to adjust their business structures in such ways as trimming production, conserving energy, and reducing the size of their labor force, comprising a general shift toward quantitative reductions. Daikin's sales in the second half of 1974 decreased by 20 percent compared to the previous year, and the company barely escaped falling into the red.

Daikin did not respond quickly enough in that critical situation, and its product inventories increased rapidly. Between December 1974 and the following May, in fact, the company was forced to introduce emergency countermeasures such as halting operations, especially at the Sakai and Yodogawa plants where operations centered on air conditioners for commercial use, refrigerators, and oil hydraulic machines. The countermeasures included about 40 days of halted operations. In December 1974, meanwhile, President Yamada sent an emergency message concerning the dire situation to all members of junior management in Daikin. Afterward, the company quickly introduced basic countermeasures and President Yamada announced that everything possible would be done to prevent layoffs. He also said the company would introduce wide-ranging remedial measures and asked the employees to work together in carrying them out. He personally visited as many business sites as he could and spoke directly with the local managers. He told them their leadership during this difficult time would serve later to build relationships of trust at the worksites, and strongly urged them to increase their local sales capabilities and introduce bold measures to reduce costs.

President Yamada felt strongly about avoiding layoffs. After the war, when Daikin was forced to lay off personnel every time the U.S. military's procurements policy changed, President Akira Yamada had to negotiate face-to-face with labor union leaders. Years later, he commented on how empty he felt during the three times he had to approve layoffs. Based on that experience, he said he wanted to make Daikin a company that never again had to lay off workers. He made his main statement around the same time that many Japanese companies were laying off workers, saying that his managerial principles prevented him from allowing layoffs. Such statements heightened the morale of both union and non-union workers in Daikin, and brought them together to fight the crises the company faced. That basic policy took clear form in Daikin's "Managerial principles" formulated in 1990. They included the following comments from Minoru Yamada: "An enterprise is comprised of a group of workers with various individual characteristics. Our company feels it is primarily important to respect the individuality of each employee, and to ensure stable employment."

The post-Oil Crisis expectations for Japan were for zero economic growth. Daikin set five goals to prepare for that eventuality: a more efficient workforce, suppressed wages, reduced costs, higher value added, and growth in new areas. The company introduced various medium- and long-range countermeasures to achieve those five goals, such as bolstering its sales agencies and establishing many new air conditioning equipment sales companies. One particular countermeasure was aimed at increased efficiency among the company's workers. Around the time that the demand for products decreased seriously, there were about 450 excess workers in the plants. The company handled that problem in ways such as training them for duties in other divisions. Most of the excess workers ended up in the sales departments, with many of them being transferred to external sales companies handling air conditioners or oil-hydraulic equipment, thus boosting the company's overall sales capabilities. Also, beginning with the design division, operations that had been outsourced, such as copying and guard duties, were brought back inside the company, which increased the number of employees assigned to new internal duties. Also, an employee franchise system was introduced for employees who chose to become independent and operate their own companies. In such ways, Daikin introduced various countermeasures to move personnel to substitute duties inside or outside the company. As a result, the 6,350 employees in Daikin in April 1974 were reduced to 5,799 by June 1979 through moves such as decreasing the hiring of new employees and transferring existing employees to external organizations. During that same period, however, there were zero layoffs and no one was fired. Among other moves, the salaries of managers were reduced by 10 percent from January 1975 to have them share the responsibility for the company's deteriorated business results and the difficulties that

Daikin's 50th Anniversary Celebration

union members were experiencing, including no overtime work and no special days off. In addition, President Yamada deliberated over many hours with members of the Daikin union, which had only recently bolstered its organization, asking for their cooperation in shouldering the difficulties the company was experiencing, deepening the relationship of mutual trust between the two parties, and carrying out a series of measures to break from the trying situation. To the families of employees, meanwhile, who felt uneasy about the company's difficult circumstances and the special time off, the company clarified the situation to them and wrote personal letters that emphasized the company's bright future, thus easing the apprehension the employees and their families felt.

Dakin celebrated its fiftieth founding anniversary in October 1974, in the context of a business downturn caused by the Oil Crisis. In his greetings to the employees at that time, President Yamada said it was especially important to improve the company's structure in the difficult circumstances of low-level economic growth, and to be determined to accept the challenge of achieving new growth. As issues the company must face, Yamada mentioned achieving cost competitiveness, bolstering the company's

sales capabilities, and accumulating development capabilities, and he asked the employees to tackle those problems autonomously. The company celebrated its fiftieth anniversary forcefully, even in the difficult circumstances surrounding management at the time. It also distributed copies of the company's 50-year history to all employees, and contributed toward support of the Yamada Scholarship Foundation, founded with the personal funds of Akira Yamada. Separately, it also established an Orphans Pension Fund.

Disastrous events such as the Nixon Shock of 1971 and the Oil Shock of 1973 dealt severe blows to Daikin's Chemicals Division. In addition, besides the yen's sharp upward evaluation on the world's money markets, the Japanese duties on imported fluororesins decreased, a special duty was placed on all imports into the U.S., and there were sharp increases in the prices of raw materials, fuels, and labor, causing a drop in the international competitiveness of fluororesins. Several new companies also entered the domestic fluororesin market because of the product's high value-added ratio, and some companies already in the market, such as Mitsui Fluorochemicals (today's Du Pont-Mitsui Fluorochemicals Co., Ltd.) and Asahi Glass Co. developed and marketed new fluororesin products that contributed to promoting increased competition. Daikin, as a frontrunner in Japan's fluororesin market, met the increased competition by reducing costs, developing new products, and entering new related fields. All-out reform of the operating system in the Chemicals Business Division and more efficient operation of facilities led to wide-ranging cost reductions so that in fiscal years 1975-76, when the overall company reported deficit operations, the Chemicals Business Division reported a profit. It steadily improved its profits until 1985.

Daikin began increasing its overall sales in fiscal 1976, and

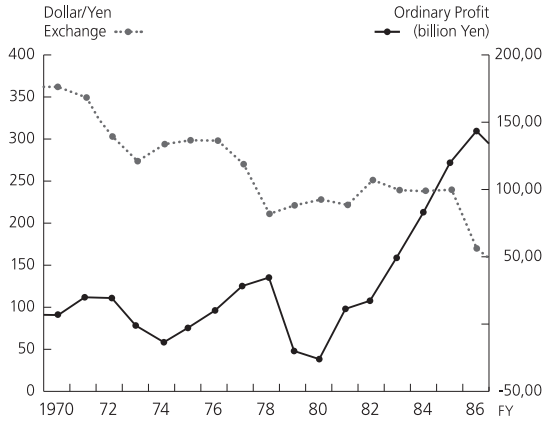
reported current profits in the black in 1977. It thus took over two years from the outbreak of the Oil Crisis for the company to bolster its business structure. Although many Japanese companies overcame the crisis by reducing the number of employees, Daikin made it through the same crisis without laying off any employees. In 1977, Daikin reviewed the plan it had in place when business came to an unexpected halt, and based on it introduced a new three-year business plan, Vision 55, to run until 1980. The company systematized the measures it introduced to combat the Oil Crisis and strengthen the company's business structure, aiming simultaneously to create a corporate structure filled with vitality and an innovative spirit. Also, under the leadership of Yoshikuni Inoue, head of the General Planning Section, conferences were held throughout the company to pinpoint R&D themes for Daikin to tackle in the middle to long term. One result of that project was the emergence of possible new businesses in electronics for Daikin to enter that would fuse technologies as different as machinery, chemicals, and electronics.

From 1975, Daikin began using a new personnel system largely based on employee capabilities. In the typical Japanese personnel system, many companies aim to keep outstanding employees by educating them further in-house after they join the company right after graduation from the university, and increasing the wages of most of them each year. Companies also guaranteed employment until retirement. Actually, Japanese companies designed that system during the country's period of high-level economic growth, when there was a shortage of labor. The two main features of the system were seniority-based wages and a guarantee of employment until retirement age. Daikin, meanwhile, experienced rapid growth and many of its employees joined the company partway through their careers, making a fair evaluation of

their capabilities all the more important. Ahead of other Japanese companies, Daikin introduced a personnel system emphasizing the qualifications of employees in 1969. In utilizing that system, Daikin added aspects of the regular Japanese system that had only slight wage differences between employees who joined the company at the same time. The personnel system was thus complicated, and the company introduced a new system in 1975 that emphasized a worker's capabilities and selected some young workers for manager training, thus trimming and rationalizing the organization. Combined with the personnel system revisions, management level employees were reevaluated depending on how well they performed their sophisticated duties, thus promoting changes in the thinking of workers.

Next, in 1979, Daikin introduced an age-limit system for its workers. In the postwar period, the company reduced its workforce size three times. The company grew rapidly afterward, however, and over a period of several years, beginning in 1958, it brought in about 1,000 new workers. Then it held back again on hiring large numbers of new workers after the Oil Crisis in the early 1970s. One result of Daikin's system was that its workforce aged more rapidly than in other companies, and it became an urgent task for the company to utilize its middle-age and older employees actively. A step the company took was to move the retirement age for employees forward to 60, the age at which the company reviewed each person's capabilities, type of work, and salary. It also introduced a system for assisting employees who wanted to leave Daikin and open their own businesses or work for other companies. Central to Daikin's thinking was the motto "Management without layoffs." The company pushed that thinking further by building workplaces where employees would want to work. Daikin's system eventually became a model case for Japanese companies that later began extending the maximum retirement age of their employees.

Yen Exchange Rate and Current Account Balance



Daikin's business performance, both sales and profits, began improving steadily from 1977. Although the company's ordinary profits dropped in fiscal 1980 due to the Second Oil Crisis, its total sales increased, leading to increased revenue. It then established a new five-year plan in 1980, called Vision 60. At that time, President Yamada said:

"The targets we aim for should be flexible enough to respond to business changes and weather shifts, and allow us to build a bold and stable business structure for adapting to all types of business weather. We must also make Daikin a company that emphasizes technology, remains a step ahead of other companies in developing new products, and assumes an immovable position in its industry."

In the early 1980s, the Japanese economy was suffering from the recession tied to the Second Oil Crisis. Although the domestic economy was in a recession, however, exports were increasing rapidly, and Japanese companies came to be known for their

strong international competitiveness and overwhelming trade surpluses, thus completely overturning their international evaluation. A number of books praised Japan's economic successes, including Ezra Vogel's Japan as Number One, and when Japan entered the second half of the 1980s the Japanese over-evaluated themselves and became arrogant. But for Daikin, the qualitative and quantitative goals set in its Vision 60 (60th year of Showa =1985) and Vision 65 five-year plans, were accompanied by an emphasis on technological successes, which made the company continue to improve itself over the decade between 1985 and 1995. Two of the years just before the start of that period, however, 1980 and 1982, were recession years that also had cold summers, dealing Daikin's air conditioning business a double punch. The stronger yen following the Plaza Accord of 1985, meanwhile, badly hurt Japan's exports, the economy's previous driving force. At the same time, the domestic economy suffered from a higher yen, which depressed consumption. Viewed in hindsight, it can be said generally that the energetic efforts of Japanese companies during the first half of the 1980s tied directly to the country's later strong international competitiveness. For certain companies, however, the external business environment during that period was harsh. It was a period in which the differences were clarified between companies that succeeded by following clear policies to speed up their internal reforms and those that did not.

President Minoru Yamada said, "Our goals are not so simple that we can achieve them by making efforts and introducing improvements along the same lines as in the past. Realizing the goals in the Vision 60 five-year plan, for example, will ultimately tie to appreciating the concept of 'Daikin with a future,' a concept filled with expectations." The company's employees took those words to heart, and they worked closely together while making strong

efforts. The harsh experience of a cold summer in 1980 led to a difficult start for Daikin's room air conditioning business. In that situation, the company moved to build a sales structure that would return a profit even if its sales goals were not realized. Although the summer of 1982 was also cold, the company realized a profit in sales of air conditioners. From 1980 to 1984, meanwhile, the company's overall exports tripled, and came to account for 18 percent of the company's total business. The managerial efforts Daikin made starting in 1980 thus began to show results. Those efforts included new product development through investments concentrating on R&D, building a sales system with emphasis on high value-added products, and increasing production efficiency using the Daikin Production System, a version of the Toyota Production System modified to fit Daikin's particular situation.

During the 15 years from 1972 to 1987, Daikin's sales increased four-fold. The chemical business, in particular, increased five-fold during the same period, based principally on the success of its fluororesin sales. In the company's main air conditioning business, packaged air conditioners firmly held top position in the domestic market, and sales of room air conditioners established a firm beachhead. Ordinary profits turned stagnant while the yen was strong, but eventually increased 3.5-fold, with gradual increases up to 1987. In that process, Daikin built its foundation for an "all-weather" corporate structure flexible enough to respond to changes in business and weather conditions.

Aiming for "Daikin, the Technology Company"

Despite experiencing the two oil crises of 1973 and 1979, Daikin strengthened its technology development, and began calling itself "Daikin the technology company." The company developed new technology and entered multiple new business fields. Although

not all the new businesses were successful, they demonstrated that "Daikin the technology company" was willing to take trial-and-error steps toward achieving its objectives.

In 1973, Daikin renamed the Research Department inside the Sakai Plant the Airconditioning Research Center and began tackling the development of new air conditioning technology. As a reflection of the most advanced issues of the time, research at the new center focused on wide-ranging themes, including environment-related equipment, the freezing and storage of food products, the use of robots, and others. In 1974, Daikin invited Kozo Fushimi, manager of energy-related research at MITI's electronic technology research center, to join Daikin as vice chief of the Airconditioning Research Center (ARC). In such ways, the company bolstered its system for researching electronic technology. In order to respond to the increased attention paid to research themes other than air conditioning, in 1975 the company also renamed the ARC a "Research Center" and moved its main research efforts to the Kanaoka Factory of the Sakai Plant. It also reorganized the Research Center's detached office inside the Yodogawa Plant into two laboratories—an Environmental Research Lab, and a Robot Development Lab. The Research Center's "Control Group" became its central group. In 1979, the company established a separate Electronics Research Center, with the Research Center's "Control Group" as its core member. Kozo Fushimi, the head of the Research Center in the Kanaoka Factory at that time, doubled as head of the Electronics Research Center.

Meanwhile, the Electronics Research Center in the Kanaoka Factory became the center of Daikin's electronics business and it moved to collect information related to electronics technology, make efforts to raise the in-house technical level of electronics, and nurture the company's future electronic technicians. President Yamada had for some time said, "To promote the company's future development and growth, we must assemble personnel with electronics backgrounds to allow our company to break from its leaning toward mechanical technologies." To that end, he promoted a change in Daikin's leaning toward expanding the number of personnel in existing technical fields to the hiring of quite different personnel with backgrounds in electronics technology. And to create situations in which electronics researchers could work comfortably, the company introduced flexible work environments. The company also established Daikin Electronics College in 1982, making it a base for cooperation between industry and academia and a focal point for industrial schooling in Japan. Aimed at totally new employees and technical employees working with machinery, meanwhile, Daikin began developing technical personnel in the mechatronics field. Although Japanese companies generally started introducing electronics into their businesses in the 1980s, Daikin began even earlier fusing electronics and mechanical engineering technology. That step was due entirely to the foresight of Akira Yamada, the company's founder.

The Daikin Electronics Technology Center (DETC) established a new research center inside the Shiga Plant in 1980, and the company assigned specialist researchers there. Their research focused mainly on inverter controls related to air conditioners, temperature and comfort sensors, and other products. Before too long, the company realized that if DETC remained under the control of the air conditioning department, it could not attract outstanding students of electronics technology to become employees. From 1982, therefore, it began building an all-out electronics equipment business. The opportunity to start that business presented itself in 1981 when the venture company Thyrac contacted Daikin about possible joint development of the world's fastest

graphics display. Although the two companies began jointly developing a three-dimensional graphics display terminal (GDT), the joint venture collapsed in 1982. That same year Daikin established an Electronic Equipment Department and based on unique technology that DETC developed, the company in 1983 developed the GDT DS Series. It delivered the equipment to the Earthquake Research Center in the University of Tokyo and Hokkaido University. In 1985, the Electronic Equipment Department was raised in stature to the Electronic Equipment Division. In that same year Daikin delivered a new model of the GDT DS Series to the Fermi National Accelerator Laboratory in the U.S. Problems related to the product's design emerged at that time, however, and the project did not realize the results Daikin expected. Afterward, the Electronic Equipment Division continued to tackle the development of two-dimensional GDT and other products. In the end, however, in 1993, the company pulled completely out of the electronic hardware business and concentrated all its efforts on software.

After Daikin established a clear system for researching electronics technology, it transferred research functions other than those related to the electronics business to the Mechanical Technology Research Center (MTRC), the company's mechanics R&D center. The MTRC had early on reinforced its relationship with universities, public agencies, private research organizations, and other groups, and after its new start it initiated a system of joint research with industry and the academic community. Some of its main activities included joint research with Tokyo Electric Power Company to develop a Heating/Cooling System Based on the Use of Solar Heat and Ice Chemical Storage, development of a Concentration Difference Engine Heat Pump made possible with subsidies from the Ministry of International Trade and Industry (MITI),

participation in the International Energy Association's joint international project for research into refrigerant blends, and joint research with plant makers and other related organizations in a project titled "Development of a super heat pump energy integrated system." Daikin also participated in joint research with the Futurology Research Laboratory in 1998 concerning possibly establishing a base on the moon's surface and development of the moon's reserves. In 1990, Daikin also conducted joint research with JR Tokai and Toshiba Corporation to develop a freezer for linear motor railway cars.

Daikin also started new businesses in the chemical industry around this time. In 1975, for example, it made good use of its chemical plant technology and established the chemical engineering department inside the Chemicals Business Division with the aim of entering the environmental business. The chemical engineering department developed a honeycomb rotor that used a new raw material called activated carbon powder paper and offered new products such as a honeycomb deodorant device. In 1985, Flecto Co. in Sweden, a major manufacturer of paint booths for automobiles, requested export ties on the honeycomb deodorant device with Daikin, which Daikin agreed to. Afterward, Flecto paint booths equipped with that device came to be installed on the assembly lines of Volvo, Ford, Chrysler, and other prominent automakers worldwide.

Daikin entered the thermal insulation panel business in 1974. Although it failed at first, in order to rebuild the business it separated its Food Products' Cryogenic Equipment Development Department from the Air conditioning Sales Division in 1978. The former then began business as an independent sales department. It developed small prefabricated refrigerators and freezers and started anew in that field as an integrated manufacturer of large

and small low-temperature storage equipment. Also, in response to the needs of newly emerging restaurant chains that were expanding quickly, Daikin entered the business of providing those restaurants with various equipment. It met those needs with in-house development, OEM production and purchasing ready-made equipment. Compared to those of other companies, the ice-makers imported from Whirlpool Corporation of the U.S. and commercial use freezers produced on an OEM basis, however, had no notable features. Daikin also received many complaints about products it developed and produced on its own, related especially to water and electrical leaks due to condensation. They included icemakers, dishwashing machines, and others. Meanwhile, sales for 1984 fell below those for 1983, and the company was unable afterward to develop appropriate countermeasures. Finally, in 1991 Daikin was forced to quit the business related to low-temperature food products equipment.

One example of Daikin's success in the very low temperature and high-vacuum business areas was its technical ties in the area of cryo-refrigerators with Air Products & Chemicals, Inc. (APCI) of the U.S. Cryo-refrigerators allow freezing to temperatures between minus 250 degrees C and minus 269 degrees C. Included in the company's technology is a cryopump that creates high vacuums. Originally, cry pumps served only special needs, such as using them in the material science field. Cryopumps, however, moved into the spotlight together with higher integration becoming possible in semiconductor production processes. APCI's cryopump had few parts, was economical to produce, and Daikin—applying technology it already possessed—could easily develop the exclusive helium-operated compressor the pump used. Daikin thus decided to participate in the production and sale of the cryopump, and in 1983 it signed a technical agreement with

APCI. The field was much more technical than previous projects in which Daikin participated, the design and production processes required an especially high level of precision, and product control required closer attention than previous Daikin projects. Despite the difficulties, the first cryopump emerged safely from the production line in 1984. Centered on the manufacturer producing the ion injection device and other equipment, sales proceeded smoothly, reaching 160 units in 1986. In particular, in the area of applying the superconductive magnet which cryo-refrigerators needed, Daikin acquired a monopolistic share of the nuclear magnetic resonance imaging (MRI) apparatus field. Also, in the area of ultra-fast railways using linear motor cars, JR Tokai installed 4,000 freezers. They were used in multiple test runs on lines in both Miyazaki and Yamanashi prefectures, and their areas of application were widened. Cryopumps, meanwhile, became essential devices in the development and manufacture of very high density semiconductors, and the demand for them increased.

In the area of equipment for use aboard ships, Daikin won orders from the New Zealand Line for the refrigeration units it attached to marine containers and succeeded in developing an outstanding product. The company then introduced the unit to international markets and it sold well. In 1984, Daikin added to that line by developing a super-thin end-wall type unit, also for use in refrigerated containers (reefers). Two of its main customers were Sea Containers Ltd., the world's largest container leasing company at the time (the company bankrupted in 2006), and Overseas Containers Ltd. (today's P&OCL) in the U.K. Europe-based shipping companies, in particular, gave the products high marks. With an increase in number of units sold, Daikin then contracted with maintenance companies in some of the world's busiest ports, at the same time having its employees learn repair

Marine Container with Super-Thin End Wall

methods. Daikin also established a parts supply system, the first time for the company to build service networks tied to local regions. In that background, Daikin's annual sales of refrigeration units in 1983 reached 3,209 units, with annual sales of 6.6 billion yen, thus passing Carrier Corporation and becoming the world's leading company in sales of refrigeration units for containers.

Around this same time, Daikin succeeded in the medical equipment (ME) field, based largely on successful sales after developing new products. The company first considered entrance to the market for home-use health and medical products in 1977, when it tackled the development and marketing of small blood-sugar level meters. Although ME was an atypical field for Daikin, the company successfully developed a high-performance blood-sugar meter in 1987, and began marketing it after receiving the Health, Labor, and Welfare Ministry's approval in 1990.

In these ways, Daikin worked across a wide spectrum of business fields. But the tackling of competitive large-scale projects did not immediately result in the development of new products. Still, the R&D and technical capabilities accumulated in that process, especially electronics-related technology, was utilized later in diverse ways with the development of new technology. Besides raising the level of the company's electronics-related technology, the company's activities at that time also played an important role toward establishing its name as a technology company. The network Daikin built at that time through cooperation with various external organizations later became a valuable asset as well.

Diversification of Air Conditioning Business

Daikin's Air Conditioning Division fell into deficit operations immediately following the Oil Crisis, and the company subsequently made great efforts afterward to rationalize its operations. It discontinued its single-division Air Conditioning Division system in 1978, for example, replacing it with a system of two divisions: air conditioning sales, and air conditioning manufacturing. As a result, the air conditioning business finally turned profitable in 1979. Japan experienced cold summers in 1980 and again in 1982, however, and the company's air conditioning business once again fell into deficit operations. Since air conditioning accounted for about 70 percent of Daikin's business at the time, the company was uneasy about its future, and urgently needed to establish an "all-weather managerial structure."

In that situation, Daikin planned drastic reforms in its air conditioning production and sales operations, aiming at the cost cut of 9 billion yen. Two of its major concerns were more efficient use of the labor force in its air conditioning business headquarters, and a more rationalized distribution system. To tackle those concerns, the company introduced the principle of setting clear priorities to its sales structure in 1983.

The cold summer of 1980 negatively affected the room air conditioning business, which before then had been expanding steadily and was one of the company's mainstay business areas.

At any rate, in 1980 the company was forced to accept a large volume of returned orders, to reduce production, and to lower its air conditioning prices. Sales decreased 14 percent versus the previous year, and business results fell deeply into the red. Construction of the new wing to the Shiga Plant, meanwhile, was completed in November 1980, and its construction costs became an additional burden on the company. Given that situation, Daikin could not escape from deficit operations between then and 1982, almost three full years.

Although the number of commercial-use air conditioners sold since 1974 was stagnant because of the negative influence of the First Oil Crisis, the company managed to keep its overall operations in the black even with the cold summer. The deficit operations of room air conditioners were the main reason the overall air conditioning business was in the red. In that situation, Daikin set in the field of commercial sales a target of securing a 30 percent share of the domestic market for packaged air conditioners, one of its key, more profitable, products. And among its room air conditioners, it positioned its medium, large, and multi-type products as particularly important items, thus building a sales structure that would realize higher profits. In dealing with the direct sales companies that previously sold mainly room air conditioners, Daikin adjusted its policy and had those companies mainly sell packaged air conditioners and medium- or large-size and multi-room air conditioners. Differing from small room air conditioners these products required installation expenses, so Daikin also recruited "professional" air conditioner companies to act as its agents. At the same time, Daikin decided to reduce the share of the large retailers of home appliances from 30 percent to 10 percent. Daikin worked with them in the past as important sales routes, but there were two reasons for the reduction: one, they

mainly sold small air conditioners; and two, their sales tended to be concentrated on a few months in the summer. Daikin realized that those retailers were not fitting for building a sales structure that aimed for high profits. At the same time, Daikin introduced measures to stimulate the sales activities of professional agents by reallocating many employees to the sales field. It could do that because overall sales had worsened due to the effects of the Oil Crisis, causing a large number of redundant employees. Most of those employees were transferred to the sales agents.

Daikin held the top share of the domestic packaged air conditioning market. In 1982, for example, in western Japan, including Osaka, Daikin held a 23–25 percent market share. In Tokyo, though, its market share was only 16 percent, and for the greater capital region, including Tokyo, it was only slightly higher at 18.7 percent. Viewing Daikin in terms of sales regions at the time, therefore, the company had strong characteristics of a local manufacturer serving Osaka and surrounding cities. For that reason, Daikin positioned the capital region as a most important business market to develop, and bolstered its sales capabilities there to include the rapidly expanding chain stores of home appliances, home builders, plants, and offices by relocating excess personnel to the Tokyo branch office and to its sales companies in the Kanto region. It introduced dynamic sales incentives, such as increasing its service cars painted with the same drastic color and inviting representatives of major customers to tour the company's plants. It also held an exhibition of air conditioning equipment at the Science Museum in Tokyo's Kitanomaru Park in November 1985, thus appealing to the company's emphasis on technology. Such active, wide-ranging, and colorful activities served to expand the number of Daikin "fans" among professional air conditioning agents and large companies using air conditioning equipment.

Airconditioning Equipment Exhibition at Science Museum

One result was that the company's market share for the capital region in 1985 rose to 20.6 percent, almost a 3 percent increase over 1982, slightly reducing the market share difference with western Japan. In such ways, Daikin finally succeeded in introducing vigorous sales activities that covered all parts of Japan.

The company's main objectives in rationalizing the activities in its Air Conditioning Production Headquarters were to reduce production costs and respond flexibly to seasonal shifts in production volumes. To accomplish those objectives, Daikin introduced the Toyota Production System into its operations, adjusting it to fit the company's unique situation. That will be discussed in detail later in this history.

In terms of Daikin's product development activities around the time of the First Oil Crisis, meanwhile, supermarkets and other types of chain stores with numerous outlets began developing rapidly in Japan, and the country's first convenience store was opened in 1974. One result was the development and expansion of a new market for commercial-use air conditioners. In 1976, for example, Daikin marketed the G-series of floor-mounted air conditioners aimed for sale at retail outlets and providing integrated functions for substantially reducing costs. The company followed those products in 1978 with development of the K-series of floor-mounted and ceiling-suspended air conditioners, the first

packaged air conditioners fitted with fluorocarbon heat pumps. Developed in-house, the pumps were highly efficient and used fluorocarbon refrigerants. The company sold the products under the brand name "SkyAir". Daikin acquired the "SkyAir" patent in 1970 and it was the first packaged air conditioner to which that technology was applied. Next, in 1980, Daikin marketed a game-changing ceiling-suspended room air conditioner only 19.8 cm wide, fitting it with computer controls to differentiate it from other products. The Electronics Technical Center, established in 1979, contributed significantly toward developing that product's computer control system. Later, market needs shifted toward ceiling-mounted, cassette-type air conditioners, and in 1982 Daikin marketed a ceiling-mounted cassette series that made effective use of technology it previously developed for thin-type air conditioners. In terms of outdoor-mounted equipment, from 1983 Daikin moved toward developing more compact equipment in such ways as mounting a rotary compressor in a small air conditioner. The "SkyAir" air conditioners became hit products benefitting from ultra-thin indoor equipment fitted with a heat pump and controlled by a personal computer. They contributed toward building a solid position for Daikin in the commercial-use air conditioning market.

With the Second Oil Crisis as a stimulus, in June 1979 the Japanese government passed the Energy Conservation Law aimed at promoting more efficient use of energy. Also in 1979, the Ministry of International Trade and Industry (MITI) introduced a major project for stimulating the development of technology aimed at promoting energy conservation. Together with those government moves, industry began moving all out to develop energy-efficient air conditioners. For its part, Daikin developed a superheat pump that used an alternative refrigerant. At the same time, it began developing a multi-room air conditioning for use in buildings, and

tackled the development of new energy-efficient air conditioning systems using medium- and large-size packaged air conditioners. The company's engineers faced many difficult technical problems in developing multi-room air conditioners for use in buildings that connected one outdoor unit with 2 to 20 indoor units. It took them the unusually long period of two and a half years to overcome the many problems that emerged. In the end, the Electronics Technical Center finally developed a system that utilized a compressor with a capacity control for managing multiple indoor units separately and supplying and circulating only the volume of refrigerant they required. Air conditioners that used fluorocarbon as their refrigerant directly moved the heat via the refrigerant. Those air conditioners had outstanding thermal efficiency, and their control system made it possible to cool only the areas needing cooling and only when cooling was needed, thus realizing increased energy savings. Since the heat was directly transferred through the refrigerant, the water circulating pump and air-supply fan in the conventional central systems were no longer required, thus considerably reducing energy consumption.

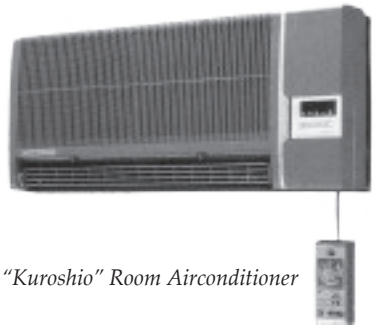
Daikin developed much other game-changing technology as well, starting with a defrosting device boasting of a new mechanism. Air conditioners using fluorocarbon, meanwhile, did not require large-scale installation work, such as air ducts or piping for hot, cold, or chilled water. Piping was also simplified by using only small-size refrigerant piping. Because the air conditioners were ceiling-mounted they allowed full use of available floor space as well. These newly developed air conditioners thus provided many outstanding functions, and they began selling quite well after their introduction in 1982. The new air conditioners won the Daikin President's Award in 1983, and were applauded outside the company for their pre-eminence as energy-efficient products. In that context, the Japan Machinery Federation subsequently awarded the products the prestigious Award for Superior Energy-Saving Machines for 1984. Also in 1984, the products won the Japan Society of Refrigerating and Air Conditioning Engineers' Technology Award.

Conceptual Multi Airconditioning System

After the market came to include small- and medium-size buildings, Variable Refrigerant Volume ("VRV") air conditioners became the mainstay products for increasing the market share of packaged air conditioners. Central air conditioning systems, however, still remained the mainstay products in the medium- and large-size buildings market. In 1983, however, the general building contractor Takenaka Corporation, in charge of the development and design of the first high-rise building in Osaka, approached Daikin with a proposal to install a "VRV" system in that building, which would mark the first time for such a system to be installed in a high-rise building. That was the 32-story Umeda Center Building, the location today of Daikin's Head Office. Many technical problems had to be overcome, of course, before a "VRV" system could be installed in such a high-rise building. Tenants would benefit, however, because individual air conditioning systems meant they would have to pay only for the time they used their system. Since the multi-type system would thus be equitable and match the needs of the time, Daikin decided to tackle the de-

velopment of such a system for skyscrapers by integrating the efforts of its manufacturing, sales, and service divisions. Still, many of the development themes presented tough technical hurdles. Because of the requirement to secure air tightness for such skyscrapers, the demand was especially strong for ensuring a comfortable atmosphere. The overall system included the installation of many sub-units, making it difficult to ensure their reliability. The company also had to develop a new communications system for controlling the system's operation. All these were difficult technical hurdles that had to be overcome. Daikin's engineers applied computer technologies in undertaking this project and developed much new technology in a short period, including wide-range capacity control using an inverter, a newly designed compressor for assuring high reliability, and Direct Digital Control (DDC) communications control. They also developed a construction method for installing air conditioning equipment floor by floor as the building was gradually built, an overall response that also included engineering. Construction of the Umeda Center Building was completed according to schedule in 1987.

The new system applied to construct the Umeda Center Building drew wide attention from the domestic building construction and design industries. Also, over a two-year period after the building opened for business, it attracted about 2,000 general visitors. The new technology Daikin developed and know-how it gained during construction of the Umeda Center Building became the backbone for developing new types of air conditioners one after the other. One of them was the new EX Series of multi-room air conditioners for buildings. The EX Series first sold in 1987 was extremely energy efficient, and offered features not available in past air conditioning systems installed in large buildings, such as permitting great freedom in combining indoor



"Kuroshio" Room Airconditioner

equipment, and allowing easy installation on the construction site. Those various features led to the product's high market evaluation. Sales increased until at one point products in the EX Series accounted for 70 percent or more of all sales of multi-room air conditioners for buildings.

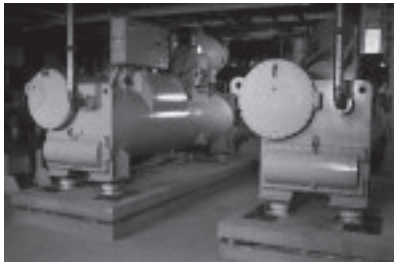
Meanwhile, in terms of room air conditioners, two types sold particularly well in the period after the First Oil Crisis. One was an inexpensive separate type with a wall-type interior unit and the other was a simple integrated window-type unit. From 1979, however, in the context of an increase in energy prices related to the Second Oil Crisis and a cold summer in 1980, the various air conditioning manufacturers developed new types of air conditioners that did not require a backup heater. They also succeeded in developing air conditioners that used an inverter, and generally shifted toward heat-pump types not greatly affected by cold weather. By selling such products, Japan's air conditioning manufacturers realized highly increased energy savings. Around this time, Daikin fell behind other companies in air conditioning technology. In 1981, however, the company switched to the fluorocarbon-heat method and realized a 40 percent decrease in its heating energy efficiency ratio. At that time, the company introduced the highly energy efficient wall-mounted heat-pump type air condi-

tioner called "Kuroshio" (Japan Current). Even "Kuroshio", however, could not compete in efficiency with the products of other companies. Daikin thus introduced an improved version of "Kuroshio" in 1982 that provided 10 percent greater efficiency than the previous product. In the post-Oil Crisis period, the price of kerosene used for heating rose considerably, and "Kuroshio" series of products proved to be highly economical.

In 1983, Daikin developed a recessed type wall-mounted indoor unit. The stimulus for developing that unit was when a Daikin engineer happened to see a wall surface-mounted air conditioner recessed in a wall at the site of a new home being built. Daikin then decided to develop room air conditioners to be installed beforehand in the walls of newly built homes and to use Japanese hemlock, a most fitting material for upscale Japanese-style rooms, as the material for wooden grilles to cover the front of the recessed units. The product took advantage of the installation experience of installers with expertise in air conditioning. The product turned out to be a pioneer product for satisfying consumer needs in the subsequent period of residential air conditioners.

Global Production of Air Conditioners

Even prior to the Oil Crisis, Daikin began expanding its sales network globally. During the 1960s, for example, it built a sales network in Asia, and established Daikin Airconditioning (DAC) in Malta, with sales agents in fifteen European countries. Daikin also established local production operations in Europe and Thailand, and following the First Oil Crisis it also began knockdown operations in several Asian countries. In Singapore, it participated with capital in ACE, Pte. Ltd., in 1976, and began knockdown operations there in 1978. In Thailand, in 1979, the air conditioning sales



Clockwise from top, Celebration with Mayor of Ostend at Opening of Daikin Europe N.V., 350-ton Turbo Air Conditioner Installed in Victoria Station, Victoria Station in London

division of Siam Motors, Daikin's sole distributor in Thailand, was transferred to Siam Daikin Sales Co., thus integrating Daikin's production and sales operations in Thailand. Daikin also began the knockdown assembly of small-size room air conditioners in Indonesia, Malaysia, and the Philippines. The only all-out overseas production base at this time, however, was Daikin Europe N.V. (DENV) in Belgium. DENV took over all Daikin business rights from DAC in Europe, northern and western Africa, and the Middle East, and started in business as Daikin's sole manufacturing and sales base in Europe.

In Europe in the mid-1970s, air conditioners were finally being installed in large buildings. At first there were only a few such buildings being built, and they were fitted with central air conditioning systems. Because Carrier had an overwhelming share of the market for large-scale air conditioning systems, DENV initially emphasized the development and sales of large-size chillers,

even as competition with U.S. manufacturers gradually raised its name recognition. Step by step, it developed a unique market for "VRV" systems (multi-type systems for use in buildings), and succeeded in establishing a monopolistic market share in this tiny market. Even with that success, however, the European air conditioning market was still relatively small, and the economic stagnation resulting from the two oil crises was more serious in Europe than in Japan. It was 1984 before DENV was able to begin steadily earning a profit and finally cover its cumulative losses.

Although the Middle East market for air conditioning equipment expanded rapidly as a result of the oil money that flowed into the area after the oil crises, U.S. companies monopolized the markets. Initially, because the area was part of DENV's territory, Daikin merely monitored the situation. From 1975 onward, however, Daikin began knockdown operations in Iran, Bahrain, the United Arab Emirates, Kuwait, Saudi Arabia, and other countries, thus switching to an aggressive sales policy. In order to strengthen the technical and service capabilities of the local sales and production bases and to provide managerial guidance, Daikin established a training system in 1980 for training and educating local technical personnel, and transferred technicians and other personnel there from Japan.

The U.S. was the world's largest market for air conditioners. And in 1980 Daikin moved ahead of other Japanese air conditioning manufacturers after including entry into the U.S. market as part of its management strategy. In that same year, Hiroshi Fujioka, Managing Director and General Manager of the Overseas Business Division, prepared a sales plan for the U.S. market. The U.S., however, was the world's first air conditioning market, and it was totally different from the Japanese market. Room air conditioners in the U.S. market were all window types, and their prices

were one-third the prices in Japan. The majority of packaged air conditioners were duct-style, split-type units for residential use, and market competition was intense. In those circumstances, Daikin developed a heat pump multi-room air conditioner, and promoted a strategy that targeted mobile homes.

At the time, it was necessary to acquire UL certification in order to sell air conditioners in the U.S. Daikin successfully acquired that certification with consulting assistance from International Energy Systems Limited. In 1981, Daikin established Daikin Airconditioning America Co., Ltd. (DAA), in San Jose, California, capitalized at $100,000. The company then began developing sales offices in cities on or near the West Coast, including Los Angeles, Las Vegas, and Portland. In 1982, Daikin entered into a dealership agreement with Omar Basar, a former employee of Carrier Corporation, who then established Daikin Miami Co., Ltd. (DMI), in Miami, Florida. Next, in 1983, DAA was renamed Daikin U.S. Corporation (DUS), and in 1985 it opened a branch office in Atlanta, Georgia. This entry into the southern part of the U.S. aimed to lay the groundwork for later development of a network of offices throughout the eastern part of the U.S.

In particular, as an indication of its great expectations for expanded sales in the U.S., Daikin invested 30 percent equity in DMI. Payments from DMI to Dakin were frequently late, however, and as sales increased President Basar kept requesting additional assistance. Daikin finally asked for a debt guarantee and sent a vice president in charge of financial affairs to DMI. Basar adamantly refused to disclose financial information, however, and Daikin filed a legal suit requesting that it be allowed to review DMI's financial records. In response, Basar filed for bankruptcy, and sued Daikin and Daikin employees for damages caused by unlawful behavior. That was Daikin's introduction to the legal

suit and countersuit aspects of U.S. society. In the end, Daikin and Basar agreed to an out-of-court settlement. Daikin then paid Basar a sum of money and won back its commercial rights. This "Miami Incident" taught Daikin important lessons related to the fundamental posture it later took in developing its overseas network. The company learned not to enter easily into joint ventures, to choose its partners carefully, and to handle its trade name prudently. It also increased the number of persons handling legal administrative affairs in the Overseas Sales Division and the Archives and Documents Section of the General Affairs Department.

Afterward, as a result of the Plaza Accord of 1985, the yen appreciated greatly and it became extremely impractical to export products from Japan to the U.S. Based only on exports from Japan, Daikin was unable to maintain its competitiveness in the U.S. market because of the intense competition and low price levels. In order to rebuild its business in the U.S., Daikin targeted residential and small-size commercial-use air conditioners as priority areas, and positioned its "SkyAir" heat pump units and multi-room air conditioners as priority products. It also began developing dealers by concentrating on the main urban centers. In the end, however, it was unable to succeed in the U.S. market and again completely withdrew in 1988.

Construction of Rinkai Factory and Kashima Plant

With Japan's high-level economic growth starting around 1955, various Japanese industries became larger in scale. There was also an increase in the construction of industrial parks, and Japan's population, starting with factory workers, became more concentrated in urban areas. One result was the construction of public housing projects one after the other, and of new private residences. Once into the 1960s, urbanization became so rapid that the construction of new housing in the cities could not keep pace with demand. Also, the mixture of factories located next to ordinary residences became a social problem. The living environment deteriorated, including noise and atmospheric pollution, and the worsening of water quality became serious. Enacted in 1967, the Pollution Countermeasures Fundamental Law set strict restrictions on the discharge of waste gases and wastewater from factories. From the mid-1960s, meanwhile, social problems emerged in Japan related to the worsened environment. Besides cadmium poisoning, other serious sicknesses emerged, such as asthma in Yokkaichi. Designating that sickness as environmental pollution finally opened the door for providing medical relief to sufferers.

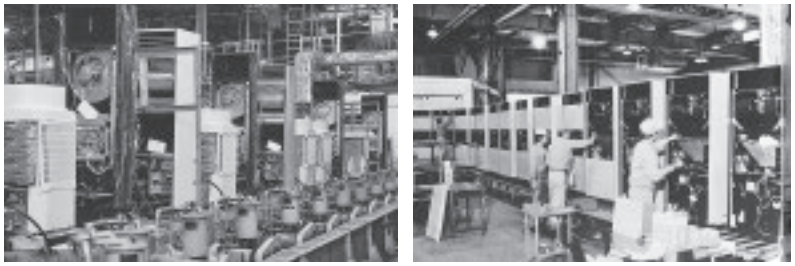
The area around the Sakai Plant when Daikin built it in 1936 was pastoral. Beginning in the 1960s, however, many factories were built in the same area, gradually worsening the local environment. On the other hand, as one response to the shortage of housing in the area, Sakai City bought land from Daikin located adjacent to the Sakai Plant's Founding Works, and from 1966 began building a municipal apartment complex there. From even before that, general housing had been built near the plant and complaints from residents had increased. Daikin prepared in-house countermeasures and responded diligently to satisfy the environmental standards of such industrial areas. The anti-pollution movement grew stronger, however, and in 1969 Osaka Prefecture established anti-pollution regulations much along the lines of regulations the Tokyo municipal government established a few years earlier. In line with the Osaka regulations, many companies, including Daikin, became the focus of surveys of the actual situations surrounding their plants. Discussions were held with local residents, and agreements were reached concerning three main points: 1. operation of the cupola at Daikin's Founding Works

would be halted permanently; 2. within two years the Founding Works and within five years the entire Sakai Plant would halt all operations; and 3. Daikin agreed to compensate the local populace and to pay related medical expenses. In1973, Daikin finally sold the Sakai Plant land to the city and acquired reclaimed land near Sakai Port. With the backdrop of the economic recession accompanying the Oil Crisis around that time, and the delay of soil improvement works, Daikin finally completed construction of the new plant, called the Rinkai ("Seaside") Factory of the Sakai Plant in October 1978. The former Sakai Plant had 50,000 m² of space, but the Rinkai Factory was much larger at 90,000 m². After moving to the Rinkai Factory, Daikin began introducing a new production system it had been studying.

Daikin struggled after the Oil Crisis to rid itself of the Air Conditioning Division's deficit operations. One approach it took was to reduce inventories by shortening production lead time. In response to the increased diversification in customer needs, the number of different models the company offered also increased, making it essential to break from the former large-lot production system. Daikin took particular interest in the new production system Toyota Motor Company had just begun publicizing—the "Just-in-Time" system—and requested assistance from Toyota's Executive Vice President Taichi Ohno, the person most responsible for creating the new system. As a result, Daikin began receiving assistance for introducing the Toyota production system from Senior Managing Director Yasushi Tsuboi of Daihatsu Motor Company, a Toyota Group company.

The Toyota production system Daikin studied at that time later became highly evaluated internationally as a system for producing many parts of many different types on a mixed-model production line. In assembly-type industries it is natural for inventories to increase substantially if assembly is begun after first receiving all the parts. Also, rationalizing each assembly process does not necessarily mean that overall operations will be rationalized. In that context, Toyota landed on the idea of assembling products not by considering the flow of operations from the previous process to the following process but by working backward and having the previous process supply the following process with only the volume of parts it used. This approach resulted in a drastic reduction in inventories. As part of the overall aim of rationalizing the order of assembly operations, the line workers were also trained to be multi-functional or to handle more than one machine, with the aim of averaging out the man-hours of the work per process. The Toyota Production System is called the Just-in-Time (JIT) System because each production process receives exactly the volume of parts it needs at exactly the time it needs them. That was the first time the JIT System was used in air conditioner production, and it was a game-changing innovation. There are relatively fewer parts in an air conditioning system than in an automobile, but there are many more air conditioner models. The production volume of air conditioners also varies considerably by season, unlike automobiles. Daikin thus had to innovate extensively when it fit the JIT System to its production lines.

Daikin employees were transferred to the Head (Ikeda) Plant and Shiga (Ryuo) Plant of Daihatsu Motor Company for training related to the new system. In January 1978, Daikin announced the kickoff date for introducing the JIT System in the Kanaoka Factory of its Sakai Plant. With that announcement, Daikin then began the important task of educating and training its employees to make them more aware that the new system would be able to produce different items on the same line. Mixed production on the assembly lines for small-size packaged air conditioners, called the Pro-



Kanaoka Plant Production Line; Before/After Introduction of PDS

duction of Daikin System (PDS), began in September 1978.

The following month saw construction of the Rinkai Factory completed. Rather than the straight assembly lines previously used for machine processing, Daikin installed U-shaped lines in the Rinkai Factory and each line worker handled more machines than before. From the start, therefore, the new assembly lines were built to match the needs of the PDS. The system for producing compressors was also put into order. From November, the Shiga Plant also began using the PDS. Senior Managing Director Tsuboi of Daihatsu, meanwhile, who originally provided Daikin with PDS guidance, moved to Daikin as an executive advisor. For six years afterward, until 1984, Tsuboi provided important advice and guidance to Daikin related to the new production system.

Among all Japanese companies, Daikin introduced quality control into its operations relatively early. In fact, as early as 1960 the company was already using statistical quality control. But after 1962, the year that the Japan Productivity Center invited Professor W. Edwards Deming to Japan to lecture nationwide about methods of quality control, many Japanese companies studied his approach to quality control. They established QC circles and tackled the matter of using QC methods effectively. Many of the huge volume of products made and exported during the early postwar years in Japan earned a reputation for being cheap and poor in quality, providing grounds for Japan earning a negative export reputation. Energetic QC activities in Japan after Dr. Deming's visit, however, gradually led to much higher quality products being exported. Daikin realized at this same time that in using its previous statistical controls it had not paid sufficient attention to product quality. As one result, it began from 1970 to hold QC Circles at its Shiga, Yodogawa, and Sakai plants with participation by all employees. Next, in 1971 it established monthly QC Promotion Committee meetings. Later that committee was renamed the Product Quality Improvement Committee, with subsidiary organizations in each plant called the Product Quality Improvement Action Committee. QC Circle Committees were also established as organizations for carrying out quality-control activities, with the committee members at all levels acting to improve product quality. Under a unified slogan, and through company-wide technical competitions and Daikin QC Circle Contests, the thinking of all employees, from the bottom up, became directed toward improving product quality.

After the Oil Crisis, the Chemicals Division succeeded in rationalizing its operations thoroughly and developing new technology. In fact, during the difficult period when Daikin's overall revenues were stagnant, the Division increased its profits, thus supporting the company's overall business performance. Sales in the Chemicals Business Division began rising rapidly from 1976, and in 1980 surpassed 200 billion yen, double the sales figure of 1973. Sales in 1983 were triple those of 1973, and in 1985 they were quadruple the sales in 1983, with exports counting for just under 25 percent of the total.

One of the factors that contributed to the rapid growth of the chemical products business was bolstering the R&D Division. Members in that division increased from 145 in 1980 to 236 in 1985.

Facilities were also bolstered, with construction of an applied research laboratory, a processing research laboratory, a polymerization research laboratory, and installation of various types of leading-edge equipment. The division provided a full line-up of PTFE resin products, the mainstay fluororesin products, and Daikin came to rank with DuPont as one of the world's top chemical manufacturers. At the same time, though, competition intensified as Asahi Glass entered the market after establishing a joint venture with ICI (Imperial Chemical Industries, acquired by Akzo Nobel in 2008) of the U.K.

During this period, the Chemicals Division targeted the technological development of molten resins such as FEP, PFA, ETFE, and others. These molten resins are fluororesins that overcome the moldability shortcomings of PTFE and can be easily melted and molded. Daikin developed FEP in 1974 and commercialized it as a resin for covering electric wires. Based on the same technology, Daikin also moved forward with developing PFA that melts at high temperatures and ETFE that melts at low temperatures. In 1982, it was the first Japanese company to market these two resins. Molten resins are highly unreactive, and hardly ever invaded by chemical products or solvents. As a result, the demand for them increased as the market expanded greatly on a global scale for applications mainly for chemical etching semiconductor processes, for pipework and carriers for reactive chemicals in semiconductor manufacturing equipment, and so on. Demand increased globally in response to rapidly growing markets. Daikin improved the properties of fluoroelastomers, meanwhile, such as heat resistance and chemical resistance after the Oil Crisis in response to customer needs, especially in the automobile industry where measures were being introduced to improve fuel efficiency and comply with emission controls. In the process of improving fluoroelastomers,

Daikin developed the iodine migrating polymerization method, block polymers, and the two-stage polymerization method. These technologies were highly rated for their creativeness, and in 1991 the iodine migrating polymerization method won the Japan Patent Office Minister Award from the Japan Society of Inventors.

Daikin also paid close attention to cost cutting. In 1985, it established the Process Development Department, and in 1986 the Engineering Department, thus putting into order a system for developing plant technology at the basic concept stage. Daikin introduced decentralized control using computers in the Gas Production Department from 1980 and in the Resins Production Department from 1982, with both systems subsequently contributing considerably to labor savings and the prevention of errors when operating equipment. Daikin also introduced chemical engineering computational software to raise the efficiency of basic design work, and process simulation software in 1987 to improve the company's engineering capabilities and substantially shorten construction time. That technology had already been introduced in Japan's oil refining and petrochemical industries and its use was expanding, but because the coupling of the molecules of the important substance hydrofluoric acid changes depending on factors such as pressure, temperature, and viscosity, the computational model was complicated. Daikin was the first company to develop it for use in fluorochemical plants.

In these ways, during the period that sales in the air conditioning division were sluggish because the summers of 1980 and 1982 were unusually cold, the Chemicals Division expanded its market by developing new products based on its fluorochemical technological capabilities. Sales of existing products expanded, meanwhile, such as fluorine cleaning solvents and fluororesins, stimulated by the rapid growth of the semiconductor industry. Al-

Kashima Plant

though it became necessary to bolster Daikin's manufacturing capabilities in order to prepare for further expansion in these fields in the future, the Yodogawa Plant did not have enough space for expansion. From around 1970, therefore, the company began searching for a new plant site. The search was postponed for a while following the first Oil Crisis, but management decided a plant had to be built by 1982 and once again began searching for an appropriate site. In 1978, Daikin learned about the Kashima Rinkai Industrial Park being developed along the coast in Ibaraki Prefecture north of Tokyo. There were several other candidate locations as well but after a comparison study was completed Daikin decided in 1980 on a site in the Kashima Hasaki area of that industrial park.

Development of the Kashima Industrial Park began from the early 1970s, and an infrastructure was already in place when Daikin viewed the area, complete with electric power and a nearby port. It was one of Japan's most representative industrial parks. In the central area, Sumitomo Metal Industries had its Kashima Iron Mill, and there were many plants of other Sumitomo group companies. The area where Daikin purchased land included one of Japan's largest ethylene plants and several other plants in the petrochemical industry. It was the first plant Daikin built away from

"Daiflon Solvent"

Plenum Cable using "Neoflon" FEP

the Osaka area, where its business was founded. Daikin was actually fortunate to have found land in such an extremely favorable location. April 1983 saw the start of operations at the Kashima Plant. The first product off the production line was "Daiflon" 22, a product for which demand had expanded quickly. That same November, operations began for producing tetrafluoroethylene and "Polyflon" PTFE M12, and in July 1985 for producing "Daiflon" 113, hexafluoropropylene monomers, and "Neoflon" FEP.

Chapter III

Recovering from Managerial Crisis (1986–1994)

Establishing Managerial Principles and Daikin Management

The period from 1986 to 1994 saw truly tumultuous international changes, including the collapse of the Berlin Wall, the unification of East and West Germany, the collapse of the Soviet Union, and the end of the world's Cold War structure. Shortly before that, in September 1985, the finance ministers of five countries— France, Germany, Japan, the United Kingdom, and the United States—met to discuss the highly appreciated U.S. dollar. They reached an agreement, the Plaza Accord, which subsequently led to a rapid appreciation of the yen in Japan from the end of 1985. Once into 1986, concerns emerged about the negative effect a strong yen would have on exports, and the Japanese economy entered a peri-

od of temporary economic adjustment. But there were international expectations for an expansion of demand in Japan, and in that context the Bank of Japan lowered the official discount rate and the central government introduced other policies to stimulate demand in Japan. As a result, from 1987 the economy made a 180-degree turn, and business expanded quickly. The four leaders in the new business situation were land, housing, the stock market, and other forms of individual consumption and private-sector demand. An economic situation called the "assets inflation" developed. With the backdrop of this rapid expansion in domestic demand, Japan's economy came to be called a "bubble economy," and the highly favorable economic situation continued until the early 1990s. Daikin's business results, meanwhile, supported by an expansion in the domestic demand for air conditioning equipment, grew rapidly. The chemical products business, in contrast, was sluggish, mainly because of difficult issues the company faced related to restrictions on the emission of fluorocarbons, a lawsuit in the U.S. related to the dumping of fluororesins, and a violation of COCOM regulations. Daikin termed these issues its "triple ordeals," and while responding to them it tackled the matter of essentially reforming the physical make-up of its chemical business. As a result of those efforts, the company returned vigor to its sluggish chemical business and realized further growth.

Daikin prepared "Vision 95," its new business plan, in 1990. The company worked vigorously according to the plan for recovery of its chemical business and construction of a global system for its air conditioning business. By the year 1992, smack in the middle of the Japanese "bubble" economy, Daikin had achieved three main business goals: an all-weather organization, emphasis on technology, and strengthening of group management. What made such business development possible was the rapid growth

of the company's air conditioning business. Daikin introduced reforms in that business during the recession following the Plaza Accord. It built a strong business base at that time, and together with the ensuing turn-around of the Japanese economy and the rapid domestic growth that followed, the company comfortably handled increased demand. Daikin also rebuilt a firm business foundation for its chemical business, which grew into a most important component in the company's subsequent growth. Although Daikin achieved an all-weather managerial structure by 1992, the ten years from 1993 were called the "lost decade," a long period of depressed business, which told the company its business structure was not as solid as it thought. Daikin later came to realize that the organization it established during the bubble economy was like a house of cards, and it thus had to tackle basic reforms to its managerial structure from 1994 on. Simultaneously, the company was also scheduled to review the Vision Management Plan established during Minoru Yamada's tenure as president.

Together with the globalization of Daikin's air conditioning business, the make-up of the employees in the group of overseas-related companies became internationalized. Even in Japan, as the company grew larger its workforce quickly expanded and diversified, including new college graduates and those who joined the company midway through the year. As a result, the company came to be comprised of a mixture of employees with differing cultural and educational backgrounds. Even for Japan, Daikin stood out for its mixture in the workplace made up of employees of different ages and backgrounds. Not only managers, of course, but all levels of ordinary employees had to embrace a common awareness, and the company had to establish clear management principles and behavioral guidelines. With that backdrop, Daikin

established a new set of management principles in May 1990. The previous principles guiding the company dated from 1958, and were expressed in three points: "absolute credibility," "enterprising management," and "harmonious personnel relations." At the time, those principles were sufficient for guiding the employees. Under the new business environment in the 1990s, however, ten new guiding principles were established with the focus on "people," and each principle had specific, detailed behavioral guidelines. The ten management principles, expressed as follows, outlined the type of company Daikin aimed to be, and they guided the employees specifically in terms of the behavior expected of them inside the company.

1. Daikin should be a company trusted by society
2. Daikin should be a company offering various opportunities to its employees
3. Daikin should constantly be growing and developing
4. Daikin should grow together with its individual employees
5. The foundation of management should be harmony among high-spirited employees
6. The foundation of management is responsive labor-management relations
7. Fair personnel affairs, and a flexible organization
8. Three essentials for business managers: Sensitivity, courage, and creative leadership
9. Development as a group
10. Activities as a good corporate citizen; activities based on corporate ethics; and formation of a network of people

President Minoru Yamada once said, "The regular business activities of management in a company are most in line with the company's basic philosophy when its employees appreciate that philosophy the most and that is also the best time to have that thinking spread widely throughout the company." Such thinking expressed Yamada's wish to have all Daikin employees thoroughly appreciate the company's guiding principles. And in response to the Daikin Group's global development, an English language version of the guiding principles was prepared and distributed around the world. The employees of the overseas group of Daikin companies were then urged to read and appreciate the company's basic philosophy and its behavioral guidelines.

Included among the company's ten management principles are six items that directly express respect for the individuality of each employee, a reflection of President Yamada's beliefs. He played a leading role in establishing personnel policies that emphasized respect for all employees. And to realize true fairness in dealing with employees, he felt a strong necessity to support a system in which the company clearly rewarded employees who made greater efforts to contribute to the company's growth. He believed that personnel in the company were "people who came together for some reason" and he supported policies that treated employees well. On a related note, in 1989 the company increased the separation pay of employees, increased the scholarships granted to children left after an employee's death, reviewed the system and conditions for employing handicapped persons, and introduced a system for rehiring employees after they retired at the age of 60. All those steps let the employees feel pride and an attachment to the company. It was truly a Japanese-style employment system that the company built and improved over the years. It responded to the Japanese life cycle by providing stability in employment and allowing employees to relax concerning their continued employment. Daikin was among the earliest Japanese com-

panies utilizing such a system for evaluating the capabilities of employees. It was exactly because Daikin strongly enforced "management centered on personnel" that it was able to build a "group of people filled with vitality." That same spirit remains unbroken in Daikin to this day.

During the years covered in this chapter—1986–1994—Daikin's business scale expanded quickly and globally. Sales of 276 billion yen for the period ending in March 1989 for Daikin alone reached 368 billion yen for the period ending in March 1992, which was 30 percent growth in three years. Among total sales, those for air conditioning accounted for over 70 percent of the total, constantly maintaining an annual profit of 9–12 percent. The company continued its globalization during this period, with aggressive investments particularly in European countries and Thailand. The company focused its investments on its chemical operations in the U.S., investing heavily on establishing a production base there. In the period covered in Chapter 2 (1972–1987), we saw Daikin make desperate efforts to recover from the blow caused by the two Oil Crises and to catch up with the rapid technological progress seen in Japan. The nine years in this chapter (1986–1994), however, cover a period of favorable business based on the "bubble" economy, a period during which Daikin experienced solid growth. Both the Chemical and Electronics Equipment businesses faced several unstable factors at the time, but active overseas investments became possible and Daikin was able to take its first steps forward as a global enterprise.

In aiming to become a "company that always continues to grow and develop," as expressed in its corporate philosophy, Daikin actively invested in R&D and new facilities. Around this time, for example, the company aggressively invested in establishing the MEC Laboratory, new air conditioners production facilities at

Kanaoka Factory, Rinkai Factory, Kashima Plant and Shiga Plant. It also invested heavily in its air conditioning equipment delivery centers and to increase the number of its air conditioning agents. Looking only at the company's investments in directly related companies, total investments in 56 domestic and overseas companies for the period ending in March 1988 were 3.2 billion yen. For the period ending in March 1993, those investments jumped to 66 companies and 23.9 billion yen, a roughly eight-fold increase in a five-year period.

To cover the investments it made at that time, Daikin secured external funds in various ways. In the 1980s, several major financial moves, such as the issuance of convertible bonds and warrants overseas had become much easier than previously after the financial Big Bang. The first corporate bonds the company issued were warrants valued at 50 million Swiss francs, issued in 1982. Later, the company undertook an active program of corporate public relations activities aimed at investors in the Euro market. Its efforts focused on raising capital under favorable terms. One especially favorable move was the issuance in 1987 of warrants worth 100 million Euro dollars. Taking into consideration the difference in exchange rates at the time of maturity, the company actually paid minus interest on the funds it raised at that time. As a result of that fund-raising activity, shareholders' equity ratio in Daikin rose from the 20 percent level it had remained at up to 1985 to 42 percent in March 1989.

Around this time, several outstanding factors contributed to the strengthening of Daikin's financial structure. One factor that contributed significantly toward bolstering the company's financial structure was the increased efficiency of the assets the company's various business divisions controlled. Also, promoting the domestic air conditioning division's collection of the fee in cash

owed to it significantly lowered the company's trade receivables. As an aside, the scale-down method of trade receivables used at that time was later also used effectively by Daikin's air conditioning business in China. It contributed substantially to the company's construction of a solid foundation in the Chinese market. As a company in the manufacturing industry protecting its main business line, Daikin also demonstrated a sound business sense by avoiding the attraction of investments in financial markets and real estate at the time of the "bubble" economy, an attraction to which other Japanese companies succumbed.

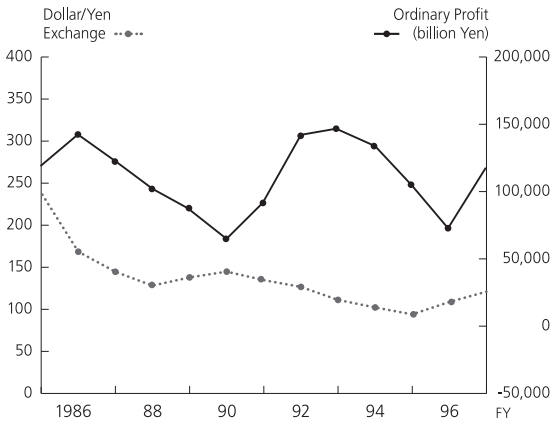
At the same time, Daikin energetically tackled investments in advanced technology, the main pillar of the company's favorable business results. For some time, Daikin was especially well-known for its accomplishments in the machinery industry, particularly with air conditioning equipment, and its work in the chemical industry with fluorocarbon and fluororesins. During the 1980s, Daikin also entered the electronics industry. And with future growth in mind, the company felt the need to tackle the development of all-out advanced technology. At that point, on the occasion of the "The International Exposition —Tsukuba, Japan,1985," Daikin began preparing to open a Tokyo Research Center in Tsukuba City, located in the northern part of the Kanto Plain. Five years later, in 1990, Daikin opened the MEC—standing for Mechanics, Electronics, and Chemistry—Laboratory. Besides developing new products based on advanced technological information it collected, the MEC Laboratory also developed the necessary technology related to sensors and optics, developed new products using ultra-thin fluororesin membranes, and included the challenge of combining these MEC research themes in its goals. There were limitations to what the MEC Laboratory could realistically expect to accomplish, however, and eventually it

MEC Laboratory

placed the main focus of its activities on medical-related research, an area of expected growth at the time. But it was difficult to achieve results in the medical field in a short period of time, and it was not a field in which Daikin could utilize its existing technical foundation. Although the MEC Laboratory developed products such as a meter for measuring blood glucose level and a device for measuring immunity, in the end the reorganization of the research system became a task later in Daikin's history.

The burst of the economic bubble quickly worsened Daikin's business environment, and sales turned stagnant in its mainstay domestic air conditioning division. Coupled with the rapid appreciation of the yen from 1993 and a record-breaking cold summer that year, total sales began decreasing rapidly after peaking in the period ending in March 1992. The company subsequently faced a severe decrease in business performance. For the fiscal year ending in March 1994, for example, it recorded a deficit in ordinary profits. Including the investments made to rebuild the company's business because of the "triple ordeals" the Chemicals Division faced, and the increased advance investments made during the period of the bubble economy, it was difficult for Daikin to respond to sales in the domestic market that were sluggish beyond anyone's expectations. Overall, the excessive weight of fixed costs

Yen Exchange Rate and Current Account Balance



reduced management's flexibility. And serious problems with lower management practices caused a delay in the company's recognition of the impaired business environment.

In 1992, President Minoru Yamada created the slogan "Let's use the headwinds we face as an opportunity for new growth," and ordered a strengthening of the company's basic structure and reforms in the earnings structure in the three areas of technology, production, and management. Besides reduced inventories, a reduction in or reassignment of the part-time labor force and seasonal workers, and more efficient expenditures, capital investments were made on a priority basis or were reduced in size, resulting in a 40 percent decrease in overall expenditures compared to the previous year. Next, in 1993, a Management Issues Deliberative Council was established, comprising a small number of top managers plus related directors, to tackle the structural reform of unprofitable business operations. Two prime targets of structural reform were the robotics division and new applications of the oil hydraulics business.

Meanwhile, the summer of 1993 set records for being cold,

and the demand for air conditioning equipment dropped noticeably. The yen rapidly strengthened around the same time to almost 100 yen to the dollar. At that level, the strong yen dealt Japan a double punch. Domestic consumption was at a low level after the burst of the economic bubble, and the stronger yen weakened the Japanese business environment further. In that situation, Daikin introduced its "Vision 95" business plan, promising expanded growth and enforcing an emergency project for overcoming the crisis it faced. It would do this in four ways: 1. Create and expand the value added of the overall Daikin Group, and develop new businesses and peripheral businesses to bolster its profitability; 2. Bolster the system for developing global businesses; 3. Relocate the company's capital, personnel, and other managerial resources; and 4. Bolster management of the Group's capital.

In the context of the negative business circumstances, the company issued an Emergency Message in President Yamada's name asking all employees to appreciate the difficult managerial situation, to continue doing their best for the company, and to expect adjustments to the standard rules for reducing company-wide expenses. That marked the start of efforts to reduce expenses further. All-out reform of the company's managerial make-up was not an easy matter, however, and President Yamada's tenure ended with a response along the lines of the Emergency Message.

Domestic Air Conditioning Business Turns Favorable, and Overseas Developments

The "bubble economy" that continued in Japan for almost four years, from 1987 to the spring of 1991 saw a tremendous surge in individual spending and unprecedented investments in plants and facilities by corporations. Daikin benefitted from both the consumption boom related to its air conditioning business and

the boom in plant and equipment sales. In its mainstay packaged air conditioning business it experienced annual growth of 18 percent, far higher than the industry's average annual growth of 10 percent. It not only greatly increased its share of that market segment but also did well in riding the wave of consumption in the room air conditioning business. In 1991, Daikin had 26 sales companies, 113 sales outlets, and a total of 2,217 sales personnel. Sales that year for air conditioners and freezers were 27.9 billion yen, double the sales in 1987. The air conditioning production volume at the Shiga Plant increased greatly during the same period. Production of room air conditioners, in particular, was 2.2-fold the production in 1987, reaching 700,000 units/year.

The summer of 1987 was extremely hot in Japan, and sales expanded so rapidly that service capabilities could not keep up with demand. Daikin had always taken great efforts in maintaining its service capabilities, and at this time it put its own service stations into order and asked its dealers for their cooperation in building an efficient service network. But even that network could not respond sufficiently to the rapidly increased workload. To resolve the service problem Daikin introduced a temporary system for the dealers who cooperated in servicing customers by paying them incentives according to the increase in the number of service calls they handled. Also, Daikin hired large numbers of new employees to reinforce the staff of service engineers. The company also opened new service stations, with priority given to covering the Tokyo capital region and the Kansai area, the two areas where demand was increasing the fastest. By around 1992, the speed of response to service requests improved considerably. Daikin also needed to improve the quality of service by raising the technical skills of the service engineers and thoroughly teaching them proper manners for dealing with customers. In that situation, Daikin opened the Daikin AC Service Engineering College, including in the curriculum engineering skills, servicing administration, and courses for obtaining various official qualifications, as well as a course on how to handle customers. Thus began the training and education of field engineers capable of providing guidance to dealers and others. In order to respond effectively to the trend toward products using more electronics and inverters in systems, fault diagnosis technology and service tools were also developed for service engineers. The tools, which included a service checker for "VRVs" and cleaning devices for ceiling-mounted cassette-type air conditioners, contributed to raising the efficiency of service operations.

In response to the increased sales during the bubble period, one move Daikin made was to bolster its production system. Initially, it did so by extending the hours of operating the existing equipment. At the Shiga Plant, for example, a system of two shifts was introduced (2 shifts per day; 16 hours of equipment operation) to increase production capabilities. On the other hand, because the Kanaoka Factory in the Sakai Plant was located in the city area, Daikin had to promote a low-noise environment, before introducing a two-shift system that included a night shift. In Japan at the time there was a serious shortage of labor, and many companies hired large numbers of workers to prepare for the future. Daikin, however, remembering what it learned during the oil crises increased its workforce only by utilizing part-timers and other non-full-time workers. In 1987, there were 1,264 employees in the direct department of the Air Conditioning Manufacturing Division of which contract workers accounted for 31.5 percent of the total. By 1991, the total number of workers increased to 2,864, over double the 1987 figure, and contract laborers, such as part-timers, came to account for 56.2 percent of the total. Meanwhile, there was

a noticeable shortage of parts from suppliers. Daikin took actions such as early preparation of production plans and early ordering of parts, depending on the production capabilities of the parts manufacturers. The company took further steps in that difficult situation, such as sometimes placing orders for the same parts with more than one company, establishing parts depots, or using replacement materials. If there were still shortages, emergency measures were introduced, such as having management at higher levels negotiate a solution.

As an essential solution to increase its production capabilities, Daikin had to bolster its production equipment quickly. In that context, the company began construction of the No. 2 Factory in the Rinkai Factory of the Sakai Plant. Using state-of-the-art technology, new and powerful lines went into operation in 1990 for producing "SkyAir" outdoor units and in 1991 for producing scroll compressors at the No. 2 Factory in the Rinkai Factory in 1988. For all commercial air conditioning equipment, Daikin's total investments in manufacturing facilities for the period 1988–91 were 23.7 billion yen, equivalent to all the company's capital investments over the previous 14 years. For residential air conditioning equipment as well, new and powerful lines with higher rates of automation were built in the Shiga Plant in 1989. In order to support operations at the Kanaoka Factory, in the second half of the 1990s the production of "SkyAir" indoor units was shifted from there to the Shiga Plant and production capacity at the Kanaoka Factory was bolstered. Investments in manufacturing facilities for residential air conditioning equipment for the three-year period totaled 11.4 billion yen.

Daikin introduced factory automation at the newly constructed No. 2 Factory in the Rinkai Factory as it aimed to build a computer integrated manufacturing (CIM) system. The system would

use computers in a production management system and data communications network to synchronize the production of varied products and their parts. Daikin aimed to have the highest rate of automation among companies in its industry by widely applying robotics that its Robot Systems Department developed. Daikin realized the benefits of automation by modularizing easily assembled parts. Also, developments such as automated warehouses, a picking system, driverless transportation between processes, and the use of auto loaders on machine processing lines to systemize the transport of parts resulted in high-speed, continuous operation lines free of workers. The use of automated compressor lines, such as the one initially introduced in the Rinkai Factory, spread later to the Shiga Plant for producing indoor and outdoor units for small room air conditioners. Use of automated lines then followed on lines producing indoor and outdoor units for small room air conditioners at the Shiga Plant and "SkyAir" outdoor units at the Rinkai Factory. By 1991, automation at the company's factories reached 90 percent of total operations.

Years later, Daikin itself criticized the efforts made during the period of the bubble economy to automate its factories, saying those efforts caused excessive investments in plant and equipment and made it difficult to respond to changes in market needs. At the time, however, the shortage of labor was critical and was expected to worsen further. Additionally, demand was increasing rapidly, and factory automation made it possible to respond to both situations. A side effect was that Daikin was able to maintain its market share. Actually, automation contributed to reducing production lead-time by about 50 percent, and labor productivity almost doubled. Also, as process management became more sophisticated, complaints about products during their first year on the market dropped to one-fifth their former level, and product

quality also improved.

Because the variety of air conditioning products became more diversified and production output of both packaged and room air conditioners increased rapidly during the period of the bubble economy, regular maintenance checks on production equipment became increasingly important in order to realize stable production. At the production sites, however, attention was concentrated on extending the operation time of machinery, and gradually less attention was being paid to regular maintenance checks of equipment. In order to cover that weakness, the Shiga Plant introduced "TPM" activities from 1987. "TPM" had two meanings: one was "Total Production Maintenance," and the other was "Total Preventive Management." TPM used five checkpoints to raise the awareness of employees concerning the care and maintenance of equipment and to develop human resources possessing high skill levels. The points included autonomous maintenance, individual improvement, early-stage management, planned maintenance, and training and education. Three goals were set for the project: 1. establish an efficient production system; 2. develop human resources; and 3. realize a pleasant working environment. To achieve those goals, all employees participated in activities aimed at improving the structure of their workplace and raising both productivity and the overall efficiency of production equipment, at the same time realizing a reduction in both equipment-related accidents and total downtime. Those activities developed personnel who came to know the equipment well and could maintain it at sufficiently high levels to enable it to produce high-quality products.

In the distribution process as well, the "bubble" economy saw the rapid development of more diversified and sophisticated needs, and customers began requesting immediate delivery of

Soka Delivery Center

small lots. The capital region market, located quite far from Daikin's assembly operations, expanded especially quickly, strongly urging the company to improve its delivery function. As one result, Daikin built a large intelligent delivery center capable of handling shipments quickly in Soka City, located 20 kilometers north of Tokyo. The Soka Delivery Center opened for operation in August 1990. It used bar code readings for inventory control, automatic materials handling equipment, and centralized computer controls. The sophisticated equipment enabled the center to sort shipments into small lots. Making use of the expertise gained at the Soka Delivery Center, Daikin next opened the Sakai Rinkai Delivery Center in April 1992 to service the greater Kansai area, centered on Osaka and Kobe.

Early 1992, however, saw the collapse of the bubble economy and a rapid cooling off of the air conditioning market. Combined with the negative effects of a stronger yen, 1992 turned out to be Daikin's worst year ever for air conditioning sales. The company was just beginning to invest in strengthening its sales capabilities when it was struck by a weakened demand for air conditioning and lower market prices. The company's share of the packaged air conditioning market, meanwhile, which had risen steadily over the previous ten years, stopped rising and then started falling, an

Automatic Materials Handling Equipment Inside Soka Center

extremely serious situation for Daikin. Although all in-house units of the Air Conditioning Production Headquarters moved to upgrade their sales, their efforts to reduce production and delivery costs could not respond sufficiently to the sharply reduced production volumes. Price decreases were also larger that Daikin's expectations, and even in the following year, 1993, the company could not halt its declining business results.

The torrid summer of 1994 saw temperatures in Japan at the highest levels ever in the 135 years of keeping records at the Meteorological Agency. Business was so good that the industry's sales of air conditioners were up 154 percent from 1993 figures. Daikin's shares of sales, however, were down in both the packaged and room air conditioning markets. Around the same time, the company's Chemicals Division overcame its "triple ordeals" and its profits covered the sluggishness in the air conditioning business, thus keeping the company's overall results from falling into deficit. The company was unable to improve the results in its key air conditioning business, however, and sales remained sluggish. Although recovering from that situation became a serious issue for Daikin, major reforms for responding to it were carried over into the next period of the company's history.

Daikin moved to acquire certification for meeting the ISO

Daikin Europe N.V. being Expanded

9000 quality management standards of the International Organization for Standardization (ISO) for improving the structure of its Air Conditioning Manufacturing Division. The ISO 9000 series are international quality standards the EU established, modeled after Japan's quality management manual. At the time Daikin began moving toward certification, the number of other Japanese companies also moving to acquire certification was increasing. Daikin's commercial air conditioning manufacturing division recognized the ISO 9000 series as a well-planned and well-organized system for promoting quality assurance, and in 1991 the company began conducting activities at its Kanaoka Factory aimed at acquiring certification.

After the company prepared a quality management manual and thoroughly trained and educated the employees, the Kanaoka Factory became the first production facility in Japan's air conditioning equipment industry to obtain ISO 9001 certification. Acquiring certification brought the secondary effect of increased trust in Daikin by government agencies and large-volume customers. After the success of the Kanaoka Factory, the Air Conditioning Manufacturing Division had the Shiga and Yodogawa plants acquire ISO 9001 certification one after the other, and the Rinkai Factory acquire ISO 9002 certification. By 1995, Daikin Eu-

Factory's Inside after Transfer of Production

rope (DENV) and Daikin Industries Thailand (DIT) also acquired ISO 9002 certification.

In 1993, on the occasion of another round of yen appreciation, DIT prepared a plan for expanding its local production. At the same time, Daikin began promoting the transfer of production from Japan to DIT of non-inverter type small room air conditioners and small RC compressors. The finished products would then be exported to Japan, their final market. DIT's efforts for acquisition of ISO 9002 certification were especially noteworthy because it signified a shorter production lead time and made DIT's quality management stable as a global production base. In 1993, Daikin began to transfer the production of several other items to DENV from Japan, including the outdoor units for medium- and large-size room air conditioners, and the outside units of multi-room air conditioners for use in buildings. The actual transfer will be discussed in the next chapter of this book but the efforts Daikin was making around the same time to acquire ISO certification provided strong leverage for a smooth start to overseas production.

Daikin's overseas sales of air conditioning equipment were dealt a severe blow when the yen appreciated following the Plaza Accord. In that situation, the company had to introduce remedial measures quickly in order to reconstruct its overseas sales system.

Daikin Industries (Thailand)

The yen, however, which moved between 240 and 250 yen to one dollar in 1985, jumped quickly at the end of 1987 to 120 yen to one dollar. Daikin formerly selected high-priority overseas countries for introducing capital, personnel, and strategic products. Measures introduced up to that point, however, were ineffective. One of its main aims starting in 1988, therefore, was to aim for a structure that would be profitable even at 120 yen to one dollar, and to achieve this, it switched to a strategy of identifying particularly important countries. The five most important markets it identified were Australia, Europe, Hong Kong (prior to its return to China), Indonesia, and Singapore, and Daikin subsequently prioritized reconstruction of its operations in those markets. In countries where Daikin was already conducting operations, meanwhile, such as the U.S., China, Malaysia, Thailand, and some others, it started reconsidering how its businesses were progressing there. In the U.S., in particular, Daikin realized that its separate-type room air conditioner did not fit well in the market. Also the company was fighting a difficult lawsuit in Miami, Florida. In addition, profitability worsened excessively because of the rapidly strengthened yen. As a result, the U.S. became the largest negative sales country in the International Sales Division. One result was that in 1988 Daikin decided to pull out of the U.S. market tempo-

Opening Ceremony of DIT

rarily, and at the end of September it liquidated Daikin U.S. Daikin had already closed its operations in Kuwait, Malaysia, and the Philippines, and now it pulled completely out of the U.S. market.

In Australia, Hong Kong, Singapore, and Thailand, meanwhile, markets considered ultra-important, Daikin switched its business format from payment based on yen to payment based either on the local currency or the U.S. dollar, thus assuming the risk associated with money exchange. At the same time, though, Daikin raised its product prices considerably, and began reconstructing its sales system in various ways, such as by developing sales agents it called "air conditioning professionals." The company also introduced various policies in a strong effort to expand the sales and service capabilities of its agents, including holding classes to bolster service technology, the transfer of know-how for managing the shops of the air conditioning professionals, bolstering publicity, and promoting invitations to visit Daikin's Head Office and tour the company's plants.

In 1987, at a company-wide development conference, there were discussions about preparing a global production strategy for maintaining the company's cost competitiveness. Three new policies emerged from those discussions: 1. Align the company's overseas production bases to enable them to produce air conditioning

products with the same quality and functions as products made in Japan; 2. Transfer technology to the overseas production bases to raise them to the same technical level as in Japan; and 3. Depending on the circumstances, produce products overseas that can be exported to Japan. Based on those policies, the first overseas production base Daikin established was Daikin Industries (Thailand) Ltd. (DIT). Besides the Newly Industrializing Economies (NIEs), Daikin also considered countries such as Indonesia, Malaysia, and other countries in Asia and the Middle East as locations for global production bases and decided on Thailand because of its previous experience in establishing a production base there. In February 1990, Daikin thus established Daikin Airconditioning (Thailand) (DAT). Daikin moved production for the Thai market from Siam Motor to DAT, and separate from DAT established DIT as a wholly owned subsidiary. The new company was positioned in Daikin's air conditioning division's strategy as a global production base, and DIT exported its total production to global markets. When Daikin completed construction of DIT in December 1990, the plant's annual production capacity was 180,000 room air conditioners and 250,000 rotary compressors. From January 1991, the plant also began producing separate-type room air conditioners.

In a major change of plans for its business in Europe, Daikin switched sharply to an aggressive strategy starting in 1988. The company's overseas activities originally began in Europe and the company developed a strong business foundation there early on. Daikin was especially aggressive in the second half of the 1980s in assisting and providing leadership to its local company for bolstering and expanding its sales network. There was much activity in Europe, including Great Britain, in the second half of the 1980s as the region prepared for unification with the EC in 1992. Besides

expectations for a greatly expanded market, import restrictions were gradually being strengthened. Multiple Japanese corporations had already been accused of dumping activities, and a stronger need emerged for initiating local production activities. In that situation, Daikin positioned DENV's Ostend Plant as a key production base in Europe. In order to bolster the plant's production capacity, Daikin introduced its DE Project in 1990. In the first phase of the project the company shifted the production of all medium- and small-size indoor units for room air conditioners and wall-mounted type indoor units from Japan to DENV. The DENV plant was then expanded, new equipment was installed, and in March 1992 the all-out production began of outdoor units for split systems. In that overall process, with the aim of turning DENV into the top air conditioning manufacturer in Europe, the company introduced the Production of Daikin System and responded to European specifications by increasing the percentage of parts and raw materials procured locally. Next, from November 1993, Daikin introduced the second stage of its DE Project. It shifted production from Japan to DENV of large-size outdoor units for room air conditioners, "VRV" systems for homes, and the "SkyAir" series

At the same time that Daikin expanded and improved DENV's production capacity it also bolstered and reorganized the local sales network. In the late 1980s, demand was increasing in London for using "VRV" systems in small and medium-size commercial buildings being renovated. In that situation, Daikin designated London as an area for expanding that type of equipment for use in buildings. Through DENV, Daikin concentrated on providing distributors with sales experience it accumulated in Japan, including ways to approach electric power companies, the hosting of seminars aimed at large installation contractors, and technical training courses for installation and maintenance services. Daikin

had a three-year start on other companies in the sales of "VRVs", and its total sales in London expanded remarkably as a result of its sales promotion activities. Those expanded sales contributed greatly to the International Sales Division turning profitable in fiscal 1988, registering a profit of 2.4 billion yen. Its income on sales was 12.4 percent, the largest among Daikin's divisions.

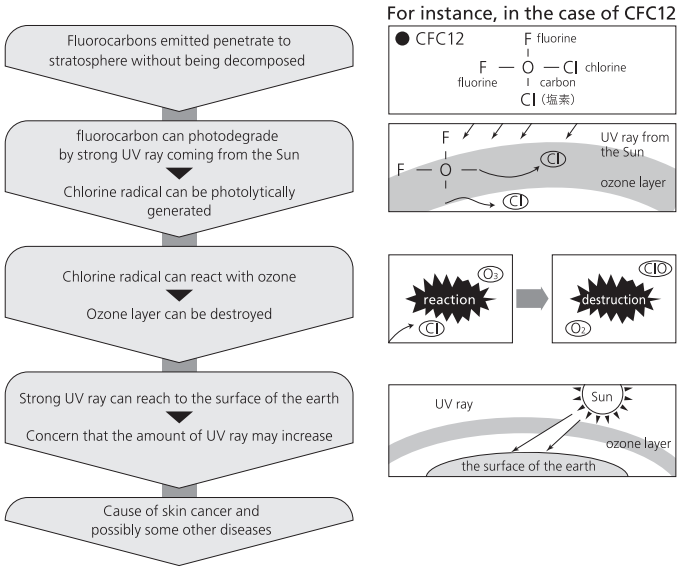
Using the success in London as a springboard, Daikin introduced similar projects for expanding the sales of "VRVs" to other countries in Europe. France was a priority market in Europe. After Julien et Meige Ltd., the parent company of Daikin's distributor Megatherm, went bankrupted, Daikin bought Megatherm and reorganized it. In 1992, Megatherm was made a wholly owned subsidiary of DENV, and in the following year Daikin changed Megatherm's name to Daikin Airconditioning France S.A.S. The company then began aggressively selling "VRV" systems. Daikin also became more aggressive in selling in the countries of Asia, in Australia, and in the Caribbean countries, thus successfully developing global markets.

Three Trials of Daikin's Chemical Business

The year from 1987 to 1988 was a truly tumultuous year in which several major problems emerged that shook the very foundation of Daikin's business. At the time, the Chemical Division's main product was fluorocarbon, a chlorofluorocarbon (CFC). CFCs were specified in the Montreal Protocol signed in September 1987 as harmful substances that contributed to depletion of the earth's ozone layer. Daikin, therefore, quickly had to develop a substitute substance with little negative effect on the ozone layer. In November 1987, the U.S. government filed charges against Daikin for dumping fluororesins.

Next, in August 1988, Daikin was investigated in Japan for

Theory of Prof. Roland Regarding Destruction of Ozone Layer by CFC12



suspected violation of the rules of the Coordinating Committee for Multilateral Export Controls (COCOM). And in December, the Japanese government charged Daikin with violation of the Foreign Exchange Law and the Foreign Trade Control Law. Daikin responded to a forced search by the government related to violating COCOM rules and faced administrative punishment, so it quickly had to develop a replacement fluorocarbon product less harmful to the earth's ozone layer, and to prepare basic measures to counter the dumping charges filed against it. Looked at another way, however, these three "trials" were faced with an overall company response and thus became the occasion for introducing major changes in Daikin's managerial structure. In that sense, therefore, the three trials were game-changing.

Of the triple ordeals the company faced, the CFC regulations and dumping charges, which required long-term, drastic responses, will be discussed in detail a bit later in this chapter. Discussed here first is the suspected violation of COCOM rules, which required a quick and proper business decision.

Japanese companies first paid wide attention to COCOM rules domestically from April 1987 after Toshiba Machine Company violated those rules. COCOM was established in 1949, at the beginning of the Cold War, to isolate the Soviet Union by placing an embargo on the export of strategic materials and technology to East Bloc nations mainly from the member nations of NATO. Although Japan joined COCOM at its establishment, Japanese companies had only a weak awareness of COCOM rules because Japan's science and technology in the postwar years were mainly dependent on imports for realizing rapid industrialization. It was in that background that the Toshiba Machine incident occurred. After that incident surfaced the Ministry of International Trade and Industry (MITI) began promoting measures to provide administrative guidance for Japanese industry to establish internal systems for adhering to export-related rules and regulations. Daikin also reviewed its system for controlling strategic materials on which regulations were based to prevent their export to East bloc nations. In April 1988, Daikin established company-wide rules related to the control of exports and presented them to MITI. Just four months later, in August, MITI questioned Daikin on suspicion of violating COCOM rules regarding the export of Halon 2402 by the Chemicals Division to the Soviet Union for use as a fire-extinguishing agent aboard fishing vessels. Daikin originally developed Halon 2402 in 1963 as a fire-extinguishing agent. Although it was regulated under COCOM rules, it was being exported to the Soviet Union from 1979 because it fell in a special category of products that could be exported if the 17-member nations of COCOM approved it. Later, together with the Soviet Union's inva-

sion of Afghanistan, exports of Halon 2402 were once again regulated. Low-purity Halon 2402 products, however, remained outside the COCOM regulations, and Daikin developed a low-purity product that it exported to the Soviet Union beginning in February 1982. By July 1987, it had exported about 1,400 tons of low-purity Halon 2402 to the Soviet Union.

After receiving administrative guidance from MITI, Daikin's department in charge of Halon 2402 discovered that for several years impurities had not been added to lower the product's chemical purity, resulting in the export of products with a high degree of purity. In July 1987, the production department revised the production and inspection methods and once again began exporting low-purity Halon 2402 from August. The Chemicals Division first learned of the error at the MITI hearings. In September 1988, the division head submitted a report to President Minoru Yamada explaining in detail what had happened. Yamada immediately established an ad hoc committee to investigate the incident and clarify the existing circumstances. Daikin filed a report with MITI in October 1988 acknowledging the fact that its exports of Halon 2402 had been improper. As a result, MITI filed a suit through the Osaka Prefectural Police Headquarters in December charging Daikin and the company that exported the products with violation of the Customs Law, the Foreign Exchange Law, and the Foreign Trade Control Law. The prefectural police subsequently searched Daikin's Head Office and Yodogawa Plant, placing Daikin in a difficult situation.

President Yamada publicly announced that Daikin acknowledged the COCOM violation, and that the company was awaiting an appropriate legal decision concerning the incident. Managing Director Noriyuki Inoue and General Affairs Department Manager Tadashi Shibai explained the incident to the media at a press

conference. President Yamada attended the press conference and apologized to the public. Also announced, in accepting responsibility for the incident, were the resignation of Executive Vice President Yoshihiko Kubouchi and a 10 percent reduction in President Yamada's salary for three months. Daikin also fully cooperated with the police in their investigation to verify the facts of the case. In February 1989, the sales section manager and inspection section manager of the Chemicals Division, the two persons most directly linked to the incident, were arrested for suspicion of violating the Customs Law and the Foreign Exchange Law. In March, prosecutors filed official charges against Daikin and the sales section manager.

Although the incident was considered unintentional, the content of the charges reflected a low level of awareness of COCOM regulations held by the related departments and individuals in Daikin, as well as poor management of internal operations. The Osaka District Court deemed Daikin and the sales section manager guilty in October 1989.

After the charges were confirmed, President Yamada wrote a personal letter in March to all managers in Daikin in which he expressed his determination to establish an internal system to prevent the reoccurrence of such disgraceful incidents. The first step was taken in April, when the company established a new Trade Control Office to control all exports. In June, a large number of shareholders attended the regular shareholders meeting and questioned President Yamada and other company officers about the incident for several hours. Yamada answered all questions sincerely and in great detail, finally gaining the understanding of the shareholders.

Also in June, MITI administered disciplinary measures by prohibiting Daikin from exporting any products or components—

not only prohibited items—to countries included in COCOM regulations for a period of six months beginning in July 1989. The measures covered not only products and components exported through affiliates and trading companies but also re-exports via capitalist countries and OEM products and components that Daikin supplied to other companies.

In the short period of only one week before the disciplinary measures took effect, Daikin carried out additional detailed countermeasures to prevent the reoccurrence of such incidents. The company contacted its domestic and overseas business partners, for example, and asked them to cooperate in the prohibition of exporting Daikin products to socialist countries. It also printed labels in Japanese and English explaining the export prohibition and attached them to all products and components shipped from its plants. In addition, all outstanding orders and business discussions currently underway were reviewed closely and contracts that infringed on the export prohibition measures were cancelled. Daikin also repurchased inventories from its overseas business partners. Thereafter, Daikin contracted directly with delivery companies to have products in each order delivered to customers.

Besides the disciplinary measures, Daikin also suffered social sanctions. Organizations such as the central government and related agencies, and prefectural and municipal governments, removed Daikin from their list of designated companies for periods ranging from one to three months. Some suppliers also informed Daikin they were halting their supply of semiconductors to the company. Since it would be impossible to produce either air conditioning or electronic equipment without semiconductors, Daikin promised the suppliers it would strengthen its internal system of controls. The company was finally able to convince them to continue supplying their products. With guidance from MITI, Daikin

then bolstered its internal system of trade control. At the same time, the company introduced a system of basic education for all officers and employees of Daikin and its affiliates to familiarize them with COCOM rules and to raise their level of awareness of the importance of strict compliance with rules and regulations. It obtained MITI's approval of its revised internal systems in August 1991. During the interim of about three years, company-wide efforts continued to prevent a reoccurrence. Those efforts succeeded not only in raising an awareness of the importance of compliance among employees but also in establishing a sophisticated system for controlling exports and the system's all-out operation.

Another of the triple ordeals that Daikin's chemical business faced was the matter of fluorocarbon regulations. In 1974, Dr. Mario J. Molina and Professor F. Sherwood Rowland of the University of California published findings from research they conducted suggesting that chlorine compounds from chlorofluorocarbons (CFCs) might live long enough in the atmosphere to destroy the ozone layer and thus negatively affect the ecosystems of plants and humans. That research eventually led to the introduction of international regulations restricting the consumption of CFCs as substances that contribute to depletion of the atmosphere's ozone layer. Specified CFCs such as CFC11, 12, and 113 contain the ingredient chlorine. They are highly stable and easily reach the stratosphere without breaking down. As the pioneer in the CFC field in Japan and as Japan's leading manufacturer of CFCs, Daikin was producing those three specified CFCs. CFC11 was used mainly as an auxiliary blowing agent to improve the processability of polyurethane (PU) foam. CFC12 was used as a refrigerant in refrigerators and automobile air conditioners, and CFC113 was used as a cleaning agent across a wide spectrum, including for electronic components, metals, and plastics, and in dry cleaning. The de-

mand for these CFCs grew rapidly in line with Japan's economic growth, and Daikin added equipment at its Yodogawa Plant and Kashima Plant to increase their production.

Since CFCs were substances essential for supporting the industrially advanced societies in the developed countries, and were widely used in areas from home appliances to industry, some 20 companies in Japan, the U.S., and Europe producing CFCs cooperated with institutions conducting research and surveys for clarifying how CFCs affect the global environment by together contributing a total of $26 million to support their activities. In 1977, after observations by NASA of the U.S. confirmed that depletion of the ozone layer was advancing, the U.N. Environment Programme (UNEP) established the Coordinating Committee of the Ozone Layer (CCOL) for periodically assessing depletion of the ozone layer with the aim of preserving it. As a result a basic agreement, the Vienna Convention for the Protection of the Ozone Layer, was adopted in March 1985. Two years later, in September 1987, an international agreement called the Montreal Protocol on Substances that Deplete the Ozone Layer, was adopted. It determined the specific content of regulations.

In 1988, one year after adoption of the Montreal Protocol, the Japanese government circulated the Law Concerning Regulations on Specific Substances for Protection of the Ozone Layer and established a system of licensing for the volumes of specific CFCs and Halons that could be manufactured and consumed. In 1990, the government expanded the regulations to cover other substances and decided to halt production and consumption of all specified substances by 2000. Once into 1992, the government further decided that by the end of 1995 all production and consumption of specific CFCs would be halted and total volume restrictions would be set on substitute CFCs. Since Daikin was not only a manufacturer of CFCs but also a major consumer of CFCs as a manufacturer of air conditioners, it faced two difficulties: one was to reduce the volume of CFCs it consumed in its plants; the other was to develop new, substitute CFCs. The results of the efforts it subsequently made would determine whether its Chemical Division would continue to exist or not.

In exerting efforts to reduce the volume of CFCs consumed, in compliance with CFC regulations, the first major task was to reduce the volume of specific CFCs consumed in production processes. In August 1989, when CFC regulations first took effect, the Air Conditioning Manufacturing Division, Chemicals Division, Oil Hydraulics Division, and Service Division all prepared plans for reducing the volume of CFCs consumed in their operations, thus initiating Daikin's company-wide approach to complying with the regulations. In machine processing and on the assembly lines, the conservation of CFCs began with improvements introduced in their various processes. CFCs were prevented from leaking from cleaning equipment, for example, and devices were installed for recovering used CFCs. On the other hand, however, the demand for CFCs continued to increase rapidly, requiring consecutive production increases and making it extremely difficult to reduce overall volumes. It was only after a series of innovations, such as developing alternate production methods, making cleaning unnecessary, and using non-CFC cleaning agents, that Daikin was able to realize substantial CFC reductions.

The Oil Hydraulics Business Division and the Special Equipment Business Division had both used specific varieties of fluorocarbon for removing oil prior to processing surfaces and for cleaning components, and they promoted the shift to using alkaline as a cleanser, making cleaning unnecessary, or using HCFC141b as an alternative cleanser. The Oil Machinery Business Division in

1992, and the Special Equipment Division by 1993, halted all use of CFC11. In 1994, they also stopped using trichloroethane. The Chemical Division, meanwhile, used fluorocarbon as a solvent, as a polymer stabilizer, and as a granulating medium. Although Daikin halted fluorocarbon's use as a solvent in 1993, its use in manufacturing processes related directly to most of the company's business divisions. Daikin's outside suppliers and subcontractors, meanwhile, stopped using fluorocarbon no later than 1994. Substantial investments were needed to replace fluorocarbon, but Daikin benefitted in terms of overall lower costs and favorable effects on technology.

As the leading manufacturer of CFCs in Japan, Daikin felt a strong social responsibility to develop CFC substitutes. In December 1988, in the context of the company's Chemicals Division facing its triple ordeals mentioned earlier, Managing Director Noriyuki Inoue was appointed director in charge of the company's chemicals business, and he initiated efforts needed to enliven the chemical business. He was the eldest son of Professor Yoshiyuki Inoue, head of the Agricultural Department of the University of Kyoto, and the person most responsible for Daikin employing college graduates with degrees in chemistry in the postwar period. Noriyuki Inoue, however, graduated from college with a humanities degree, and he knew next to nothing about chemistry, not even the chemical symbols. Once he became the director in charge of Daikin's chemicals business, however, he took action to have the department develop an inexpensive substitute for fluorocarbon ahead of other companies, which would give Daikin the chance to make great progress. He tackled that project energetically from early 1989, organizing the project team for the development of CFC substitutes, including strategy and research functions. From then until 1993, the Chemicals Department invested

10 billion yen to develop new CFC substitutes such as HCFC142b, HFC134a, and HCFC141b. Even while Daikin was developing substitute products, however, regulations were bolstered further toward total prohibition of all CFC/HCFC substitute substances as well, and Daikin began moving quickly toward developing new substitute substances that had zero ozone depletion potential (ODP). Those efforts marked a switch toward developing HFCs. At any rate, Daikin was the first company in the industry to move toward developing new refrigerants.

The first commercially successful CFC substitute was HCFC142b, which replaced CFC12. HCFC142b is an intermediate fluororesin, and Daikin already had the technology to produce it. In 1988, based on that technology, Daikin began the joint development of the HCFC142b refrigerant with Dow Building Solutions Co., a subsidiary of Dow Chemical. Daikin began operations inside the Yodogawa Plant and Kashima Plant for total annual production of 6,000 tons of HCFC142b.

Daikin sold HCFC142b as a foaming agent for polystyrene, practically monopolizing the Japanese market. Daikin also sold the product to styrene foam manufacturers such as BASF and Rockwool in Europe. Next, in 1989, Daikin developed the world's first non-CFC-type cleaning agent, called fluorine alcohol, and in 1991 successfully developed HFC134a, another substitute for the refrigerant CFC12. Since fluorine alcohol or HFCs contain no chlorine, it was possible to continue producing them even after the government placed restrictions on CFC substitutes. Daikin positioned HFCs as most important development themes and concentrated its resources on producing them. As a result, it was the first company in the world to succeed in mass producing the refrigerant HFC134a.

The principal market for the new refrigerant was automobile

air conditioners, an area where Daikin's market share was low up to that point. Daikin thus went all-out in sales approaches to Japanese automakers such as Toyota, Nissan, Honda, and others, and quickly came to hold the largest share of that market. Next, in 1993, Daikin developed HCFC141b, a substitute for CFC11, as a foaming agent for polyurethane. The company also continued to search for a substitute substance for HCFC22, a CFC substitute consumed in large volumes in air conditioners, and in 1993 began operating a pilot plant producing HFC32 and HFC125.

Daikin also had to develop new air conditioning models to handle the new refrigerants. The company announced its intention to halt the manufacture of air conditioning using specified CFCs and set the year 1993 as the final year. It then moved forward with developing new products using substitute refrigerants, and preparing production facilities and a recovery system. Actually, Daikin halted the production of models using specified CFCs at the end of 1992. For air conditioners already sold, Daikin proposed that its customers switch to the new models and moved to replace the compressors and refrigerant on the customer's premises.Daikin was also at the forefront of air conditioning manufacturers around the world in developing air conditioning equipment using HCFC22 and new substitute refrigerants such as HFC32, HFC125, and others.

Originally, there were 30 or more companies manufacturing fluorocarbons worldwide. By 1995, however, as production and consumption restrictions became increasingly stringent, the number dropped to ten companies. In the end, after development of HFCs, only six companies worldwide were still producing fluorocarbons. The fluorocarbon issue actually marked the first crisis for Daikin related to fluorocarbons since the company began producing them in 1933. Still, with the backdrop of the world-scale competition to develop HCFCs and then HFCs, Daikin secured an advantageous position, ensuring its future in those businesses. Before long, Daikin cleared the turning point for becoming the number two fluorocarbon producer in the world behind DuPont.

The third ordeal the Chemicals Division faced was a suit filed by DuPont charging Daikin with dumping fluororesins. With Sumitomo Corporation and Gunze Sangyo as its export agents, Daikin began exporting fluororesins to the U.S. in 1971. By the early 1980s, Daikin was exporting a full line of outstanding products, including Daikin "Polyflon" PTFE M12, with electrical characteristics superior to the products of other companies, and Daikin "Neoflon" FEP for use with plenum cable, and began aggressively selling them to users in Europe and North America. As Daikin gradually expanded its markets the competition with DuPont turned especially keen concerning Daikin "Polyflon" molding powder (polytetrafluoroethylene molding powder—PTFE-M). Daikin's exports of PTFE-M reached 25 percent of its total production of that product. After the Plaza Accord, however, the yen's exchange rate rapidly appreciated from 240 yen to one US dollar in September 1985 to 120 yen to one US dollar at the end of 1987, and Daikin's conditions for competing with DuPont turned severe.

With the intensified competition tied to the higher yen, in November 1987 Du Pont filed antidumping charges in the U.S. against Daikin related to PTFE-M. Certification of dumping charges requires proof that: 1. a product is being sold at unfairly low prices; and 2. that a domestic U.S. company is suffering damages. The Department of Commerce handled the first charge, and the International Trade Commission (ITC) investigated the second charge. At a hearing held in December 1987, Daikin was found guilty of both charges. Immediately after being informed of the original charges, Dakin began studying countermeasures. On the first

charge, Daikin avoided arguments that would require having to reveal cost prices. And on the second charge, Daikin did everything possible to prove that U.S. industry was not suffering damage caused by Daikin's product prices. At the time, however, the general business situation in the U.S. had worsened, and in August of the following year it was officially announced that U.S. industry was suffering damages from Daikin's products. As a result of that ruling, it became impossible for Daikin to continue exporting PTFE-M12 and other "Polyflon" products to the U.S.

Many negative issues emerged related to fluorocarbon, but the production of fluororesin, which had no negative effect on the ozone layer, became the foundation for Daikin's fluorocarbon business. At the time, however, Daikin was in danger of losing its position in the U.S. market, the world's largest market for fluorocarbons. Success in the U.S. was thus a life or death situation for Daikin's fluorocarbon business. Actually, the U.S. accounted for roughly half of the entire world's demand for fluorocarbons. In that context, Daikin had for some time embraced the dream of having a plant in the U.S., and it felt it had to act quickly to make that dream a reality.

In September 1988, Daikin liquidated Daikin U.S. and withdrew from the U.S. air conditioning market. In order to prepare for reentering the U.S. market at a later date, however, the company needed a new base of operations for conducting market surveys and for servicing the air conditioning equipment already in use. In that situation, in October 1988 Daikin opened a New York Office in Manhattan and began preparing a new business strategy for the U.S. market. The company sent Director and Office General Manager Yuzuru Kometani, and six other persons, three each from the Chemicals Division and the Air Conditioning Division, to New York. The first three collected information on the chemical

Interior of New York Office (above), Located in the Seagram Building (right)

industry in the U.S. and surveyed possible sites for a local plant. The other three liquidated Daikin U.S. and conducted market surveys to prepare for establishing a new Daikin U.S. to conduct future sales activities. They also studied the feasibility of local production in the U.S. Daikin thus took its first steps toward global management.

The Chemicals Division established Daikin Chemical America (DCA) in 1989 inside Daikin's New York Office. One of DCA's first duties was to build sales and service systems and to conduct a feasibility study for identifying an appropriate plant site and candidate companies to become its partner. It listed ten companies as possible partners and in the end two ideas emerged: one was to purchase a plant; the other was to form a joint venture with Minnesota Mining and Manufacturing (3M). Daikin negotiated with various companies concerning both possibilities, and in the end decided it did not want to purchase a plant. It then turned to 3M around the middle of 1989 and entered into serious negotiations about establishing a joint venture. At the time, 3M was a leading manufacturer of fluororesins and it was looking for a partner with superior technology in the area of raw materials, including the production of monomers. Daikin, meanwhile, favored 3M because

the two companies were not competing in the area of PTFE, and because its managerial style resembled Daikin's own style, with a corporate culture that emphasized taking good care of employees and a stance of emphasizing the development of new products. Those factors were central to Daikin's decision to choose 3M as a partner.

The final figure for building a plant in the U.S. was expected to total more than 20 billion yen, a figure over half of the Chemical Division's annual sales. The Division had already invested substantially in developing a new refrigerant but it had no previous experience in making investments of this size. The overall business environment for Daikin was favorable, however, with sales proceeding especially well in its mainstay air conditioning business. In the end, President Minoru Yamada's enthusiasm regarding the joint venture and the local plant project led to a mood of support for the investments. Daikin's board gave approval to move forward with both projects.

Following negotiations between Daikin and 3M, it was agreed that Daikin would produce tetrafluoroethylene polymers and PTFE, and the joint venture would produce R22 and hexafluoropropylene monomers. In December 1990, President Yamada of Daikin and Executive Vice President Hamery of 3M signed a basic agreement at 3M Headquarters in St. Paul, Minnesota. Then, in January 1991, Daikin established the wholly owned subsidiary Daikin America Inc. (DAI), and DAI and 3M established the joint venture MDA Manufacturing Inc. Director Yuzuru Kometani of Daikin assumed the presidency of both companies. DCA, meanwhile, was absorbed by DAI, thus bringing together manufacturing and sales. Next, DAI acquired 400,000 m² of land bordering on the plant of 3M in Decatur, Alabama, for building a new plant, and began construction in January 1991.

Dakin America Inc.

Building a plant in the U.S. was a new experience for Daikin. Still, even though the plant's basic design included somewhat more automation than the Kashima Plant in Japan, it was well within the range of Daikin's previous plant-building experience. Because of the differences in standards and in materials and material quality, however, Daikin met problems related to the "Americanization" of design details and equipment spec sheets. Clifford Adams, a former plant manager of Pennwalt Corporation in the U.S., was hired as plant manager and was trained in Japan for seven months to have him understand Daikin's corporate principles better and provide him with expertise related to Daikin's style of management. Workers were then hired in stages. Including managers and supervisors, Daikin hired over 100 persons. Depending on their job responsibilities, they underwent long-term training either locally or in Japan. When the plant's construction was completed in 1993, Director Tatsuo Sueyoshi, the strongest promoter of building the plant, traveled from Japan to observe the construction and oversee trial operation of the plant. Besides the employees hired locally, veteran Japanese employees of the various processes and departments were sent from Japan to provide technical guidance. In this way, by September 1993, trial operation of the tetrafluoroethylene polymer plant was successful. Business

Polytetrafluoroethylene Plant (top)
Lightening Ceremony (left)

operation of the plant then began in February 1994.

In August 1993, without waiting for completion of that plant's first-stage of construction, Daikin decided to build a moltenresin plant in the same location for producing "Neoflon" FEP/ETFE. Building that plant quickly was in response to a rapid increase in demand in the U.S. for cabling used for computer LANs. At one point, construction and start-up operations moved forward simultaneously at a high pitch at six different plants inside the Decatur Plant. The method used was to have Japanese employees sent from Japan head the start-up operations at most of the plants and then gradually turn over operations to local employees. By the end of 1995, after the plants were fully operational, almost all the Japanese employees returned home. President Daiji Naito, however, remained in Decatur.

Daikin received the full cooperation of plant General Manger Clifford Adams and 3M in operating the plants, including the en-

Decatur Plant of Daikin America Inc.

vironmental response, and received full local support and advice, such as from Alabama state authorities, for hiring new employees. The company emphasized localization of its operations, including building a direct sales system utilizing American sales personnel that DAI hired, and responding in great detail to user needs through DAI's technical service center, thus making DAI widely known as an American company. Various efforts were also made to deepen the understanding of Daikin as a Japanese company by DAI's employees and residents in the local community, such as by holding regular employee meetings, introducing the Japanese custom of the summer Bon Odori Dancing Festival, and establishing a program for local high school students to visit Japan and stay at the homes of Daikin employees.

DAI's corporate principles included: (1) working closely together with the company's customers, with both parties growing; (2) providing outstanding technical services; (3) taking the steps needed to make the company's plant welcome in the local community; and (4) increasing the level of stability in product quality. All four principles were carried out in the company's business activities. In that background, DAI turned profitable in 1996, a year earlier than expected. That was a smooth start for Daikin's production activities in the U.S. Also in 1996, the development of new

refrigerants began providing smooth results, and the overall Chemical Division turned profitable. The Division thus recovered to become important once again, contributing to Daikin's profits together with the Domestic Air Conditioning Division.

Daikin's first entry into the U.S. with a production base was thus successful, and through company-wide efforts the Chemicals Division also overcame the triple ordeals it faced. The lengthy struggle changed the business structure of the Chemicals Division, and it gradually became a global business. It can be said that it was because the Division did not play as important a role as it plays today among the company's business divisions, it was able to accept and overcome the bold challenges it faced. At the same time, behind the all-out approach to make the most of the company's core technology and aggressively meet the challenge of new business areas was a corporate culture born of the sense of solidarity that emerged from top to bottom inside the company and took firm root.

Reduction of Working Hours, and Social Contributions

During the period of the bubble economy, the international community began criticizing Japan for it overly favorable balance of payments and—viewed as supporting that balance—the fact that Japanese worked too hard. Japanese workers, too, began thinking more about how to use the free time they gained as the affluent society gradually became a reality. Based on an advisory from the ILO, the Japanese Trade Union Confederation (RENGO), the national center for Japan's industrial federations, began moving from 1989 toward realizing a reduction in working hours to 1,800 hours/year plus additional days off. For 400 years, ever since the Edo Period, the beginning of Japan's modernization, working diligently was considered a virtue and Japanese workers grew accustomed

to long hours. But now a reduction in working hours was finally becoming a main trend of the times.

Although a reduction in working hours was a topic in labor-management talks in Daikin from the early 1980s, the company's business was expanding rapidly and the trend was toward longer working hours to respond to that expansion. In 1990, annual working hours per employee in Daikin reached 2,273 hours. In 1991, labor and management agreed to have Daikin follow the social trend and reduce total working hours. That actually was 16 years since the last time working hours were reduced in 1975 because of the effects of the first Oil Crisis. Specific discussions focused on setting and achieving a goal of 1,800 working hours. A flexible working system suited to each workplace was introduced, though the total yearly working hours were kept constant. A system of working days and hours matched to the work load (9 hours/day in the busy season, and 7 hours/day in the off season) was adopted for the production lines in the air conditioning manufacturing divisions and a flextime system was adopted for all the deskwork sections, which formerly applied only to employees in the R&D departments. As a result, work efficiency was improved and the number of total working hours was reduced. In 1992, workers became almost obliged to take five straight days off of paid vacation time. Including the two weekends surrounding the five days, that meant a total of nine straight days off. Mid-level managers were asked to take the lead in taking vacation time off, and by changing the atmosphere at the workplace the company aimed to make it easier for employees to take paid vacation time due to them. This aggressive approach led to a considerable reduction in the number of working hours in Daikin in 1992 and 1993. In 1993, annual working hours reached 2,000 hours and in 1994 they reached 1,920 hours. Even that figure, however, was still far

President Yamada at Initial Meeting of Okinawa Business Leaders' Forum in 1990

from the ILO's recommended 1,800 hours.

Daikin began tackling the in-house cultivation of a spirit for contributing to society, and before long was being recognized for the activities it undertook. President Minoru Yamada often said, "Nothing is more important to human beings than the people they meet in their lives." He also said, "Personal relations are based on a moral fiber that makes human beings considerate of others and makes them never betray another's trust in them." An event symbolic of that spirit is Daikin's sponsorship of the officially sanctioned "Daikin Orchid" Ladies Golf Tournament held in early spring every year in Okinawa Prefecture. The origins of this tournament date to 1988. Daikin became its sponsor through a business forum held regularly between business leaders in the Kanto region around Tokyo and those in Okinawa Prefecture, organized with President Sohei Nakayama of the Industrial Bank of Japan in the center. The tournament is held in early March as the first tournament of the year in the Japan Ladies Tour. Golf courses in northern Japan are still covered in snow at that time, and other parts of Japan are still cold. Okinawa Television Broadcasting broadcasts the tournament throughout Japan to golf enthusiasts eagerly waiting for the official start of the golf year in Japan.

The "Daikin Orchid" was an unusual competition for Japan, held between amateur and professional golfers, and business

leaders and professional female golfers were invited to play. Daikin employees, motivated by President Yamada's philosophy of being sincere in everything one does, supported the tournament with great hospitality. As a result, the tournament was evaluated highly by business leaders and professional female golfers, who became the driving forces for continuing the tournament. The strong hospitality that marks the tournament relates not only to the Daikin employees involved in conducting it but to the entire company. In fact, that hospitality became a mark of Daikin's employees who place great importance on their relations with people. The tournament also raised the morale of all Daikin employees.

President Yamada was interested in much more than corporate sponsorship of a golf tournament. He served as director, for example, of the Okinawa Business Leaders' Forum for many years after it was established in 1990. Two days before the "Daikin Orchid" Golf Tournament started, business leaders from the Kanto and Kansai regions and Okinawa met together at a Forum Conference to discuss a wide range of topics and to exchange opinions. Discussions included proposals for stimulating business activities on Okinawa, sponsorship of various forums that contributed to development of the local communities, and support for cultural events.

Okinawa suffered tremendous damage during the Second World War. After the war, the U.S. occupied Okinawa until 1972, and the prefecture's development fell drastically behind that of the Japanese mainland. With the aim of gaining a deeper understanding of the situation in the prefecture's local communities, President Yamada felt an obligation to provide support to Okinawa and essentially took the lead in establishing and promoting the Okinawa Business Leaders' Forum. The role the Forum plays

in helping Okinawa establish its self-reliance and development, and promotion of the prefecture's industry, is like a "spiritual bridge" connecting the mainland to Okinawa. In that sense, Okinawa society and business leaders on the mainland evaluate the Forum highly.

As a recreation facility for employees, Daikin opened "Daikin Eau de Ciel Tateshina". At the time, it was quite an outstanding facility compared to the health and wellness facilities of large Japanese corporations. It was built on a plateau in Nagano Prefecture and opened in 1991. The facility's design concept was to realize a facility that "provided mental rather than physical affluence," and the basic policy was to open it not only to employees but also to residents of the local community. President Yamada was considerate of people, and the facility put to best use his ideals and good sense. He believed that "A company's growth is the sum total of the growth of the individuals inside the company." As an extension of such beliefs, Yamada gave it its French name, Daikin Eau de Ciel, which in English means "water of Heaven." In contrast to many of the corporate wellness facilities in Japan that have a poor reputation among young employees and suffer from reduced usage, the Eau de Ciel became popular among Daikin employees and the occupancy rate stayed steadily at 75 percent. In 1993, the facility won the Design Prize of the Architectural Institute of Japan, considered the most prestigious architectural design award in Japan, an expression of the high social evaluation of the facility.

Daikin began showing increased interest in environmental matters after depletion of the earth's ozone layer turned into a social problem. A Company-Wide Environmental Measures Committee had been established previously and was active in promoting anti-pollution activities. Daikin decided to upgrade that committee and have it promote measures for preserving the global environment. For that purpose, the company established the new position of director-in-charge of global environmental issues and a Global Environment Department, and in 1993 established a Charter on Global Environmental Preservation. Based on rules in the Charter, a company-wide system was established for responding actively to the CFC issue, providing products and services with minimal negative effect on the environment, and promoting the development of technology useful in preserving the environment. Next, in 1994, as a specific plan for behavioral guidelines, four main items were outlined for improving the environment. They included halting all in-house consumption of specified CFCs and trichloroethane, reducing the in-house volume of energy consumed, reducing the volume of waste material emissions, and taking stronger steps to recycle products. Daikin then established company-wide environmental improvement items and targets to be achieved by the year 2000. In addition, the company began publishing an annual Environmental Report starting in 1998.

In 1993, Daikin was the majority shareholder in establishing Daikin Sunrise Settsu, Ltd. (DSS), as a third-sector—that is, non-profit, non-government—company, a large-scale project for a Japanese company to conduct social contribution activities. The Japanese Diet passed the revised law for promoting employment opportunities for disabled persons in 1976, and companies were obliged afterward to have persons with disabilities account for a certain percentage of their total labor force. Medium-size and larger companies that did not achieve the percentage applied to them had to pay a penalty fee. At the time, disabled persons comprised 0.35 percent of Daikin's total labor force, a figure higher than the national average, but it still did not reach the 1.5 percent mandated by law. In 1989, the mayor of Settsu City, where the Yodogawa Plant is located, contacted the Yodogawa Plant and

Daikin Sunrise Settsu (top)
Scene of Daikin Employees at Work in Daikin Sunrise Settsu (left)

requested Daikin's cooperation in establishing an organization for employing persons with severe disabilities. After considering various factors, such as continuous, long-term, stable employment, potential profitability of the venture, and a minimal workload on the disabled workers, Daikin worked closely with Settsu City and established DSS. The main business of the company, which began operating in 1994, was the assembly of components for lubrication equipment for the Oil Hydraulics Division of the Yodogawa Plant. Of the company's 22 employees, 16 were disabled persons. The company started in business with annual sales of 260 million yen.

The main corporate philosophy of DSS is "To provide a pleasant working environment in which persons with severe disabilities can find purpose in their jobs and work free from anxiety." DSS was the second such company in Osaka Prefecture and twenty-third in all of Japan. The Osaka prefectural government designated DSS a model business for employing handicapped persons. As time passed, DSS gradually added a variety of parts for assembly and increased its production volume. In 1999, it wrote off the last of its accumulated deficit. The company received several awards, including the Labor Minister Award for improving its worksite. In 2003, of a total of 47 employees, 43 were handicapped. Annual sales that year increased to 1.4 billion yen. In 2002, DSS was also the first company in the Daikin Group to obtain ISO 14000 certification.

The percentage of handicapped persons in Daikin's total workforce was 1.33 percent in 1993 and 1.65 percent in 1994, meeting the legal requirement of the time. In 2003, the percentage surpassed 2 percent, thus reaching the top level in Japan. In the interim, DSS won several awards for its work with the handicapped, including the Asahi Shimbun Cultural Foundation's "Disabled Persons Employment Award." The activities of DSS, however, did not stop at merely providing employment for the handicapped. It also promoted handicapped persons to responsible positions such as section chief and shop steward, thus providing them with greater economic independence and growth. Mutual exchanges between DSS and Daikin employees also served to broaden the awareness of ordinary employees concerning handicapped employees through mutual exchanges and by giving all employees the opportunity to participate energetically in volunteer activities at the local community level, in society-at-large, and on the international stage. As a corporation, Daikin showed great understanding of the social contribution activities of individual employees, and, believing there is true significance in those activities, promoted formation of a corporate culture that aggressively supported them.

The year 1994 marked the 70th Anniversary of Daikin's

Members of Kansai Economic Council Visit Chancellor Helmut Kohl (Daikin President Yamada is third person from right)

founding. With the burst of the bubble economy, the company's business declined when it had just begun to implement basic measures to recover from the negative business situation. The company felt that it was moving strongly toward recovery in what it felt was an approaching favorable business period. To celebrate its founding, therefore, Daikin hosted a commemorative program in Japan that included an announcement concerning a new program of social contributions inside the company. Besides activities related to the National Museum of Fine Art, Daikin published "The 70-Year History of Daikin Industries (1924-1994)" and began construction of the Akira Yamada Memorial Museum. Six months later, on May 1, 1995, Chairman Minoru Yamada passed away at the age of 73. Chairman Yamada was especially active in Kansai financial circles, including roles as Vice Chairman of the Kansai Economic Council, Representative Director of the Kansai Branch of the Japan Committee for Economic Development, and Vice Chairman of the Kansai Productivity Center.

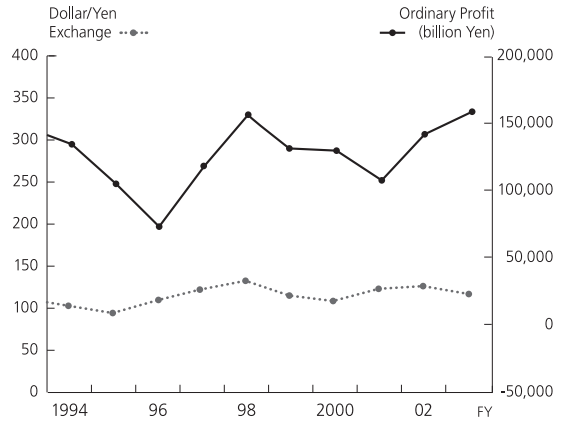
Chapter IV

Challenging Globalization (1994–2000)

Series of Reforms

After Daikin's chemical business overcame the crisis it faced, the company's air conditioning business also recovered and subsequently experienced substantial growth. Business declined in 1993, however, and Daikin came to face new difficulties. From late 1990 to early 1991, the bubble economy in Japan burst, and from 1993, in the background of a stronger yen, the country entered a difficult recessionary period. In particular, the burst of the bubble economy caused a major decrease in the value of assets, which then caused a sharp drop in personal consumption. After that situation became prolonged, Daikin's air conditioning business, which had shifted toward individual consumption, was negative-

Yen Exchange Rate and Current Account Balance



ly affected. The yen, meanwhile, continued to strengthen, moving to 100 yen per dollar between 1993 and the first half of 1995. In fact, at one point the yen greatly appreciated to near the extraordinary 80-yen mark. Economic observers at the time had said that if the yen moved higher than 100 yen to $1.00, many Japanese companies would lose their international competitiveness. Even Toyota, one of Japan's foremost corporations, said 80 yen was the highest level at which it could compete effectively in overseas markets. In Daikin, air conditioning products and chemical products accounted for, respectively, 17 and 22 percent of its total exports. The negative effect of the strong yen on those two industries was serious indeed. And, because many Japanese companies took advantage of the strong yen and opened overseas production operations in tandem, the domestic air conditioning market came to depend on overseas operations for the supply of components. As a result, product prices dropped rapidly. In the packaged air conditioning market, meanwhile, where Daikin held top position, there was a significantly sharp drop in domestic demand. That was in the context of the poor business situation. Daikin's domestic air conditioning business, including both room and packaged air conditioners, thus experienced a severe slump forcing the company to conduct fundamental reviews of the business structures of both its domestic and export businesses. It was also forced to review its managerial strategy.

Chairman Minoru Yamada (left) and President Noriyuki Inoue

In June 1994, amidst that business crisis, Daikin announced top management changes. President Minoru Yamada, the company's third president, moved into the chairman position. Yamada steered the company safely through two oil crises, overcame the "three ordeals" of the chemical business, and stuck rigidly to his belief in not laying off personnel despite the company's severe business circumstances. On the occasion of Daikin's Seventieth Anniversary, however, Senior Managing Director Noriyuki Inoue, director in charge of the Personnel, General Affairs, and Chemicals divisions, and the person mainly responsible for recovery of the Chemical Business, became Daikin's fourth president. In his final greeting before leaving office, President Yamada clearly voiced his thoughts regarding the company's circumstances. "Almost all Japanese companies are facing the largest and most im-

portant transition period since the end of the war." To the company's new leaders, he said: "Be fully confident and express clear policies." To ensure available personnel resources, he recommended "building an internal environment for enabling the company's outstanding human resources to develop themselves further." He continued, saying: "In order to build a new Daikin, let us be decisive and courageous, and at this turning point let us rid ourselves of past shortcomings we might still possess."

In his first in-house greeting, President Inoue said he would continue the basic stance of pursuing Yamada's business philosophy of trusting the company's employees. "Let us build mutual relationships of strong trust, believing in the potential and outstanding qualities of our employees." But in order to change the company's business structure to face the challenges in the current period of change, Inoue said it was necessary to create new values for building a more aggressive style of management. As a basic management principle for Daikin, President Inoue then introduced a new policy he called "Fast & Flat management." Specifically, that policy pinpointed three urgent tasks: 1. speeding up the R&D of technology, and taking the initiative ahead of other companies; 2. establishing global business strategies by product, constructing a 4-pole global system; and 3. in order to defeat the company's competition during a period of rapid change in the business environment and markets it is necessary to promote strong management leadership for realizing speedy decision-making and to manage a flat and flexible internal organization.

Daikin faced an urgent need to reorganize its mainstay air conditioning business. Operations at the Chemical Division's plant in the U.S., meanwhile, had just begun, and the company felt a serious need to speed up its global strategy. The first step was to review the strategy originally introduced in 1993 to promote

emergency projects in the air conditioning business in Japan. Fortunately, increased air conditioning sales during the hot summer of 1994 in Japan contributed greatly to restructuring the company's overall business. In the U.S., meanwhile, operations started smoothly at the newly constructed fluororesins plant. In the fall of 1995, when it became obvious that the company's emergency projects were progressing smoothly, President Inoue reflected on the causes of the company's hit-or-miss measures up to then. He realized that they were not attributed only to changes in the general external environment but also to a managerial approach that could not properly decide on clear policies for the divisions' issues and to a delay in cultivating new businesses indispensable for building the next-generation of business. Based on a reflection of that fact, the company began formulating a new strategic management plan.

The new management plan, called "Fusion 21," set four main business tasks for Daikin to accomplish in order to establish a foundation to enable the company to take a great leap forward in the twenty-first century. The first task was to reform the corporate structure to allow the company to respond flexibly to changes occurring as global society passed through a period of transition. Second was to set high business goals from a global perspective and develop detailed strategies to realize those goals. Third was to develop peripheral areas of business where the company could benefit from its core technology and core markets. And fourth was to establish a flat management system to promote speedy decision making. The word "fusion" in the management plan contained multiple ideas, such as short- and long-term goals being established side-by-side; manufacturing, sales, and R&D being integrated to develop global business; the development of business by combining the wisdom of everyone in the company from top

management to the newest employee through the sharing of information; and solidarity among the domestic and overseas companies in the Daikin Group.

In specific terms, Daikin set reforms for each of its Strategic Business Units (SBU). Because the previous approach of defining a strategy for each SBU was unable to respond properly to the business changes taking place, Daikin decided to develop more detailed strategies, including the position and managerial needs of each business unit. Daikin also divided the strategies into three levels: 1. short-term strategies spanning over a one- to three-year period; 2. a five-year approach up to the year 2000 for business development; and 3. long-term (10 years) reforms viewed from a global market viewpoint. First was preparing a detailed strategy, and outlining clear and specific goals for implementing it. Second was to set clear long-term and mid-term sales targets in both the air conditioning and chemical businesses for Japan, Europe, North America, China, and Asia. Third was to set a sales target of 100 billion yen in new business areas, including those currently being developed, such as oil hydraulics equipment for motor vehicles and semiconductor-related equipment. The fourth basic target was an overall lowering of costs, to be achieved by closing unprofitable businesses, slimming down the indirect divisions, and building a business structure that would be unaffected by exchange rate fluctuations. The final target was to achieve fast and flat managerial decisions while contributing to resolving problems related to the earth's atmosphere.

After the bubble economy burst, many Japanese companies adopted business policies centered on "selection and concentration." Even in that context, the Fusion policy was introduced relatively early on. While Daikin carried out "Fusion 21", however, the Japanese economy failed to demonstrate any noticeable improvement. In 1997, the government also raised the consumption tax from 3 to 5 percent, the summer was relatively cold, and the Asian currency crisis broke out. One result of those events was that Daikin's air conditioning business faltered once again. Also in 1997, Chairman George David of United Technologies Co., the parent company of Carrier Corporation, the world's leading air conditioning manufacturer at the time, visited Daikin in Japan. In a meeting with President Inoue, he said one of his dreams was to see Daikin and Carrier joined together in the future as a single air conditioning company. Then, in a takeover bid (TOB), he proposed that United Technologies become a silent partner in Daikin. In line with Daikin's corporate principle of autonomous management, however, President Inoue immediately declined David's offer. As a result, President Inoue felt a strong need to raise Daikin's current aggregate value so that TOBs could not be made so easily, and felt an additional strong need to emphasize the Daikin Way in business.

Daikin's business situation at the time saw domestic sales of air conditioners, the foundation of the company's overall business, languishing. Even favorable sales of fluororesins and new refrigerants, as well as good overseas sales of air conditioners, barely allowed the company to record increases in revenue and profit. President Inoue recognized that the poor business performance of the air conditioning business was not a problem solely of the domestic air conditioning sales or air conditioning manufacturing divisions but had to be tackled by the entire company. In that backdrop, Daikin established Task Force K903 in February 1998, and the entire company subsequently tackled reforms in the air conditioning business.

The direction of those reforms was decided in November 1998 and with the years from 2000 to 2002 as a target period seven

reforms were introduced, aimed at a basic restructuring of the company's business. The content of the reforms was as follows: (1) a workforce reduction of 1,000 employees by reducing the number of new employees; (2) turning the R&D and IT divisions into separate companies, and outsourcing Head Office administrative functions; (3) reform of the wage structure, and further promotion of a system of compensation based on performance; (4) basic strengthening of the financial structure; (5) promoting strategic alliances in the air conditioning business; (6) drastic reconstruction of the domestic air conditioning business; and (7) drastic reconstruction of the oil hydraulics business.

Next, Daikin introduced the "Fusion 21D" (21 Dash) management plan in February 1999. It was a revised version of the "Fusion 21" plan originally introduced in 1996. A main feature of "Fusion 21D" was its emphasis on overall management, including an all-out move toward consolidated financial reporting and reform of the company's financial structure through management that emphasized cash flow. During the 1980s, Japanese companies were quite successful in applying the so-called Japanese style of management to their operations. Once into the 1990s, however, after the burst of the bubble economy, companies around the world began globalizing their operations. Japanese companies also quickly had to introduce management systems that embraced global standards. Besides introducing international accounting standards, for example, it was necessary to bolster consolidated management in order to improve the overall management of group companies. Also, by improving its capital efficiency, the company's financial structure would be strengthened, thus tying to a higher international credit rating. Appropriate IR activities, meanwhile, would contribute to an international society having greater trust in Daikin. Daikin would also respond to

environmental issues by meeting International standards and obtaining ISO 14000 and other certifications. Additional specific measures in the management systems included achieving greater transparency in the company's business operations and emphasizing compliance.

Daikin promoted a response to global standards while remaining true to its unique management principles. In particular, as a fluorochemical manufacturer, Daikin had to emphasize group-wide tackling of environmental issues, and to go all-out if it wished to establish a code of corporate ethics. For that purpose it was necessary to strengthen the bond among the group companies, particularly in the context of the corporate principles it established in 1990 that expressed respect for the independent management of each group company. There was a need, based on the existing relationship of mutual trust among the companies, to strengthen their ties in specific ways. As a step in that direction, the First Daikin Group Conference was held in 1995, bringing together the presidents of the main subsidiaries—centered on Daikin sales affiliates—and the directors of Daikin Industries. The participants at the conference established a "Code of Behavior for Autonomous Management." Beginning in 1996, Daikin made the Group Conference more meaningful by also inviting managers from overseas affiliates to attend, enabling all the participants to understand better the group's actual market situation regarding globalization and borderless business. Discussions at the Group Conference emphasized helping overseas affiliates understand the English translation of the company's corporate principles. In such ways, Daikin reinforced the business structure of the group companies and promoted all-out consolidated management.

Another structural reform was introduction in 1999 of an advisory council system. Although some Japanese companies had

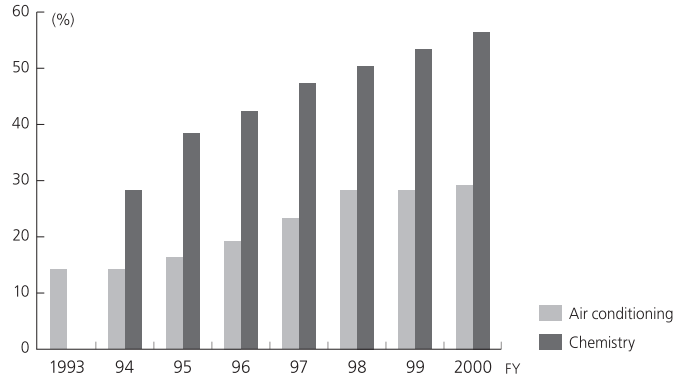
begun to introduce American-style executive management systems at the time, Daikin had only 25 directors, a relatively small number, and rather than introducing a new system it decided instead to enliven top management within the existing system. True to itself, therefore, Daikin elected members to an advisory council system and organized lectures and get-togethers as venues for Daikin officers and managers to learn from the experience and expertise of elite Japanese business leaders it appointed as advisers. In 1999, with the aim of strengthening the company's competitiveness in various business fields, Daikin emphasized a system of management control for pursuing the market principle, and introduced a virtual-company system to clarify the principle of individual responsibility. At the same time, President Inoue embraced the strong belief of deceased Chairman Minoru Yamada and emphasized the people-centered aspect of the company's operations. He thus searched for ways to improve the company's wage system based on performance. In these ways, the Daikin Way gradually took clear form in the company's management.

Fortunately, the Japanese economy bottomed out in 1998 and then began to recover. Daikin's two mainstay businesses—air conditioning equipment and chemical products—both almost completely met their year 2000 performance goals set in the management plan adopted in 1996. The company moved forward quickly in establishing manufacturing bases for its air conditioning business in Europe and China but was still unable to reenter the U.S. market. Although in monetary terms the company's new businesses and the oil hydraulics business did not achieve their goals, air purifiers and parking systems—the former a new business and the latter an oil hydraulics business—both began expanding. Among unprofitable businesses, meanwhile, Daikin withdrew one after the other from the robot business in 1995, from the electronic carpet and fan heater businesses in 1997, and from VP (vacuum pumps) businesses, such as dry pumps, in 1998. During the prolonged recession in the 1990s, many other Japanese companies also revised the diversified business structure they established during the bubble economy. They concentrated on the range of functions in which they could use the same technology or sales capabilities simultaneously to realize a cost advantage over the competition. This was called "selection and concentration" based on economy of scope. Daikin also promoted reforms in its business structure following the same principle, concentrating its resources on its core businesses and core technology.

Parking System for Apartment Projects (left) Mold Polishing Robots (right)

Fast and flat management, meanwhile, contributed toward carrying out the Fusion Strategic Management Plan. It helped to realize a slim management structure, and the company grew more than originally expected. Consolidated sales in 1994 of 384 million yen increased by 40 percent in 2000 to 532 billion yen and operating profit for the same period increased over six-fold from 6.5 billion yen to 39.8 billion yen. Operating profit on sales was 7.5 percent, much higher than the average for all Japanese companies, drawing Daikin closer to becoming a global company. As a result of energetic efforts, overseas operations also expanded, and over-

Overseas Business Percentage of Total Business



seas sales came to account for 32 percent of the company's total sales. Daikin thus took its first steps toward becoming a truly excellent global company.

Shift toward Emphasis on Strategy of Three Pillars of Air Conditioning Business

Daikin's domestic air conditioning business performance declined from 1992, mainly because of poor sales during a cool summer. The summer of 1994 was especially hot, however, and domestic sales were brisk. But then the company faced a new problem: it discovered that its product supply system was not in good order. That situation led to a loss in share for both room air conditioners and packaged air conditioners, forcing Daikin to face the worst possible business situation. And as if that were not enough, depressed air conditioning sales, which previously had accounted for 70 percent of total sales, were the main cause for the company's overall operations to fall into the red for the first time since 1976. President Inoue, meanwhile, who assumed the presidency in 1994, knew that Daikin's business results would not improve if the air conditioning business were not revitalized. He thus put to effective use his previous experience in having Daikin's chemical business overcome a crisis it faced, and set two targets for recovery of the air conditioning business: one was to establish clear business targets to achieve; the other was to instill a sense of crisis among the employees responsible for achieving those targets. The department managers in the four departments related to the air conditioning business met to discuss the content and direction of the targets being considered.

At the convention held in November 1994 for distributors and dealers handling Daikin air conditioning and refrigerating equipment, Chairman Yamada admitted that Daikin had fallen behind other companies in recent years by not being able to provide sufficient new products and the necessary product quality and services, and he promised that the company would rebuild its air conditioning sales and service systems. Tasked with that promise, President Inoue said that Daikin would return to the starting point of "there being no Daikin without its business partners," thus expressing his determination to tackle recovery of the former strong relationship of trust that existed between Daikin and its business partners. In terms of the air conditioning business, the company studied reforms of its internal structure from 1993, and in October 1994, four months after President Inoue took office, the company introduced a basic "Plan for Reform of the Air Conditioning Business." These decisions were made quickly under President Inoue's fast and flat management policy. The new business plan marked a major strategic shift for the company. First of all, in the three major business areas of room air conditioners, packaged air conditioners, and central air conditioning systems, Daikin formerly held core competence only in packaged air conditioners and that was the area the company emphasized the most. Although the company at one point seriously considered withdrawing from

the room air conditioning market, it ended up adding them and central air conditioning systems, thus marketing three main types of air conditioners. With that product line-up, Daikin then moved to expand its total air conditioning market share. Second, the company shifted from 2-pole sales, consisting of the domestic market and overseas markets, to a 4-pole strategy covering Japan, Asia, Europe, and the U.S. As a new policy, Daikin had its technical personnel also conduct marketing of central and packaged air conditioners, and changed its sales system of room air conditioners in response to the expanding "distribution revolution." In introducing such reforms in the air conditioning business, Daikin aimed at reinforcing the image of "Daikin, the global company" and "Daikin, the overall air conditioning specialist."

Daikin cited several reasons for emphasizing the marketing of three main types of air conditioners. First, in order to develop into a world-class specialist in the manufacture of air conditioning, Daikin's initial step would be to offer technical superiority, thus making it important to develop new room air conditioner technology. Second, it was important to build a structure for servicing central air conditioning systems, which could also be applied in other areas as well. And third, the markets for room and central air conditioning systems were both predicted to expand globally, and Daikin had to take advantage of that predicted expansion by utilizing its growth potential. In the context of new policies, the first step Daikin took was a substantial restructuring of its Air Conditioning Production Headquarters, turning it into three separate headquarters: Home Air Conditioning, Universal Air Conditioning, and Central Air Conditioning. Product planning, profit management by product, and the development and production technology divisions were placed under those three production headquarters. Daikin also established an Air Conditioning Production Strategy Office, a Compressor Development Center, and a Mechanical Technology Research Center. After those moves, the company then tackled organizational reforms in the area of sales, beginning with the reconstruction of domestic sales routes. It also moved to bolster its Overseas Sales Department, which will be discussed later under the section related to global strategy. For now, let us review Daikin's rebuilding of its domestic sales system.

One of Daikin's strengths was using the routes of air conditioning dealers with expertise in air conditioning systems (air conditioner installers, other equipment installers, electrical work shops). Daikin called them professional dealers and they could be put to good use when a company was moving to develop itself globally. They served Daikin well when it was establishing the foundation of its sales competence. But large stores handling electric appliances were always at the forefront of severe price decreases in the past, and manufacturers tended to fall into situations where their products handled by those stores competed solely on price. In that context, Daikin withdrew from this sales route in the early 1980s, except for several stores with whom the company had close relations. For the all-out sales of room air conditioners, however, the large electric appliance stores were an indispensable sales route because they were in direct contact with consumers. From the summer of 1994, Daikin decided to compete on price and began redeveloping its business relationships with volume sales electric appliance stores. By 1997, Daikin began redeveloping its business ties with the leading electric appliance stores in all parts of Japan. Also, since the installation of room air conditioners required electrical work, Daikin developed influential wholesalers of electrical work materials and piping materials as air conditioning dealers. These wholesalers also had business

"SkyAir Super Inverter 60"

relationships with other air conditioning manufacturers, but Daikin strengthened its sales and service of new products, such as its commercial-use air conditioner "SkyAir Super Inverter 60" series, and was thus able to differentiate its products from those of other companies, develop dealers, and gradually increase its market share. Most of the increased share was attributed not only to the strengthening and improvement of the traditional air conditioning installers with expertise in air conditioning systems but also to the newly developed large electric appliance stores and wholesalers of electrical work materials and piping.

The setting of sales strategies for each sales route and the development of new products and putting into order of service and support systems to carry out those systems proved to be the impetus for the recovery of Daikin's air conditioning sales. From early 1995, the domestic Air Conditioning Sales Division began a sweeping reform of its sales and marketing systems as it aimed to make Daikin "No. 1 in total service capabilities." The first step taken was organizational reform of the sales system. In January 1995, the branches formerly under the Domestic Air Conditioning Sales Division were abolished and the sales companies formerly under

the control of the branches were given wholesaler, sales support, and service functions that the former branches had. In order to have the new system progress smoothly, the general manager of the Domestic Air Conditioning Sales Division visited retailers and franchise dealers to exchange opinions with them about how to operate the new system. A convention of the top managers from super dealers – those whose sales amounts were particularly large – was held for the first time in three years to improve communication. At the convention, managers from Daikin explained the company's sales policies and provided the dealers directly with information on new products and new technology. In that process, the air conditioning sales, engineering, and manufacturing divisions prepared unified responses to the super dealers' and installation dealers' questions and opinions. Daikin made great efforts to respond quickly by having the presidents of the sales affiliates and managers from the Domestic Air Conditioning Sales Division visit the major dealers directly to answer their questions and explain Daikin's policies.

The integrated relationship established between Daikin and the sales affiliates for expanding sales was called the "Daikin Air Conditioning Federation (DACF)." Under that new system, the sales affiliates took on wholesaler, sales support, and service functions and Daikin expected them to serve a role as manufacturer's sales affiliates. More than previously, Daikin wanted to make certain that DACF thoroughly understood the company's sales policies, and felt a need to build a system for sharing with DACF the opinions and information from the sales outlets and users. For that purpose, from March 1995 Daikin began distributing a regular videotape titled "Flash News from the Air Conditioning Sales Division," thus making it more certain that updated product and technical information was reaching the sales affiliates. In order to

respond promptly to inquiries from the sales affiliates, an email system was also developed that connected the Domestic Air Conditioning Sales Division to the sales affiliates in Japan. Also, the "Customer Service Centers" previously located in the branch offices were transferred to the offices of the sales affiliates. In October, meanwhile, the three sales affiliates not able to perform the new functions assigned to them because of their small size were integrated into one company, thus reducing the nationwide number of sales affiliates to 24 companies.

The sales affiliates were capable of responding precisely to requests from the sales outlets, and that capability clearly differentiated them from other companies. With the aim of becoming the No. 1 air conditioning manufacturer in total service capabilities, Daikin created a system to support the various technical services of the sales affiliates. In January 1995, the company established the Daikin Institute of Air Conditioning Engineering, and through it began to develop systems engineers with sophisticated technological capabilities in system design and installation management. The first students graduated in May 1995 and were transferred to the manufacturer's sales companies. A month before that, Daikin opened an Air Conditioning Business School aimed at raising the technical competence of all employees in the sales companies, wholly owned dealers, and the Domestic Air Conditioning Sales Division. In mature air conditioning markets such as Japan it is especially important in sales to obtain repeat orders. To support that goal, "Dream Teams" were set up in the sales companies. Members of the Dream Teams made regular visits to the wholly owned dealers to assist in preparing customer lists, visiting users, and performing air conditioner cleaning and inspection services. Also, in order to contribute toward increasing the levels of expertise and design and estimate capabilities, Daikin provided the sales affiliates with software to prepare proposals for repeat orders.

For commercial-use air conditioners, Daikin developed the Air Conditioning Network Service System ("AirNet") that eliminated wasteful operation by remote monitoring, coupled with a service system for immediately detecting malfunctions through an "AirNet" device attached to equipment located on the premises of users. In October 1993, Daikin established an "AirNet" Control Center (ACC) in the Abeno part of Osaka and in December 1995 established another ACC in Tokyo. The two ACCs not only created a support system for the "AirNet" service but also served as centers for expanding the service. Daikin also developed a unique air conditioning communications system that allowed control and monitoring of the operating condition of air conditioning systems and other building equipment through D-BIPS, an independent integrated building monitoring board. The system enabled the prediction and report of breakdowns. From April 1998, Daikin moved all out to develop a Facility Control System business that directly connected D-BIPS and the ACCs for supervising the management and maintenance of air conditioning systems and other equipment in buildings. Those were the first steps taken toward establishing a 24-hour, 365-day service system.

High-Cycle Production System and Development of "Ururu Sarara"

While developing new products in the late 1990s Daikin also introduced various experimental products. At the time, the general consumer mood in Japan was toward belt-tightening because of the burst of the economic bubble. The domestic air conditioning market had matured, however, and quality products continued to sell well. Japan's air conditioning manufacturers staked their con-

Global Mini-Split (GMS) E-Series Inverter

tinued existence on the development of new products with features such as higher-level performance, energy conservation, attractive pricing, and other outstanding features. As the only company in Japan specializing in the production of air conditioning equipment, Daikin was already well known for its outstanding technical capabilities. The company, however, made it possible to develop new products in response to market needs by introducing a system in which technical personnel involved themselves directly in marketing. Besides the "Super Inverter 60," a packaged air conditioner that provided overwhelmingly superior energy efficiency, Daikin also introduced the Global Mini-Split ("GMS") series of room air conditioners at prices lower than what other companies could offer. Also, a new Daikin product called "Ururu Sarara" became a representative hit product among room air conditioners because of its outstanding performance.

The first products tackled among packaged air conditioners were cassette-type units in the volume-production "SkyAir" series. The aim was to challenge the limits of cost reductions by developing a product at half the cost of previous models. From the development stage, plans called for achieving a 50 percent cost reduction through overseas procurement of parts while maintaining superior heating and cooling capabilities and quiet operation. Those targets were met and sales of the product began in 1995. In order to respond efficiently to the demand for repeat orders, meanwhile, Daikin took positive action regarding requests from customers to develop products that could be installed in a short time and reduce construction costs using the piping in existing installations. This was accomplished by developing an outdoor unit capable of using existing piping by improving the flexibility of the piping diameter so that existing piping could be used while replacing old air conditioners with new, larger-capacity, indoor or outdoor units. In March 1997, new models capable of using existing piping were marketed together with the existing "SkyAir" indoor units.

"Ururu Sarara" R Series

Around this time, society began to show greater concern for energy conservation. The government bolstered the regulations for CO_2 emissions, and Daikin began placing greater emphasis on developing energy conservation technology for use with air conditioners. For the first time, packaged air conditioners used a compressor motor fitted with a reluctance Direct Current motor, thus increasing operation efficiency by 25 percent at low speeds and 10 percent at high speeds. Many new functions were developed, including an outdoor Heat Divide-type heat exchanger to increase the heat efficiency, a first in the air conditioning industry. The "Super Inverter 60" series that Daikin put on sale in April 1998 consisted of 160 models capable of using existing piping for installation,

ranged in size from 5kW to 16kW.

As a result of these various reforms, starting in 1995 Daikin succeeded in increasing its market share in the air conditioning business for three consecutive years. The sales growth of the "Super Inverter 60" series of packaged air conditioners was especially remarkable. Starting in 1996, however, a business slump ushered in a rapid drop in prices, and Daikin's efforts to reduce costs could not keep up. In 1997, the company's business results declined drastically. Consolidated operating profit for fiscal 1997 decreased substantially to only 40 percent of the profits of fiscal 1996. Although profits for fiscal 1998 recovered to 60 percent of the fiscal 1996 level, consolidated sales stayed below those in fiscal 1996. Daikin thus faced the urgent task of improving its ratio of gross income on sales. With March 1999 as a target date for considerably expanding profits, the company introduced a second set of reforms, called Task Force K903, in February 1998. Eleven priority measures were introduced at that time for increasing profits in the domestic air conditioning business. Besides bolstering sales capabilities in order to increase sales, the company established a business structure that would produce a profit even if sales fell 80 percent from their current level. The general content of the reforms included reduced production costs, considerably decreased logistics costs, the activation and improved profit structure of the sales affiliates and dealers, and the early development of new products and products in new areas of business.

Daikin initially pursued production cost reductions from 1978, mainly through the Production of Daikin System (PDS). The manufacturing division felt great pressure to reduce costs further after business results worsened in 1997, and the division began to feel the need for an overall review of the PDS as used up to that point. Daikin promoted the widest possible use of computers to

achieve the maximum level of automation for continuous operation of its production lines and synchronization between sales and distribution. But the company could not respond flexibly to the post-bubble cooling off of consumption in the domestic market, a drop in Japan's international competitiveness because of the stronger yen, or the progress of the distribution revolution and continued collapse of prices. Speed and flexibility became important in production and preparation of a system for producing only products that would sell and only in the volumes that could be sold—just-in-time thinking—and keeping investments in facilities, people, energy, and other areas to the minimum levels needed. While closely following the just-in-time approach, Daikin built a system that rid production of excesses in every area of the company, including personnel, parts, and the production of different models on the same line. The company also asked its suppliers to start delivering frequent shipments of small lots of parts. After the reforms were introduced, the resultant production plan was based on a schedule of production volume 18 weeks in advance. Decisions on the model mix and on firm orders to suppliers were made three days in advance, and steps were taken to introduce a high-cycle production system that would considerably shorten the cycle from receipt of orders to ex-factory shipment, from 15 days to only three days. Daikin accomplished those high-cycle production system in 2002. Because of the large number of different models being produced to meet the diversified needs of customers, and because sales fluctuated widely by season, with production volume at peak season being three times that during off season, the high-cycle production system was not easy to realize. Workers were trained to multi-task in order to provide widespread support between production lines; commonality of parts was promoted; flexible lines responded to changes in production volume; and fi-

nal assembly was conducted using production cells. The production system Daikin developed, modeled after the Toyota approach of producing small volumes of many products, responded to sales of a changeable models and changeable volume.

In order to expand sales through the large electric appliance stores sales route it was necessary to develop unique and outstanding products to prevent competitors from catching up. It was also necessary to develop low-priced products for the volume zone of sales. Around this time, a price revolution occurred in Japan as the economic recession following the burst of the economic bubble was prolonged. In the distribution area, meanwhile, as large-scale retailers and chain stores grew in size they developed overwhelming sales capabilities and the ability to negotiate better prices. In the air conditioning market, room air conditioners were being sold for lower prices and the price difference between them and home electric appliances disappeared. On the one hand, the market share of the large electric appliance stores increased steadily, until it accounted for over half of all sales, and on the other hand the market position of general retailers dropped noticeably. During the hot summer of 1994, in particular, general retailers ran out of products while large electric appliance stores offered a rich line of products and their sales increased tremendously. Still, because Daikin began developing the large electric appliance stores sales route much later than its competitors, that route accounted for only 35 percent of the company's total sales. In that situation, Daikin moved to bolster its relationship with the large appliance stores. The company, however, did not have low-price, small-size products in the volume zone and it was thus an urgent task to develop products that would sell in the large electric appliance stores sales route. Daikin's name was not well known in the room air conditioning market, and it was urgent that the company develop

a new product suitable for handling by the large electric appliance stores that would raise the company's corporate image.

Daikin's air conditioning business results declined considerably in 1997. The company's Manufacturing Division came to face a critical situation with the development and sale of small-size air conditioners. At one point Daikin even seriously considered quitting the small-size air conditioning market and selling the Shiga Plant. Instead, however, the Manufacturing Division tackled the all-out rationalization of production operations for small-size room air conditioners, realizing that failure would mean withdrawal from that market and loss of its mainstay factory.

From the design stage, Daikin aimed a new small-size air conditioner it was developing for worldwide release called the "Global Mini Split" (GMS). The company kept the product's target sales price low, reduced the number of parts, and procured parts at the world's lowest prices, thus keeping overall costs low as it aimed to produce a game-changing product combining multiple functions with a low sales price. Daikin also reduced wasteful processes and operations to the maximum extent allowable, thus greatly simplifying the manufacturing process. By utilizing its high-cycle production system, Daikin succeeded in achieving lower production costs. Daikin finally marketed the product in September 1999.

Development, meanwhile, moved forward from 1996 on a new air conditioner that automatically added humidity when used for heating. It was to be completely original, but it was 1999 before the technical direction of the product became clear. Development of the humidifier unit actually began in April 1999. In the air conditioning market at the time, however, if new products were not put on sale by October they would not be in time for the next season. Development of this product thus required a crash

program to meet the October deadline. There were particularly difficult hurdles to overcome in developing the device that drew in humid air from the outside and sent it through an insulated hose to the indoor unit. Also, engineers did not notice that the ventilation fan was noisy until the prototype stage. It thus took until the end of August to resolve that and various other problems. When the product's specifications were about finalized, orders were sent to die makers as preparations moved toward trial production. Performance goals were simultaneously cleared and the final stage was development of the control system. Due to the untiring efforts of the development team the product was ready for production within the October deadline. Taking advantage of the "engineer spirit" in the product development division, the engineers worked diligently to develop the product and get agreement from the manufacturing and sales divisions in the process. This project is a good example of the effectiveness of Daikin's unique product development system in which the completeness of the manufacturing and sales systems is synchronized with success in developing new technology.

The mechanism for the automatic water supply unit used a zeolite rotor to carry humid air from the outside and then used heat from a heater to forward the air to the indoor unit, resulting in the world's first water-free humidifier mechanism (called "ururu"). Also, traditional air conditioners had the shortcoming of lowering the temperature too much when operating in the dehumidifying mode. Dakin engineers successfully overcame that shortcoming by developing a dehumidifying method for keeping the temperature constant (called "sarara") by reheating the air reheated by the condensed refrigerant radiation. That air was then mixed with dehumidified cold air to maintain the temperature at a reasonable level. In that way, Daikin successfully developed a

compact air conditioner fitted with a humidity control function. Besides cooling and heating comfort, the new product achieved the industry's highest energy conservation efficiency. As a step to contribute toward meeting the goals of reducing CO_2 to levels published in the Kyoto Protocol, the Japanese government began applying the Revised Energy Conservation Law from 2004 to room air conditioners. The energy efficiency performance of the "Ururu Sarara" unit cleared those standards prior to being marketed.

Because top priority was placed on the time schedule for the new product, and because high-quality materials were utilized to ensure the product's safety, the newly developed product could not avoid high planning and production costs, and a high selling price. In that context, an effective sales plan utilizing various ingenious ideas was needed to provide the strong impression that the "Ururu Sarara" was a game-changing product. A sales plan was formulated under a completely new system for Daikin. Up to that point, Daikin's main products had been commercial-use air conditioners, and the products had number designations, not names. It was thus necessary to create a name for the new product that would appeal to housewives, the main persons making the purchase decisions for home electrical appliances. The two final name candidates were "Index of Refreshing" and "Ururu Sarara," but the members of the sales planning project team were divided equally about the name and could not decide. The decision was then left up to Vice President Yasushi Yamada, and he chose "Ururu Sarara," the name the younger members of the project team favored. Daikin had just begun sponsoring television commercials again in 1996, after a four-year hiatus, and the first commercials were almost entirely devoted to "Ururu Sarara." Planning called for heavy emphasis on impressing viewers with the out-

"Pichonkun" Festival Car at Aomori Nebuta Festival

standing humidifying and dehumidifying features of the new product. Among the memorable images used on television were those showing drops of water entering and leaving the air conditioner. They were given eyes and mouths, and the onomatopoeic sound of water dropping to the ground gave rise to the character "Pichonkun" being associated with the product.

The "Ururu Sarara" R series was finally put on sale in October 1999. Up to then Daikin had mainly offered products aimed at business and professionals; the new product responded directly to the needs of the mass consumer market. Compared to general room air conditioners on the market, selling for about 190,000 yen, for a room 13 m2 in size, "Ururu Sarara" sold for 250,000 yen, 30 percent higher. But the product responded to the market need for high performance air conditioners and it was evaluated highly. It sold well from its introduction. The "GMS," meanwhile, a product priced so low that the competition could not match it, was not only competitive in price but also provided much greater energy efficiency—with lower annual electricity consumption costs—than the products of other companies, and sales in the large electric appliance stores route progressed extremely smoothly. Both the "Ururu Sarara" and the "GMS" products offered quite high

product quality levels, and they matched closely the extremely strong awareness of the need to conserve energy. Daikin's room air conditioning business, which suffered reduced income and profits in fiscal 1997 and 1998, turned toward recovery in fiscal 1999. In fiscal 2000, due to the success of these two products, Daikin's business recorded remarkable results.

Leap Toward becoming Global Company in Air Conditioning Business

1994 marked the all-out start of Daikin's global strategy. That was the year the company began operations at the Chemical Department's new plant in the U.S. and around the same time that the company's air conditioning business began procuring parts from overseas suppliers. That was also the year that Daikin announced its intent to enter the Chinese market. The company broke from the twin-axis trend of viewing markets as either domestic or overseas and established a quite different global strategy that differentiated markets by product and region. Then, in 1995, it introduced the "Fusion 21" strategic management plan, aiming to hold the number one share in the world's air conditioning market. To do that, Daikin became active in Japan, the ASEAN nations, Oceania, Europe, and China—the world's five major markets—to build self-supporting production systems. In the chemicals business, meanwhile, the company established market strategies in Europe and Asia to optimize its global operations, and began studying the possibility of establishing a production base in China. And in order to formulate a specific strategy and carry it out, in July 1996 Daikin established its Global Strategy Headquarter.

The first step Daikin took in its global strategy in the air conditioning business was to procure components from Thailand. The direct stimulus for that decision was to offset the yen's rapid

appreciation from 1993 and the collapse of prices in the domestic Japanese market related to the strong yen. Strategically, however, the aim was to build a cost structure that would prevent Daikin from losing out to other companies in the same industry, especially Matsushita Electric Industrial Co., Ltd., who had a plant in Malaysia. Daikin introduced its "Fusion 21" strategic management plan in 1995, thus ushering in a true global strategy. DIT in Thailand was originally established as a sub-plant of the Shiga Plant in Japan and Daikin repositioned it as a global production site in the Daikin Group. In order to supply low-cost room air conditioners and compressors not only to countries in Southeast Asia but to Japan, the Near and Middle East markets, and countries in Europe, Daikin put into order a system for increasing the production of those products. With packaged air conditioners, Daikin positioned DIT as a supplier to markets in Southeast Asia, and created a production system for DIT to supply those markets with "SkyAir" products and duct-type packaged air conditioners.

Meanwhile, in order to supply parts and materials from Southeast Asia at minimum cost to production sites in Japan, Europe, and China, Daikin established Daikin Trading (Thailand) Ltd. (DTL), in Bangkok in May 1997 to import and export air conditioning components. That same November, Daikin established Daikin Asia Servicing Pte. Ltd, (DAP), in Singapore as a center for handling service-related parts and components. In the ASEAN and Oceanic markets, DIT began functioning as a production hub for room air conditioners by 1997 and for packaged air conditioners by 2000. By turning Thailand into an international production center, Daikin Industry Ltd. (DIL) also increased its international production of components from 20 percent in 1998 to 29.1 percent in 2000, which contributed toward establishing a financial structure unaffected by exchange rate fluctuations, one of the goals of

the "Fusion 21" strategic management plan. Actually, at the time of the Asian currency crisis in 1997, "Fusion 21" ran into trouble with the drastic lowering of the value of the Thai baht and the cooling off of the ASEAN market. One result was that Daikin had to lower its growth target for the ASEAN market substantially. In that context, it became necessary to review the overall growth expectations for the air conditioning industry in Asia, a review that began with the setting of strategies by country.

In the summer of 1994, meanwhile, not long after President Noriyuki Inoue assumed office, Daikin shifted its policy 180 degrees and began considering entry to the Chinese market. In the early 1990s, however, when Daikin hesitated and then decided not to enter the Chinese market, the existing Chinese air conditioning manufacturers had already formed business ties with overseas capital, and it was not easy in 1994 for Daikin to find a potential business partner. Since 1995 was the year set for termination of the Chinese government's favorable tax incentives for importing production facilities, the time for Daikin to select a business partner had almost run out. In that situation, Daikin decided quickly on a joint venture with Yah Chong Sewing Machine Co. in Shanghai. The two companies, with Daikin holding a 60 percent share, then established Shanghai Daikin Yah Chong Airconditioning Co., Ltd. later renamed Shanghai Daikin Airconditioning Co., Ltd. The two companies agreed to build a plant capable of annually producing 30,000 units of "SkyAir" and other products.

From the summer of 1994, meanwhile, Daikin began negotiating with the Qing'an Group of Xi'an to establish a joint venture for producing compressors. Daikin had previously negotiated from 1985 to 1990 with Aviation Industry Corporation, the parent company of the Qing'an Group, to provide them technology related to rotary compressors. The negotiations, however, did not proceed

Shanghai Daikin Yah Chong Airconditioning Co. (top)
Starting Members of Company (left)

smoothly and were halted in 1990. Daikin negotiated with them again in 1995 about establishing a joint venture for producing scroll compressors. This time the two companies reached an agreement and established the joint venture Xi'an Daikin Qing'an Compressor Co., Ltd. (DIX), with Daikin holding 51 percent equity. DIX supplied compressors to DIS and by 2000 increased its annual production capacity to 150,000 units. Sales included units sold through the sales routes of local manufacturers.

Next, in 1997, Daikin reached an agreement with the Suns Group Co., Ltd., in Huizhou City, Guangdong Province, to establish a local joint venture for producing water chilling units, with Daikin holding a 70 percent majority share of the venture, called Huizhou Daikin Suns Airconditioning Co., Ltd. (HDS), renamed Daikin Central Airconditioning (Huizhou) Co., Ltd. (DCAH), in February 2005. The DIS and DIX plants both began all-out operations in 1997, and in November the HDS plant also began production. At the time, all the Japanese-affiliated air conditioning manufacturers were conducting joint-venture production in China, and an excessive number of room air conditioning makers caused problems tied to overheated competition. Credit transactions with dealers also caused serious problems. As a reflection of that situation, and to avoid direct competition with Japanese-affiliated manufacturers, DIS at first produced only packaged air conditioners. Rather than floor-type equipment, the mainstream products in China, DIS focused on sales of cassette-type air conditioners embedded in ceilings. It also accepted only cash transactions as it steadily developed sales routes. After the Chinese government began moving to adopt a policy of not approving new applications for producing air conditioning, however, Daikin quickly decided in 1996 to increase DIS's capital in order to expand its production capacity. In August 1996, Daikin received tentative approval to produce room air conditioners. It began all-out production from March 1998. DIS thus participated in the room air conditioner market with annual production at the 60,000-unit level.

After that, major changes occurred in the area of international competition. First, Toshiba Corporation and Carrier Corporation entered into business ties and began a sales offensive in the ductless air conditioning market. Second, South Korean and Chinese air conditioning manufacturers developed rapidly and expanded their market share in the low-price product range. Competition was not limited to price but also included service and logistics systems. Those problems and foreign exchange fluctuations forced manufacturers to respond promptly by region. In a situation where it was no longer possible to respond by tweaking its existing strategy, Daikin began the all-out challenge of becoming a global company by reviewing its former strategy and draw-

ing up a new medium-term global management plan.

One of the first steps Daikin took was to make its regional strategy more detailed by expanding its global approach from five to eight zones, responding all-out by economic bloc and by country, thus promoting an overall quicker market response. To differentiate itself from its competitors, Daikin introduced products such as "GMS" and other room air conditioners in the volume-zone, and differentiated products such as separate-type medium and large air conditioners, multi-room air conditioning systems, and "SkyAir" in the intermediate zone of room air conditioners and packaged air conditioners. The company also expanded its solution business, including building maintenance services, and bolstered its sales network, introducing measures that responded closely to the market situation in each country. In the Philippines, Daikin established the joint venture Daikin-Alen Airconditioning Inc. in May 1998 for manufacturing and selling air conditioning equipment. In April 2000, Daikin established the joint venture company Daikin Shriram Airconditioning Co., Ltd., for manufacturing and selling air conditioning equipment in India.

Daikin's second new strategy for meeting competition was the promotion of strategic alliances. In response to the mega-competition the company faced in global markets, and as part of its aim to become the world's No. 1 air conditioning manufacturer, it was important, of course, for the company to offer leading-edge products that considered the global environment. But it was likewise important to offer products in a timely manner around the world that responded to diversified market needs and to create not only the necessary manufacturing and sales systems but also a dependable service system. To make that possible, it was necessary to form ties with other companies on a global scale. One such strategic alliance was entered into with Matsushita Electric Indus-

Announcement of Business Ties with Matsushita Electric, Presidents Morishita (right) and Inoue

trial Co., Ltd. (MEI). MEI held the largest share of the domestic market for room air conditioners, and from early on had moved to expand its global operations centered on that product area. Daikin, meanwhile, was the top domestic manufacturer of packaged air conditioners, and it had developed strongly in that product area in overseas markets as well. With that backdrop, and to make best use of the outstanding features of both companies, Daikin and MEI entered into a comprehensive strategic alliance in November 1999. Four of the main areas covered in the alliance were the division of production on a global scale, joint product development and joint procurements, the study of joint R&D of essential element technology for compressors used in room air conditioners, and sales assistance from MEI for Daikin's scroll-type compressor. Since both companies already had domestic production and sales systems in place, they decided not to integrate capital or sales, basing their domestic ties wholly on mutual trust.

In Japan's manufacturing sector it had become normal for parts manufacturers and general assembly manufacturers to conduct long-term stable business transactions based on mutual trust, but there are few examples of two companies such as Daikin and

MEI, manufacturing the same kind of products on the same scale, entering into comprehensive ties. The ties were more than an alliance between two powerful companies each holding top product shares in Japan's air conditioning market. They were ties between two companies with their bases in the Kansai region, and there were mutual feelings of strong trust between President Noriyuki Inoue of Daikin and President Yoichi Morishita of MEI. Another important deciding factor was that the two presidents understood and appreciated the corporate culture of each other's company. The gentlemen's agreement between the two companies, such as to divide production, was a decision aimed at making the most of the individualistic qualities of each company, and maintaining the loyalty of the employees of both companies at a high level.

Daikin's third step in its all-out move to become a global company was reorganizing its sales affiliates in Europe. At the time of introducing the "Fusion 21" strategy in 1995, Daikin was third in the global air conditioning industry behind only Carrier Corporation and Trane Company. Daikin had made progress in moving the production of room air conditioners, the "SkyAir" series, and "VRV" systems to DENV, and its single-year business performance had finally turned profitable. DENV moved to strengthen its competitiveness in various ways, such as by bolstering its sales system, reducing costs, developing medium- and large-size chiller products, and restructuring its logistics system. As a result, in 1997 it was able to clear its cumulative loss, and in 1998—largely because of favorable weather conditions—the company's business performance turned profitable and it moved into second position in market share. With the ties between Toshiba and Carrier in mind, DENV then moved quickly to put its sales system into order.

In France, Daikin had capital ties with Megatherm Electronics Ltd., its sole distributor since 1987, and in 1992 it bought out the

Daikin Airconditioning Germany (DAG) (top) Get-Together to Celebrate Establishment of DAG (right)

company and in 1993 renamed it Daikin Airconditioning France S.A.S. (DAF). In the U.K., the only area with multiple distributors, Daikin set up the U.K. Office in 1993, and began moving toward establishing its own sales affiliates. In Germany, Daikin bought out the air conditioning sales division of Kuba Kaltetechnik GmbH, a subsidiary of GEA Happel, and in June 1998 established Daikin Airconditioning Germany GmbH (DAG) in Munich. In 2000, Daikin bought out ACISA, its sole distributor in Spain, and established Daikin Airconditioning Spain S.L. (DACS) in Madrid. In countries of the old COMECON region, meanwhile, where economic recovery was expected to lead to an increased demand for air conditioning equipment, Daikin set up Daikin Airconditioning Central Europe (DACE) in Vienna, Austria, to oversee all Daikin sales companies in central Europe. These various moves re-

sulted in a direct sales system being created in the major European markets.

Finally, based on the "Fusion 21" Strategic Management Plan, Daikin accepted the challenge of reentering the U.S. market. After conducting market surveys and confirming that duct-type air conditioners accounted for an overwhelming percentage of sales in the U.S., Daikin abandoned for the time being the idea of entering the market with ductless-type air conditioners. In July 1998, together with Modine Manufacturing Co.—a leading manufacturer of heat exchangers in the U.S.—Daikin established the joint venture Daikin Modine Inc. (DMI), and entered the unitary business. Modine's Rockbridge Plant in Virginia was revamped to allow annual production from 1999 of 5,000 rooftop-type air conditioners, combining heating and cooling functions. Because product development took more time than expected, production and sales did not begin until October 1999. Even then, a mistake in the marketing strategy led to initial sales of only small-size premium products, causing great difficulties in starting up the business. In order to remain in business, additional large investments were needed to develop products and reconstruct the sales network. There was also substantial risk related to competition Daikin would face from major U.S. manufacturers such as Carrier and York. In that situation, not much future potential was expected from the venture. As a result, the joint venture DMI was dissolved in April 2000, and Daikin and Modine mutually shared the cumulative loss. In that way, Daikin's second attempt to enter the U.S. market again ended in failure.

Global Strategy of Chemicals Division

The Chemicals Division prepared a Medium-Term Business Plan in December 1993 that emphasized improved revenues, a 4-pole development of global business, and the development of new business areas based on superior technology. Plans originally called for having the Decatur Plant begin operations in February 1994. During 1993, however, Daikin was forced to respond to the rapidly appreciating yen, which reached 100 yen to $1.00, and faced the equally urgent task of responding to a sluggish domestic market as users of fluororesins and fluoroelastomer shifted their manufacturing bases overseas. The new business plan aimed at further cost reductions and at speeding up the development of overseas markets.

At the time, along with the banning of specified CFCs, the worldwide fluorocarbon industry was being reorganized. In that backdrop, Daikin aggressively promoted the development and sale of substitute CFCs, aimed at substantially increasing its market share. When specified CFCs were banned in 1996, Daikin was the leader in the domestic market for fluorocarbon because of its development of CFC substitutes. Daikin held a 40 percent market share, a large increase from the 28 percent share in 1989 prior to the banning of specified CFCs. That share firmed up Daikin's position as the leading company in the industry. Viewed by main products, the Chemicals Division increased its market share substantially to 91 percent for HFCC142b, used as a foaming agent for polystyrene and polyethylene, 60 percent for HCFC141B, used as a foaming agent for polyurethane, and as a cleaning agent; and 35 percent for HFC134a, used as a refrigerant in car air conditioners and refrigerators. Special note should be made of Daikin's successful entry into the huge automobile market. Daikin also had business ties with National Refrigerators Inc. (NRI) for selling HFC134a in the U.S. refrigerator market.

For resins and rubber products, the Chemicals Division moved to develop new applications and new markets, with the

Division's manufacturing, sales, and research departments working closely as a team to break away from merely developing products to keep up with DuPont. With "Neoflon" FEP (Fluorinated ethylene and propylene copolymer), "Neoflon" ETFE (Ethylene tetrafluoroethylene copolymer), and "Polyflon" PTFE (Polytetrafluoroethylene), in particular, Daikin expanded the production facilities at DAI, and production began there from September 1995 of FEP and ETFE. Production capacity was bolstered further at DAI for PTFE.As one application, ultra-expansion technology was developed in 1990 and an air filter unit called "Neurofine" was put on sale in 1995 utilizing that technology. Since the product used expanded PTFE film as its filter material, no major shift from traditional glass filters occurred. Afterward, Daikin reduced costs by manufacturing the filter in-house and developed applications in business areas where high performance was required, such as in clean rooms for producing semiconductors. Other new businesses included final-stage products based on unique development activities, such as "Zeffle", a weatherproof fluorine varnish, and "Lezanova" golf gloves and golf shoes made of fluorine-impregnated natural leather.

As a result of that energetic structural transition, Daikin's chemicals business recorded a turnover of total assets of 1.07 and operating profit of 15.1 percent, figures that far exceeded the average in Japan's chemical and synthetic resin industries. In fact, those figures brought Daikin close to the levels of DuPont and 3M, representative multinationals with high earnings. In global market share as well, compared to DuPont's roughly 30 percent share, Daikin's share was just under 20 percent, thus allowing Daikin to move a step ahead on the world's number two groups of companies—ICI/Asahi Glass, 3M/Dyneon, and Elf Atochem (today's Arkema). The Chemicals Division's contribution as a main pillar

of Daikin's overall business also increased. On a consolidated basis, the Chemicals Division maintained steady growth from fiscal 1996 onward. In fiscal years 1997 and 1998, in particular, when the company's air conditioning business was sluggish, the chemical business had an operating profit percentage of 60 percent, thus supporting the company's overall profits.

In the context of the Chemicals Division's favorable business performance, Daikin formulated a plan called "Growth Strategy for the Chemicals Business" in November 1998. It marked the start of an expansion policy with the goal of catching up with DuPont, the world's top corporation in the chemical industry. Two specific goals in the new growth strategy were an increase in the production capacity of resins for hot melt resins and a global expansion of business. Daikin's global expansion in the chemicals business started with the U.S. market and then moved to China and Europe.

In the early 1990s, Daikin waited patiently for a chance to build a foothold in the Chinese fluorochemicals market. Because the company was having trouble finding an appropriate partner, it decided in 1998 to reduce its aim to produce coating materials, and acquired land for building a plant in the outskirts of Shanghai. Prior to building a plant, however, and for establishing production and sales systems in South China, the main location of potential customers for purchasing coating materials, Daikin established Daikin Chemicals (Hong Kong) Co., Ltd. (DCHK), in August 1997. DCHK then commissioned China Paint Co., China's largest manufacturer of painting materials, to produce all its paint, and began to sell the coating materials and provide technical services in South China. Next, in March 1999, construction of the plant for Daikin Fluoro Coatings (Shanghai) Co., Ltd., was completed, and the company began producing and marketing fluororesin paints. Preparations thus moved steadily forward with Daikin's determined

Daikin Fluoro Coatings (Shanghai)

development of the chemical business in China.

Daikin then moved forward with establishing an all-out production unit as the second step of its chemicals business plan in China. People's Republic of China Ministry of Chemical Industry (ChemChina), meanwhile, had begun developing the idea of establishing a fluorochemical base in Chanshou City in Jiangsu Province. With strong support from ChemChina, Daikin then moved forward promoting strategic ties in the fluorochemical industry. Next, in 1998, Daikin and China National Chemical Construction Corporation (CNCCC), an organization directly under ChemChina, agreed to work together to develop wide-ranging operations in the fluorochemical business. In February 1999, Daikin opened an office in Chanshou, and began planning to build a plant. Prior to that, in April 1998, Daikin and CNCCC jointly established Daikin CNCCC Chemical Trading (Shanghai) Co., Ltd. (DCCTS), for the import from Japan and sale of products as pre-marketing activities prior to the start of commercial operations at the Chanshou Plant. DCCTS established a sales network for exclusive sale of Daikin products and to develop new markets in China. In these ways, Daikin steadily carried out its chemical business in China.

In Europe, meanwhile, Daikin established Daikin Chemical

LAN Cabling Using FEP

Europe (DCE) in 1992 in Dusseldorf, Germany, and began offering technical services. From 1994, DCE's focus shifted more toward sales and the company operated as a dealer. In 1998, Daikin established Daikin Chemical Netherlands (DCN) as a production center for fluoroelastomer pre-compounds. DCN imported raw rubber from Daikin's Yodogawa Plant in Japan and began pre-marketing on Europe's compound market. Finally, it established Daikin Chemical France (DCF) in the outskirts of Lyons, for the production of fluoroelastomer, thus completing an integrated production and sales systems in Europe.

In the U.S., Daikin began commercial production of PTFE from 1994, and FEP and ETFE from 1995. Fiscal 1990 marked the third year of operations, and the company moved into the black. In that context, Daikin in 1997 announced its Second Stage Plan in which it would aim to turn its U.S. operations into a comprehensive fluorochemicals company. FEP was used in LAN cabling, and was used extensively in the U.S. as the IT market expanded. FEP sales, in fact, contributed significantly to the first year of positive business results for DAI. From around 1997, however, demand decreased rapidly and a need arose to develop additional sales routes quickly. Sales were especially competitive for PTFE because it was a general-use plastic. There was thus an urgent need to improve

Daikin and DuPont Sign Cross-Licensing Agreement

the product's profitability. In order to secure the world No. 2 position in the fluororesins market, it was also necessary to increase the existing volume of business and introduce new products, such as repellent agents. In that situation, DAI introduced polymerization facilities to its Decatur Plant, and from early 2001 began producing repellent agents for commercial use. In order to bolster its production and development capabilities, DAI established the American Research Center. DAI also moved energetically to create new markets through product development, to enter into new strategic alliances, and to expand its sales system. After writing off its cumulative losses in 1998, DAI made concentrated plant and equipment investments and succeeded in maintaining a high level of income.

During this period, an explosion and fire broke out at the Decatur Plant in the U.S., killing three employees and injuring one. To DAI, which had marked 2.42 million hours of continuous operation since the start of operations without an accident requiring the production lines to be shut down, the shock was enormous. While doing everything it could for the affected employees and their families, DAI immediately conducted an investigation into

Content of Agreement between Daikin and DuPont (1997)

	DAIKIN	DUPONT
HFC32	Plant starts operations; supply to DuPont	Purchase from Daikin
HFC134a	Operations of plant halted at Kashima	Mitsui-DuPont supplies Daikin
HFC125	Conversion of HFC134a plant	Purchase from Daikin of refrigerant to sell in Japan and Asia
HCFC141b	Purchases ODP production rights from Mitsui-DuPont and increases production	Purchase

*ODP = Ozone Depletion Potential

the specific cause of the accident in order to introduce safety countermeasures and conduct exhaustive training of the employees to prevent similar accidents from occurring in the future. DAI halted the production lines for about three months, and then gradually started production again from August.

In the fluorocarbon business during this same period, companies competed fiercely to develop new substitute refrigerants. In order to reduce expenses related to R&D and to capital investments, the companies entered into strategic alliances for using each other's patents or products. As a result of energetically promoting strategic alliances in the area of substitute refrigerants, Daikin entered into an alliance with DuPont in February 1997 for mutual supply of HFC32/HCFC141b and HFC134a, and cross-licensing related to HFC407c, 410a, and 404a. Specifically, Daikin and DuPont entered into global ties concerning new refrigerants. Based on those ties, Daikin successfully acquired sales rights for HFC410a in Japan and Asian countries, 407c in Asian countries, and 404a in Japan, Asian countries, and the U.S. The ties with DuPont made it possible for Daikin to supply all new refrigerant products to customers in Japan and Asian countries. DuPont, on

the other hand, became the only company able to supply all products around the world.

Besides the cross-licensing ties between the two companies, Daikin expanded other business with DuPont and at the same time actively entered into business alliances with companies such as Allied Signal and Atochem for supplying products, licensing, and other activities. Fluorocarbon restrictions, meanwhile, based on the Montreal Protocol of 1987, seriously affected Daikin's business at the time. Daikin immediately turned afterward toward developing a new refrigerant to replace fluorocarbon, and rather than being affected negatively the new product helped the company expand its market share. As a result, the banning of fluorocarbon led directly to Daikin and DuPont sharing the worldwide market for refrigerants.

Business Restructuring and Business Withdrawals

The largest of the businesses from which Daikin withdrew during this period was the robot systems business. Daikin originally entered the robot business by developing robots to automate its internal operations. The company began external sales of some products in 1989, such as an automatic die polishing system. After the burst of the domestic bubble economy, however, the needs of companies for automation equipment changed. Daikin's robot sales grew sluggish, and profits worsened. The overall robot industry in Japan at the time saw two straight years of double-digit drops in revenue from the robot business, and demand decreased in the context of a mature domestic market and a decrease in new investment as more Japanese companies shifted production overseas. The larger robot manufacturers were also suffering from a decline in profitability. In that situation, Daikin was unable to create a future vision for its robot business, especially since it had not

been able to develop unique markets of its own. It positioned its robot business as an unprofitable venture, and in 1993 decided to rebuild the business and make it more efficient. Those efforts, however, were not successful.

The robot systems business contributed toward realizing major production increases by promoting the automation of air conditioning production during the economic bubble years when labor was short. Even after Daikin withdrew from the robot systems business in October 1995, the mechatronics technology the company cultivated previously was put to good use in related in-house divisions. There was thus no need to disperse the group of engineers in the robot systems division, including those recruited from the outside. Instead, Daikin reassigned them to new projects such as market research for developing new products using mechatronics, and developing high-performance hydraulics products by applying robotics technology.

Daikin decided in 1998 to withdraw from the Medical Equipment (ME) Business Division, and began negotiating to sell off the division's two main product lines. The first product Daikin originally developed in 1987 was the small-size blood glucose meter "Antsense". Daikin established its ME Business Division in 1990 and in July 1991, the company started to market the product, having obtained approval from the Ministry of Health and Welfare. Not long after introducing the product, however, customer complaints related to the bio-sensor, the product's "heart," kept the company busy. Despite those problems, the product succeeded in gaining a 9 percent market share in 1996, which turned it profitable. But afterward competition with the products of other companies turned increasingly severe. Meanwhile, Daikin purchased the basic patent of a British company, and in 1995 developed and marketed the optical immunoassay equipment called "Evanet",

aimed at professionals. The product used a specific reagent to detect coagulation in the bloodstream and B-type hepatitis. Since it was a product aimed at professionals, Daikin consigned sales to Sankyo Co., Ltd. Sankyo sold it through a medical products route to hospitals and medical professionals but it was unable to secure sufficient sales.

The ME Business Division was unable to reach its sales goal of 10 billion yen in the year 2000, and had no outlook for recovering its cumulative losses and turning profitable. With that backdrop, Daikin decided to withdraw from the ME business. In line with that decision, negotiations began for selling off the division's two main product lines. In March 2000, Daikin sold off the "Evanet" line to Nissui Pharmaceutical, a manufacturer of drugs and health food products, and in July 2000 it sold off the "Antsense" line to its franchise dealer Sankyo. Daikin closed the ME Business Division in September 2000 but did not second or transfer division personnel to other companies. The ME engineers and others in the division were transferred elsewhere inside Daikin where they could best use their abilities.

Around that same time, the oil hydraulics and defense systems businesses were troubled by shrinking markets after the burst of the economic bubble in Japan. Daikin responded quickly to those problems and fortunately avoided the closing of related operations. Unlike the robot and ME businesses, where Daikin did not have in-depth experience, the company had a firm technical foundation in both the oil hydraulics and defense systems businesses, allowing it to anticipate the direction in which to rebuild them. The oil hydraulics business, in particular, was affected by a sharp drop in the building construction business, which had expanded rapidly during the bubble period. In addition, the domestic industrial machinery business began to introduce electric or pneumatic machines and the oil hydraulics field contracted. Finally, with the burst of the economic bubble, construction equipment manufacturers increased the volume of business conducted in-house. Hydraulics equipment manufacturers thus came to face a life-or-death situation. In that situation, Daikin's oil hydraulics equipment business, which depended greatly on business in the domestic market, was forced to reorganize its operations. It emphasized two areas for attention: first, it would aim for the top share of the domestic industrial machines field; and second, it already decided on all-out entry into Asian markets. It was not able to make great progress in the 1990s, however, and the oil hydraulics equipment business continued to languish.

In terms of the Defense Systems Division, demand from the Defense Agency accounted for over half of its business in a market that previously was not affected much by economic fluctuations. It was also a market that saw great business shifts related to the government's defense policies and to circumstances inside the companies supplying the Agency with raw materials and components. In aiming to stabilize its business, therefore, Daikin moved to develop technology that would let it grasp its customers' needs and developed aggressive order-taking abilities. In doing so, the company was able to differentiate itself from its competitors and in 1995 succeeded in independently winning an order for tank shells used in training maneuvers. The locations for such training were often near civilian housing and roads used by local residents, making it next to impossible to conduct maneuvers using live shells. In that situation, Daikin developed shells for use in shooting practice that acted almost the same as live shells until it was on the way to its target. It was designed so that it never travelled outside the training area, and after being propelled more than a set distance it "melted down" harmlessly.

Oxygen Inhaler "LiteTec"

Daikin also developed a container made of fiber reinforced plastic (FRP) composite that utilized plastic processing technology, and began marketing it in 1996. One product developed using this container was an oxygen inhaler container for use at home. Two other products Daikin developed and marketed for this container were a large-size oxygen cylinder for use by firemen, and an ICU apparatus for use with small animals. There was a pet boom, and sales expanded in the market for sophisticated medical equipment used with pets. In January 1995, at the time of the Hanshin-Awaji Earthquake, the older buildings in Daikin's plant for producing defense systems were severely damaged, and the company quickly moved to erect new structures. At that time, Daikin also introduced new production lines with increased capabilities, resulting in significantly reduced production costs, and allowing Daikin to develop new markets apart from the Defense Ministry.

Corporate Social Responsibility and Improved Business Results

Daikin's business results in 1993 were in deficit. From 1994, however, both sales and ordinary profits (on a consolidated basis) turned favorable. Then, in fiscal year 1999-2000, the company experienced the largest business expansion in its history. 2001 sales results were also positive, ending up at about 540 billion yen, with ordinary profits of over 40 billion yen. The ten years after the economic bubble, called the "Lost Decade," were difficult years for Japan, and Daikin's favorable business results were thus worthy of attention. As mentioned, however, Daikin's favorable business results could not be achieved smoothly. The company suffered from stagnancy in its air conditioning division, and although it tackled basic business reforms, it once again fell into difficult times in the second half of the 1990s. It finally started to recover after the release of "Ururu Sarara" products. In place of the generally poor results of the air conditioning division, the favorable chemicals business division supported the company's business results. The chemicals business results in the U.S. were especially favorable, and in the year 2000 overseas business accounted for over 50 percent of the company's total business. For Daikin in the second half of the 1990s, its chemicals business assumed the lead as the company took its first steps toward becoming a global business.

In terms of environmental problems, meanwhile, Daikin faced its fluorocarbon problem around this time, and the company gained a stronger awareness of the importance of preservation of the global environment and strengthened its environmental countermeasures.

Daikin established its first environmental management rules in 1981. They were aimed at having the company's business operations comply with Japan's laws related to pollution and the environment. After fluorocarbon emerged as a problematical substance, Daikin became even more aware of the importance of protecting the environment: in 1992, the company established a Global Environment Department; and in 1993, the company announced "The Charter on Global Environmental Preservation." After the

Rio Summit (United Nations Conference on Environment and Development) held in June 1992, society-at-large began showing greater interest in environmental issues. In 1994, the International Standards Organization (ISO) developed its ISO 14000 series of quality standards for environmental management. During fiscal 1996, all of Daikin's domestic production facilities, starting with the Sakai Plant, were certified for the ISO 14000 series. Next, in 1997, Daikin's most important overseas group companies at the time—Daikin Europe (DENV), Daikin Industries Thailand (DIT), and Daikin America (DAI)—all obtained ISO 14000 series certification.

In 1998, Daikin published its first "Environmental Report." Next, in 1999, the company held its first Group Environment Conference, with participants from nine domestic and nine overseas subsidiaries. The conference marked Daikin's first step toward constructing a group-wide environmental management promotion system. Environmental accounting is an excellent tool for clarifying the expenses needed for carrying out environment-related measures and evaluating their positive results, and for promoting execution of those measures. In that context, Daikin systematized its environmental accounting from 1999. The Air Conditioning Manufacturing Division, meanwhile, introduced a life-cycle assessment system starting in 1995 for assessing the environmental impact generated in every process, from procurement of raw materials used for manufacturing, to use by customers, and disposal. That assessment led to efforts for reducing the environmental impact related to products. From 2000, Daikin took even further steps to reduce the environmental impact by publishing Green Procurement Guidelines for prioritizing the procurement of parts and materials that reflected a consideration of the environment.

In terms of the emission of chemical substances by corporations in Japan, in November 1999 the Law for Pollutant Release and Transfer Register (PRTR) was a factor. According to that law, corporations were obliged to measure the volume of chemical emissions from their facilities and to report the figures to the related government office. Daikin was already regularly monitoring its chemical substances emissions from 1996 in the Chemicals Division and from 1998 in the Commercial Air Conditioning Manufacturing Division and Residential Air Conditioning Manufacturing Division. The company then moved to promote the new law to construct a common-use system in the group companies for surveying and compiling the necessary information.

Gradually, society-at-large began evaluating the posture that companies adopted toward the environment. From 1999, eco investment funds were introduced in Japan that invested only in companies that considered the environment, and the funds attracted much more capital than anyone expected. Nikko Securities included Daikin in its eco investment fund, which meant that society recognized the company's environmental stance.

Daikin also included aggressive IR activities in its "Fusion 21D" Strategic Management Plan, and actively conducted those activities with the aim of winning a favorable international reputation. In 1997, with the backdrop of the company's chemicals business in the U.S. being assertively expanded, and its global strategy being forcefully developed, corporate information meetings were sponsored in Boston and New York. In 1998, the Chemicals Business sponsored a similar meeting at the Tokyo Branch Office, and from 1999 President Inoue began inviting journalists to get-togethers. Those various moves were in preparation for the issuance of unsecured debentures worth 10 billion yen, and journalists evaluated them highly. The Securities Analysts Associa-

Party Following Daikin's 70th Founding Anniversary Ceremony

tion of Japan presented the company in September 1999 with its Award for Excellence in Corporate Disclosure. Even afterward the company continued to conduct ambitious IR activities, including sponsoring in 2000 a financial information meeting of its air conditioning business aimed at shareholders and investors.

Daikin announced a new project in 1994 as a link in celebrating its 70th founding anniversary. The project was support for the National Museum of Art, Osaka (NMAO). In March 1996, Daikin established the Daikin Foundation for the Promotion of Modern Art, and announced financial support for exhibitions at the NMAO, creative activities, and academic research related to modern art. Late Chairman Yamada of Daikin proposed putting into order a permanent support system for the NMAO because it was the only national art museum in Osaka. When it came time to rebuild the dilapidated museum, it was relocated from the Senri Expo Park to the Nakanoshima area in the center of Osaka. The new NMAO opened on November 9, 2004, and quickly became a popular cultural spot.

Chapter V

Becoming an Attractive Company (2000–2006)

Fusion 05: Aiming for True Blue-Chip Status

Economic globalization picked up speed as the world moved toward the twenty-first century. In 1999, for example, the EU introduced the euro as its currency for settling transactions, and from January 1, 2002, euro banknotes went into circulation as twelve of the 27 countries in the EU and six non-EU member countries/regions started using the euro. There were great expectations for the unification of their markets and having them grow as one large market.

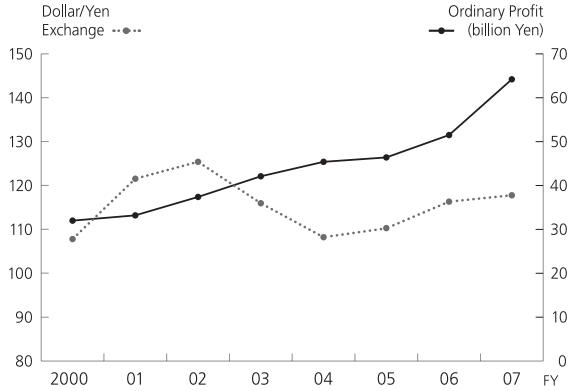
Although an economic crisis at the end of the twentieth century sent shock waves through several countries in Asia, the Chinese economy emerged as a bright new star on the international

horizon. In response to the bewildering changes in the global economy, the "mega-competition" between huge multi-national corporations heated up tremendously, and corporate restructuring based on large-scale mergers and buy-outs progressed rapidly. The turn of the century was a period during which corporations conducted their business far faster than previously.

Many Japanese corporations, however, could not move away from their past style of management, including the inter-dependence of group companies and warm government administrative protection. As a result, they were losing the sharp competitiveness they were known for and which was required for survival in global markets. Among the Japanese companies that decided to partner with foreign-capital companies, such as Nissan Motors and the French automaker Renault, there were some companies that attempted to introduce American-style corporate governance into their operations, leading to competition in establishing global standards. It was soon clear, however, that American-style corporate governance was not all-powerful, as seen by Enron Corporation's bankruptcy. Japanese companies such as Toyota and Canon, meanwhile, were sharply aware of the merits of the unique Japanese style of management nurtured in their organizations from their founding. Those companies emphasized the favorable aspects of the Japanese system while globalizing themselves through dynamic reforms.

In 1994, Daikin introduced a managerial policy aimed at realizing a business structure marked by a fast and flat organization. Afterward, under President Noriyuki Inoue's leadership, fast and flat management took firm root in Daikin. The company enthusiastically tackled managerial reforms by establishing and firmly fixing a unique form of corporate governance. As a result of success at that time, the company subsequently achieved rapid

Trends in Exchange Rates and Overseas Business Percentage of Daikin



growth at the turn of the century. The two main pillars supporting that growth were favorable exchange rate movements and a higher percentage of overseas business. Daikin was especially aware of the importance of establishing the "Daikin Way" of corporate governance. Many Japanese corporations at the time divided top management and their executive officers into two groups for faster decision-making by having relatively few managing directors. Daikin maintained a unique method of top-management operation by convening its board of directors, comprised of all directors and auditors, for wide-ranging, detailed discussions. This drew on the total wisdom of the group and enabled mutual information sharing. Also, in executing its operations Daikin utilized human resources in a flexible organization of task forces and projects, allowing the speedy resolution of problems. Amidst rapid changes in the business environment, meanwhile, Daikin closely reviewed its Fusion 21 management plan, drew up the Fusion 21D management plan in 1999, and at its board of directors meeting in May 2000 the company proposed a set of new business reforms aimed at realizing a unique approach to corporate governance.

Four main points marked the new set of business reforms. The first was energetic integrated management that placed the responsibility for management and the execution of operations with the company directors, and establishment of a new system that put associate officers exclusively in charge of carrying out certain operations requiring specialist knowledge. The second main point was a review of the virtual company system to conduct business that emphasized all-out current aggregate value and division responsibility. This point positioned the virtual companies as the units for promoting "management by ratio." They comprised eight divisions: domestic air conditioning, global air conditioning, central air conditioning, chemicals, oil hydraulics, defense systems, electronics, and semiconductors. That organization allowed comprehensive control in a system of dual responsibility, with the corporation bearing overall responsibility and the virtual companies bearing responsibility for conducting operations in line with business policies and goals. The third main point was making certain the Daikin Way of doing business was being thoroughly practiced at the Daikin Group level. The fourth main point was expanding the role of the general shareholders meetings, strengthening investor and public relations activities, raising the level of accountability, maintaining amicable labor/management relations, and emphasizing information disclosure and management transparency.

In parallel with business reforms, Daikin also introduced sweeping improvements in human resources and employee benefits. The principal aim of the new system of human resources introduced in April 2000 was to build a new and equal relationship between the company and its employees that allowed for interactive communication with regard to choice. Early on, Daikin questioned the usual Japanese employment system of evaluating em-

ployees based on performance and for rehiring employees after their retirement at the age of 60. The new system contributed toward the company's pursuit of "equal opportunity" and "fairness of results" by challenging all employees to realize change and to grant special rewards to employees who contributed notably to the company's development.

Based on these various reforms, in April 2001Daikin formulated its Fusion 05 Strategic Management Plan. When the company introduced this plan it also announced its intent to become a blue-chip global corporation. In that process, it aimed to be an especially attractive company in the three areas of personnel, capital, and information. Nine main points were set as business goals. First, each of the virtual companies was provided "management by ratio" goals to reach by 2003 in a mid-term implementation plan, and other goals were set to achieve by 2005 with emphasis on business reforms, such as structural reforms and the direction in which to head. Second, Daikin selected the air conditioning and fluorochemical businesses to develop itself into number one in the world. With that in mind, the company set its total sales goal at one trillion yen. Third, Daikin aimed to achieve "management by ratio" goals alongside the emphasis on Daikin-style Economic Value Added (EVA) and free cash flow. Also, in order to realize a change in the company's structure as its business scale expanded, the company had to promote the innovation business inside its operations and to have overseas business account for 50 percent or more of its consolidated net sales. Fourth, exert all-out efforts to follow the principle of the market mechanism while fusing competition with Daikin's traditions and corporate culture. President Inoue emphasized the company's people-centered business philosophy held by former president Minoru Yamada, which said that "people" bear the responsibility for reforms. Each employee

should accept full personal responsibility to achieve the goal of building a solid team through each member's determination and enthusiasm. Fifth, with a customer-first policy as the starting point, conduct an overall review from the customer's viewpoint of workflow, from sales, design, R&D, manufacturing, and service to support divisions and the corporate division. Sixth, uphold the company's long-standing emphasis on technology and accelerate the development of more sophisticated technology and product differentiation. Seventh, introduce comprehensive business reforms using IT. Eighth, reassess the differences between core and non-core businesses while simultaneously responding to outsourcing needs of other companies and strictly enforcing so-called arbitrage management. And lastly, Daikin set a goal for establishing globalized corporate ethics. Accomplishing this goal involved four policies; 1. all-out quality control, 2. aggressive development of investor relations activities to promote management that emphasized aggregate current value, 3. in each aspect of the business, such as development, production activities, sales promotion and a PR strategy, become an advanced corporation in terms of its pro-environmental stance and 4. establishment of global corporate ethics and compliance with the law.

In the background of Daikin establishing these major goals was the rapid globalization of the company's business structure. Daikin introduced a new management system, continuously developed new products; introduced comprehensive quality control; and set up systems of accountability and compliance to actively disclose information and respond vigorously to environmental issues. Also, the company enthusiastically promoted more sophisticated global management than practiced in Fusion 21 up to that point. Management thus had an exceptionally clear awareness of the situation and became highly anxious about the need to push

forward with never-ending reforms. If Daikin hoped to become a truly blue-chip global company it had to conduct comprehensive "management by ratio" and build a solid business and financial structure, including improved profitability. Daikin also strongly emphasized the people orientation in its corporate culture, believing it is possible to realize the fusion on a global scale of "management by ratio" and fast and flat decision-making.

Noriyuki Inoue Assumes Chairmanship

The Fusion 05 Strategic Management Plan contained basic corporate principles which provided clear directional vision for Daikin. That plan allowed the company's corporate governance to evolve steadily alongside the principles. In June 2002, the company strengthened management by bringing in capabilities from the outside, making its managerial system more sophisticated and resulting in further emphasis on transparency, disclosure, and corporate ethics. One measure was to separate CEO and COO duties to speed up management and bolster consolidated control. This was realized by having President Noriyuki Inoue assume the chairmanship and Senior Managing Director Hiroyuki Kitai assume the presidency. The new president had worked closely with President Inoue and in 1989 was placed in charge of rebuilding the Chemicals Division. He was also head of the General Planning Department that formulated the Fusion 21 Strategic Management Plan, and as general manager of the Corporate Planning Department and concurrently senior managing director, he played a key role in formulating Fusion 05 as well. For many years he was truly President Inoue's right-hand man.

As management matters became more complicated and sophisticated, Daikin established a Steering Committee to speed up the decision-making and problem-solving processes. The regular

President Hiroyuki Kitai

members were CEO Inoue, COO Kitai, Vice President Satoshi Mizuno, Vice President Yukiyoshi Okano, and Executive Advisor Yasushi Yamada. New external members of the Board of Directors, meanwhile, included Tadasu Tachi, advisor to Kanegafuchi Chemical Industry, and Chiyono Terada, president and CEO of Art Corporation. Tachi was an expert in managing R&D and technology in the chemical field, and Terada was a pioneer entrepreneur who established a unique removal company based on the consumer's viewpoint and strongly supported female employees. As a way of using external management capabilities, Daikin had already established an Advisory Council System and the new system of using external directors, thus aiming to boost further the level of managerial transparency and awareness of the company's corporate social responsibility by having persons with independent and neutral perspectives participate in the decision-making process.

The globalization of Daikin's business increased rapidly from the late 1990s but the introduction of the Fusion 05 Strategic Management Plan in April cemented the principle of globalization and accelerated the process. Along with globalization, diverse human resources from around the world emerged to develop and promote Daikin's business activities. A need thus arose to create management principles as common guidelines for all employees.

No matter where in the world they worked, Daikin employees were expected to have a strong awareness of being members of Daikin, and to be able to think on their own and resolve problems unique to their location, based on Daikin's global strategy. For that purpose, in August 2002 Daikin established a Group Philosophy. Its original global strategy dated from 1990, when the company first began developing its global business. That was in response to the remarkable globalization that had occurred over the previous decade or more. The Group Philosophy was drawn up so that employees in each country and region, with different languages and cultural backgrounds, shared a common thread of understanding. The first item in the Group Philosophy was to move in advance of other companies to understand market needs and create new value. To do so, Daikin had to recognize changing social trends and discover emerging needs—even the dreams—of customers, and to have those needs reflected in specific products. In a word, that mission was to express in concrete form the company's customer-first policy. Daikin also promised to contribute to society through world-leading technology. The Daikin Technology Statement of February 2002 placed special emphasis on developing technology, and marked the Company's start in introducing large-scale reforms in technology. That was the introduction of a policy to accept the challenge of boosting the company's technical foundation by continually marketing high value-added products, solution-related products, and products that contributed to society and clearly differentiated Daikin from other companies. Daikin also emphasized that because the pride and joy that its employees feel can become a force that moves the entire Daikin Group, it was important to make absolutely certain that the revised personnel wage system provided employees "fairness of opportunity and reward." For that reason the company clearly stated that it would

maintain and expand job opportunities for employees who wished strongly for long-term employment during which they would continually contribute to the company's growth. At the same time, the company asked its employees to remain loyal and to perform their regular duties thoroughly, with the starting point being the "dreams" they have concerning their jobs, the "enthusiasm" they feel in moving to realize those dreams, and the "perseverance" needed to remain faithful to their duties and perform them even in adverse times. Lastly, the company had a goal of establishing the Daikin management system within the companies in the Daikin Group in order to manage people in a "fast and flat" organization to which Daikin employees around the world would be loyal. All employees should practice teamwork in meeting the challenge of achieving their work goals, and they should further improve the Daikin Group's strengths of developing measures in a global top-tier company with a flexible structure and traditions and a corporate culture of "Best Practice, Our Way." The group philosophy was aimed at passing on to employees in the Daikin Group around the world the fact that Daikin is a people-centered company.

Daikin prepared its Group Philosophy in Japanese, English, and Chinese, and distributed it to all group companies in Japan and overseas. Also, the chairman and the president visited companies in the group to directly explain the meaning and intent of the philosophy.

Naturally, of course, the Daikin companies in each region and each country had different social and cultural backgrounds, and often the employees spoke different languages. Thai was a popular language in Southeast Asia, for example, while many of the Southern European languages derived from Latin. The language barrier was thus a clear reality for Daikin as it moved to expand its

First Group Management Meeting

business around the world, and the company strived diligently to respect other cultures while having Japanese-style management ideas reflected in specific overseas operations. To overcome the various problems it met while expanding overseas, Daikin called 2003 Year One for having its group philosophy understood at the worldwide group level. The company then moved to strengthen two-way communication with top management in all its group companies. It also actively educated Japanese employees transferred to group companies overseas so that they could embody the Group Philosophy in order to confirm that it was being reflected in specific business measures introduced at the local company level.

In order to make certain that important group business policies and strategies were being shared companywide, Daikin also began sponsoring a Group Management Meeting (GMM) once or twice a year. Members of the Steering Committee attended as did directors from related divisions, top managers from Daikin's eight major subsidiaries and other subsidiaries involved in businesses related to the GMM themes, top management from the eight companies comprising the main Daikin Group, and top management from the group companies most directly related to the themes be-

Second Group Management Meeting

ing discussed. As part of Daikin's efforts to spread the Group Philosophy to all group members, the company held the first GMM in Osaka in June 2003 with 59 managers attending from Japan and Daikin's main overseas companies. President Inoue gave the welcome address followed by lively discussion that covered six main themes, including securing and developing human resources, developing products that fit the specific regions and countries where Daikin was doing business, total permeation of the Group Philosophy; and autonomy of the Group companies. Securing and developing human resources was a particularly important management theme, and based on the results of the conference discussions Daikin determined to establish an education and training program for new managers. Opinions voiced and questions asked during discussions in the GMM were answered either on the spot or within a set period of time afterward, part of the Daikin way.

In October 2004, in line with the above decision, Daikin established the "Daikin Managerial Training Center," an education and training program aimed at managers. The program enrolled 20 people per year-long course and offered a new course every six months, training 40 people at any given time. Over several years that program educated roughly 200~300 managerial-level employ-

80th Founding Ceremony

ees. The company also introduced a similar program for executive trainees from some of its overseas companies. Called the "Daikin Business School," the program trained about 20 persons per class from among employees selected to be next-generation managers.

The Second Group Management Meeting was held in Osaka for two days in October 2004, alongside Daikin's 80th Anniversary celebration. The meeting was a gala affair, with 260 participants that included managers from 96 companies in 23 countries, members of top management from Daikin Industries, Ltd., and representatives from the Daikin Group companies. The main theme for discussion was "The form and direction of the Daikin Group in five to ten years." The participants were separated into eight subgroups that then engaged in lively discussions. A panel discussion was held at the end of the conference under the theme "The increased sophistication of Group management, and understanding the role of the Group companies." Each of the subgroups had

President Yukiyoshi Okano

one representative on the panel for discussing the theme. Vigorous discussion continued over the two-day conference for promoting flat communication and the sharing of information. When possible, Daikin responded immediately to questions raised during the meeting. For questions that required study, a clear deadline was set for providing the results of the study or answers to the questions.

In June 2004, Hiroyuki Kitai resigned from his positions as president and COO of Daikin for health reasons and assumed the position of senior advisor. Executive Vice President Yukiyoshi Okano was then appointed to the vacated positions of president and COO. Other members of top management included vice presidents Katsuhiko Takagi, key in developing the global strategy of the air conditioning business; Hiroshi Tanaka, who headed the second set of reforms in the domestic air conditioning business after serving as president of DENV; and Guntaro Kawamura, who headed Daikin's business in China. Other members of top management included Masanori Togawa, appointed director, member of the board, and senior executive officer; Yasushi Yamada, appointed director, member of the board, and senior advisor; and Tadasu Tachi and Chiyono Terada, two external directors who continued to serve in the same positions. With the new president and COO assuming office, Daikin introduced an executive officer

system comprising 25 executive officers, including seven internal directors. The new system was designed to promote autonomous judgment and decisions by the officers to perform the company's business and functions, thus quickening strategic implementation. By having internal directors also act as executive directors, Daikin aimed at putting to good use in business decisions the benefits of having decision-making, execution, and supervision conducted close to the worksite. In these ways, as the series of reforms was introduced, one factor steadfastly maintained throughout was "integrated management." As a company aiming for "people-oriented management," Daikin considered maintaining leveled relationships as the main cornerstone for treatment of employees and the decision-making process of company officers.

Aggressive Expansion of Air Conditioning Business in Japan

As it moved forward with reforms in the air conditioning business, Daikin became more aware of the need, as a goal, to build a system of supply chain management (SCM). The company first tackled reforms in logistics in 1995, centered on production patterns, the streamlining of models, and the sharing of parts. It accomplished the first stage of reforms by fiscal 2000, and succeeded at that time in reducing the value of domestic and overseas inventories by about 10 billion yen. After that success, Daikin initiated a project to promote an SCM model strictly for the air conditioning business, thus marking the company's advance into its second stage of reforms, that of utilizing IT to build a Daikin-style SCM model linking together the company's suppliers and sales outlets. Through a highly itemized weekly order cycle, and a three-stage confirmation process, Daikin also aimed to bolster high-cycle production and to establish a build-to-order system (based on receipt of firm orders and clear specifications) for customized products

Toyota Personnel Providing SCM Guidance

(modified or made-to-order products).

As Daikin's overseas business expanded a need emerged to transfer SCM expertise from Japan to the company's overseas operations. In looking at the global SCM in 2002, however, although the trend indicated a decrease in days of inventory on hand, the value of inventories increased as sales improved. DENV was a particular bottleneck because products were shipped there from both Japan and Thailand. Besides the geographical situation of having long lead-times, moreover, weather fluctuations caused a large disparity to emerge between predicted and actual sales. As a result, errors occurred related to product shortages, excess inventories, and confusion in order plans sent to parts suppliers. Those problems became especially serious in Europe during the scorching summer of 2003. In that situation, Daikin turned for guidance to Toyota Motor Corporation (TMC), known for having one of the automobile industry's finest global SCM systems. TMC had an in-house policy of providing SCM guidance to one outside company each year. In the fall of 2003, TMC selected Daikin to benefit from its direct SCM guidance.

Under TMC's guidance, Daikin completely revised its former SCM. The development, production, and procurement divisions of Daikin worked together with suppliers to shorten lead time,

reduce overall costs, reduce the time for developing parts, and eliminate waste. The results were increasingly stabilized product quality and reform of the former SCM that included suppliers, sales companies, and sales outlets. The origins of the Production of Daikin System (PDS) trace back directly to the Toyota production system. When Daikin originally introduced its system it was evaluated as significantly advanced in the air conditioning industry for its high-cycle production and ability to produce changing volumes of various products. But in terms of building a global SCM, there was still much to be learned from TMC.

The use of central air conditioning systems in Japan lagged far behind the U.S. market. Because of the relatively small market size in Japan there were also limitations to improving profitability. The construction market remained sluggish, moreover, causing a tough business environment for air conditioning products. Daikin, however, viewed the central air conditioning business as important in terms of cultivating the company's capabilities in developing proposal-based sales, and exerted great efforts to develop the central air conditioning business as one of the three main pillars of its overall air conditioning business. In central air conditioning systems, it is necessary to use air handling units and fan coil units to provide cool or warm air inside rooms as well as central heat resources such as water chillers and turbo refrigerators. Daikin was fortunate to be one of only few companies in Japan at the time capable of producing both those products in-house. Taking advantage of that capability, Daikin made efforts to cultivate sales personnel able to approach architects and design offices and have them build the company's equipment into construction specifications.

Daikin and the Trane Division of American Standard entered into business ties in the air conditioning business in November

Announcement of Business Ties with American Standard's Trane Division (CEO Poppy of ASI and Chairman Inoue)

2001. Trane, the second largest air conditioning manufacturer in the U.S. at the time, had particular strengths in the solutions business and in proposal-based sales centered on large- and medium-size central air conditioning systems. It had built a powerful network of dealers handling ductless-type air conditioners in Japan, other parts of Asia, and in Europe. Both companies, Daikin felt, complemented each other in their businesses. Daikin also felt that ties with Trane would help it rebuild its central air conditioning systems business in Japan and enable it to acquire know-how in the solutions business.

Trane's sales personnel, meanwhile, were sales engineers who conducted a range of activities from product PR to proposing the most appropriate system for particular customers, price negotiations, the issuing of product orders to Trane's plants and other companies, and providing after-sales services. In order to educate such personnel, Trane prepared a range of programs to fit their experience and capabilities.

The program instructors included sales engineers who actively worked all around the world and transferred their experience and cutting-edge market information to incoming sales personnel from Trane. They voluntary attended the training programs, and paid their own expenses. The sales engineers worked on a commission basis and had great authority in their work. Depending on their sales, some of them earned more than company executives. They also bore heavy responsibilities, such as having to pay personally for mistakes they might make in, say, the combinations of equipment they proposed. That same commission system could not be applied directly to sales engineers in Japan because they received salaries. By studying counselor sales methods, however, sales engineers in Japan improved their personal skills remarkably.

In the applied business, where sales engineers designed systems to meet the needs of particular customers, Daikin also changed the organization of the Daikin Plant Co. and renamed it Daikin Applied Systems Co., Ltd. Through its ties with Trane, Daikin also expected to build a new business model in the solution business. In that business, it was important to propose low-cost and energy-efficient systems for comfortable living space that closely fit the needs of customers, with the combination of various equipment besides central air conditioners, and with the sophisticated technology of controlling all equipment.

As an air conditioning manufacturer, Daikin had to provide its customers with the air conditioning equipment most appropriate for their particular situation and to provide high-quality service. It was especially important to gain total customer satisfaction (CS). Daikin's approach to CS began with organizing a group of agents able to install, maintain, and repair air conditioning equipment. Next, in the 1990s, convenience stores and family restaurants became popular in Japan. Then, centered on stores and restaurants open 24 hours/day, Daikin established a system

that provided services all day, every day. Besides offering the same services nationwide from April 2004, the company also offered 24-hour repair services, technical advice, and the supply of parts/components. Daikin also established a system for supplying weekend, on-site, repair services nationwide, late-night services in urban areas, and advertised delivery of parts any day of the year. The service targets were not only sales outlets or customers using air conditioners in their offices but included air conditioning equipment operating in ordinary homes. Daikin was the first company in Japan to offer such services in the air conditioning business.

Daikin introduced the "AirNet" system in Japan in 1993 as a maintenance system for air conditioning equipment. The company later developed that system into a building control system and then into a central supervisory control system. From 2001, Daikin moved forcefully into the air conditioner monitoring business in China and some European countries. From 2002, moreover, it put "AirNet Eco" on the market and started the "AirNet" Control Centre in Japan, allowing bi-directional control by controlling efficient and comfortable operation of air conditioners through the feedback of information on weather conditions for the area in which the equipment was located and on the operating condition of the exact building's air conditioning equipment. In April 2003, meanwhile, the Japanese government introduced the Revised Energy Conservation Law, which provided tax benefits for installing energy-conscious air conditioning equipment. That law provided an incentive for installing such equipment, leading to Daikin winning 4,300 sales contracts at the end of 2002. Daikin's sales of related equipment for the same period, meanwhile, surpassed 42,000 systems.

From 2001, Daikin expanded and applied its servicing know-

how to the domestic market. Based on the rapid dispersion of information technology (IT), moreover, it became increasingly necessary for Daikin to respond quickly to Internet-based inquiries from customers. For that purpose, Daikin worked jointly with Cisco Systems, Inc., to develop an in-house system for managing online customer-related information, and introduced that system with NTT West Japan as the systems integrator. Seeing that the future would shift toward a business model with customers at the center, Daikin felt it would become important not only to respond promptly to inquiries from customers but also to analyze the inquiry information and have it reflected in product development and marketing. Customer inquiries up to that point went directly to either the Airconditioning Customer Center or, for repair services, to the Service Front Center. Inquiries averaged over 670,000 per year. Using multi-network technology, Daikin eventually merged those two centers to form the Internet Protocol Contact Center. Customers could contact the Center 24 hours/day, 365 days/year by telephone, e-mail, the Internet, or other medium they preferred. Based on the personal information the customer wanted, and the customer's previous business with Daikin, the phone call was then directed to the most appropriate person for action. The attendants at the centers used a centralized customer database to access a customer's history of inquiries, and then provided quick, generous, and accurate responses.

Daikin also developed a mobile terminal called an "e-SWAT" (Speedily Working Absolute Technique) System for resolving problems no matter where the customer was based. Immediately after a Daikin office received a request for maintenance assistance it dispatched a service engineer (SE) to the customer's premises. The SE used the "e-SWAT" System to confirm customer- and service-related information, including information on past mainte-

nance services, technical information, the current availability of needed parts, and so forth. In addition, the SE input the results of the visit into a computer connected to the company while with the customer. It thus became possible for dealers to receive repair reports from Daikin's SEs in real time.

Based on the new system, customer service improved remarkably. Daikin also established a system for providing late night services in the Tokyo, Nagoya, and Osaka areas. The company saved on customer service center office space, required fewer operators, and was able to concentrate its telephone lines, to considerably reduce costs. The greatest benefit was that it became possible to centralize customer information, enabling the company to develop products and conduct marketing directed at specific customer needs.

In contrast to the record-breaking heat of Europe's 2003 summer, Japan's summer that year set records for being cold, and air conditioning sales were generally low. Overall, however, the sales of high-performance, high-price units increased. Sales of Daikin's "Ururu Sarara" series, for example, with its humidifying and dehumidifying functions providing year-round comfort, increased 40 percent over the previous year. That favorable sales performance raised Daikin to top position in the domestic room air conditioning market, taking the number one domestic spot from Matsushita Electric Industrial (today's Panasonic) who held it for many years. In an extremely hot summer in 2004, moreover, with high temperatures continuing into September, the domestic demand for air conditioning increased significantly. Daikin recorded sales double the previous year, and its market share increased to 18.8 percent. The main reason for the favorable sales of the "Ururu Sarara" series was product attractiveness, especially its high functionality. Consumers said the name "Ururu Sarara", as

well as Daikin's marketing character "Pichonkun" were "friendly." Another major factor was that consumers began to relax with Daikin products, knowing that a system of repair service was available 24 hours a day, 365 days a year. Daikin also closely followed its in-house rule of meeting domestic demand with domestic production. It had built a production system enabling it to meet changes in demand with three days lead time, making it possible to hold down excessive inventories and respond quickly to increased demand. Large appliance stores appreciated Daikin's approach because they suffered from large leftover inventories during the previous year's cold summer, and their favorable sales capabilities added to Daikin's overall positive sales performance.

Daikin Technology Statement and Production System for Changeable Models and Volumes

Daikin announced its Technology Statement in February 2002, hoping through it to become the world's No. 1 air conditioning equipment manufacturer in terms of engineering staff and technological capabilities. The Statement contained measures to promote drastic reforms in technology. Daikin had many tasks at all production sites such as product development, reliability of products, and development of distinct products in the mid and long terms. In order to cover the gap between goals expressed in the strategic management plan and actual performance and in the process becoming number one in the world in technical prowess, President Inoue and the directors in charge of technical matters and air conditioning technology in Daikin hotly debated related issues, which served to clarify the direction in which the company should move. Daikin always did its best as a company to respond to comments from employees and to expand internal discussions and introduce measures for realizing major reforms in technology.

President Inoue wrote a message accompanying the Daikin Technology Statement. "The company," he said, "will put into order an environment for enabling our engineers to conduct wide-ranging activities freely." He also emphasized the point that technological reforms must be a never-ending task for Daikin. To accomplish reforms, Inoue said Daikin's engineers must apply their vitality toward reforming their thinking and improving their technical expertise. For management, the primary support task was to put a system into order that allowed engineers to be aware of their specific duties while conducting their technical activities. Three particular sets of reforms Daikin introduced at that time to realize major technical reforms were: 1.structural and organizational reforms aimed at flat, matrix-type operations, and reforms for simple, speedy, decision-making; 2. from the viewpoint of selection and concentration, clarification three to five years in advance of R&D themes to develop and those to eliminate; and 3. measures aimed at raising the quality of engineers.

With the structural and organizational reforms mentioned above, the divisions directly related to production were all integrated into the air conditioning production headquarters. This included the room air conditioning production division and commercial use air conditioning production division, as well as the compressors development section and quality management section. As in the past, moreover, they were placed under the director overseeing production. For duties related to the development of important products, however, Daikin introduced a new system in which two directors shared the duties related to overseeing air conditioning production and machinery R&D. That new system speeded up decision-making in the long process from element technology to production. For product development and R&D themes, moreover, the director in charge of air conditioning production and the director in charge of machinery R&D discussed issues that arose and either established new procedures or resolved/discarded problem areas. As a staff division, Daikin established the new Air Conditioner Planning and Development Section, providing the company an overall grasp of the development situation regarding air conditioning. The new division also acted as the meeting point for information it provided to the company's various divisions. In addition, the air conditioning production headquarters and research division bolstered their marketing personnel, establishing a system in which the production and research divisions accepted the responsibility for providing product concepts. Also, apart from the air conditioning production headquarters, Daikin established a new department called the Air Conditioning Reliability and Innovation Department, as well as the Global Promotion Group established inside the Planning Department in the Air conditioning Production Headquarters.

Thirteen development themes for important products, including existing themes, were identified and reviewed from the viewpoints of "selection" and "concentration." Those themes included a strengthening of global cost competitiveness, establishment of top product attractiveness among ductless-type air conditioners, and development of high value-added products on the cutting edge of technology. A total of 90 such themes were identified, of which 32 were rejected early on. Daikin selected 101 technical development themes, such as response to the global environment, acceleration of the company's solution business, development of devices to differentiate Daikin's next-generation air conditioners from competitive equipment, and the quest for new technology. On the other hand, Daikin dropped 25 themes.

In terms of its research system, Daikin moved to raise the level of its air conditioning technology by exposing it to the market

principle. In order to promote the development of unique technology, in April 2000 it also established several new research organizations by turning three internal research groups into companies. They were the Daikin Air Conditioning Technology Research Center, the Daikin Systems Solutions Research Center, and the Daikin Environmental Research Center. In order to provide direction to those three research centers, Daikin established 19 important technology development themes, including bolstering its system of technology development related to the global environment, a speeding up of its solution business, and development of highly technical devices for supporting the company's next-generation air conditioning. Daikin appointed the director overseeing machinery R&D to head the R&D activities related to those 19 themes. Daikin also established the new Research Management Department. In terms of production technology developed in the Manufacturing Division, the company established four important themes, including a strengthening of fundamental technology and technical capabilities, the binding together of the development of distinct products and production technology, a bolstering of global manufacturing capabilities, and the passing on of technology. Daikin also bolstered its personnel requirements for these efforts.

In line with the new structures and organizations, work duties moved forward by making the themes handled by the engineers and development staff —and their schedules—open to others; clarifying roles and duties for making technical capabilities more sophisticated; setting up a team for each development theme, and through close communication with managers and leaders, conducting comprehensive management of goals by division. Also, engineers were asked to tackle trial themes through active exchanges with external research organizations, even as Daikin

improved and strengthened its in-house education and training program. In such ways, therefore, Daikin put into order the environment needed for its engineers to tackle head-on and carry out effectively the themes assigned to them.

Daikin promoted further improvements in the PDS production system by establishing a structure for responding speedily to changes in the market environment. One special feature of the air conditioning industry, where demand fluctuated widely by season, was the importance of being able to respond quickly to demand influenced by local weather changes. Concerning room air conditioners, for example, although production plans were prepared up to 1999 based on 15-day cycles, by 2002 the cycle was shortened to three days. In other words, production plans were prepared in advance based on demand forecasts and were adjusted later as actual demand became clear. Ex-factory shipments were made three days after receiving firm orders, the so-called "high-cycle production method." The first steps introduced in using that method was the adjustment of seasonal fluctuations so that the disparity in annual production volume at peak would be triple the bottom dip volume. One way to accomplish that was to introduce a system of flexible working hours, made possible by the revised Labor Standards Law. While keeping the fluctuation in the number of personnel at a minimal level, Daikin adjusted working hours by season. It also adjusted plant operation hours, and as a way to respond to peak production periods, it also gradually increased the number of contract workers. From 2004, moreover, when the law was changed to allow the employment of dispatched workers in the manufacturing industry, the total number of workers from contractors and worker dispatching agencies reached almost 80 percent of the total workforce.

Also, Daikin introduced innovations in its production lines to

Cell Production Line of Room Air Conditioners Inside Shiga Plant

adapt to short-term fluctuations in production volume and the variety of models being produced, and to maximize the capabilities of the line workers. In 2001, moreover, Daikin introduced the cell method of production at the Shiga Plant. In that method, one worker, or several workers working together, assembled products. From the end of 1990, with the twin aims of raising product quality and increasing productivity, many Japanese manufacturers began employing the cell method. Different companies, however, used the method in different ways. In Daikin, a cell worker received a set of components and a frame on the conveyor line and assembled them offline. When assembly of one air conditioner was completed the worker immediately moved on to the next one. Several workers, meanwhile, teamed up to assemble large, commercial-use air conditioners and freezers. During peak season, when the production volume of air conditioners increases greatly, the traditional method of line assembly was also used, as it increased production more quickly and the productivity is higher than the cell method. A review was also made to rid production lines of unneeded automation, including the dismantling of some robots, helping to add more flexibility in the design of assembly operations. And in order to improve efficiency, in response to the

fluctuations in production volume and the variety of different models, flexibility was especially important when assigning duties to workers. Also, workers carried "passports" stamped to indicate their level of competence in particular assembly processes. A production system was established that allowed changeable production volumes of different products. In 2002, the Shiga Plant was the first plant to win the Monozukuri Gran Prix Award from the Japan Society of Plant Engineers. Daikin learned from Toyota Motor Corporation, however, that production system reforms are a never-ending process, and to this day the company continues to meet kaizen challenges in its production system.

Worker's Passport

Transfer of Skills, and Development of New Products

From the end of the 1990s, in response to the rapid globalization of production, support by domestic plants for overseas production bases became a more urgent task than previously. This was mainly because production capacity was greatly increased at overseas locations, including DENV in Belgium and DIT in Thailand. Daikin also built air conditioning plants in China and the Czech Republic. One result was that the number of employees in Daikin-related overseas operations increased rapidly almost 6-fold from 1,700 persons at the end of 1994 to 9,800 persons at the end of 2004. In order to support start-up operations at the several new plants being built overseas, many DIL workers with knowledge and experience in production operations were sent there from Japan. It was natural, therefore, for Daikin to send mostly veteran employees overseas to train the non-Japanese employees and assist them

in starting up local operations. Since the employees who gave guidance at overseas plants needed to know all production processes, those with the most on-site experience were selected.

In that context, education related to technical skills became more important at DIL's domestic plants, especially emphasizing the training of new employees to be full-fledged workers as quickly as possible, and to provide them with multi-skills. Daikin opened an education and training center to provide new employees with basic education prior to working inside the company. The company also developed widely varied and improved in-house education programs, and designed a special course to develop technicians who could work in cell assembly sections to evaluate the capabilities and technical/non-technical inclinations of new employees.

Three main factors comprised the approach to in-house education. First, the monozukuri skills that supported product performance, product quality, and manufacturing costs were not systematized. That meant if skilled workers retired there was concern that the workplace would lose those skills. Second was that as more parts were made outside and the production lines became more automated, the skills available in-house were "hollowed out," causing the loss of an important venue for developing human resources with superior technical skills for providing guidance to workers in overseas plants. The third factor concerned product development. Fewer skilled workers on assembly lines meant a proportional decrease in meaningful product evaluations and proposals from the workplace, leading to concern about a decrease in the ability to develop attractive products.

Daikin thus felt great concern about a decrease in the number of skilled workers in its domestic plants. To quickly create a system for promoting such transfer of skills, the company established

Scenes of Company-wide Technical Skills Olympics; Clockwise from upper left, Sheet metal processing, Lathe operation, Brazing, Electric welding

a Superior Skills Succession Committee in April 2001. In particular, it selected strategically important skills and established a system of accredited meisters (master craftsmen). The role of the meisters was to develop workers to carry on skills, provide guidance for raising the level of production line skills, make monozukuri proposals on safety, product quality, and manufacturing costs, and prepare manuals about their personal skills. In a word, the meister system was established to have skilled workers convey their skills to the next generation of workers. In order to promote raising technical skills throughout the company, meanwhile, in 2003 Daikin sponsored a company-wide technical skills competition. It changed the name of the competition the following year to the Daikin Technical Skill Olympics. Daikin also invited highly skilled employees from overseas plants to participate, and they all competed at the same product quality level. The Superior Skills

Succession Committee later improved and strengthened the system for supporting the development of skilled workers in the overseas plants, and for its part the Chemicals Division moved forward with preparations to promote activities for enabling the transfer of skills to next-generation workers.

After Daikin announced its Daikin Technology Statement, the air conditioning division dramatically increased the pace of its new product development activities. The Group Philosophy clearly stated how the company must move in advance of other companies to appreciate market needs, and to create new value in the process. That same philosophy was at the core of the Fusion Strategic Management Plan introduced earlier, and was a main pillar supporting the Daikin Technology Statement. In the air conditioning division, from as early as 1996 it was believed that next-generation room air conditioners would require the all-out pursuit of energy conservation, and Daikin developed reluctance DC technology for that purpose. When room air conditioners and packaged air conditioners fitted with reluctance DC motors were first marketed, they were praised as game-changing low energy consumption models. The same technology was used in the ultra-energy conscious "Super Inverter 60" Series that Daikin marketed in 1998. Sales of that series contributed greatly to a large increase in the company's market share.

The next issue Daikin tackled was helping convenience stores make themselves more energy efficient. During the 1990s, the number of convenience stores in Japan increased remarkably, and the market situation turned excessively competitive at the end of the 1990s. In that context, the parent company of one of the major convenience store chains approached Daikin to inquire about making their stores more energy efficient. The results of a survey showed that the stores were buying equipment such as air conditioning equipment, freezers and showcase refrigerators directly from specialist manufacturers, and the outdoor units of each piece of equipment were lined up against the outside walls of the stores. Zero attention was being paid to the overall energy efficiency of the stores. In order to improve that situation, Daikin developed the innovative "Convini-Pack ZEAS" that combined energy-efficient and low-temperature technology it had cultivated up to then.

The "Convini-Pack ZEAS" Exhibition held in Tokyo generated much attention. One of the product's first installations was in a major convenience store chain; not long afterward it was also sold to a chain of drugstores. As a reflection of the product's outstanding energy-conservation performance, in 2003 it won three major awards: the Energy Conservation Award of the Minister of Economy, Trade and Industry, the Minister of the Environment Award for Contributing to Prevention of Global Warming and the First Award for Promoting Development of New Machinery. It sold particularly well from 2009 to factories and warehouses after changing its name for marketing reasons to the System for Recovering Heat from Freezing, Cooling, and Air Conditioning Systems.

Although Daikin initially used reluctance DC technology in an energy-efficient motor fitted to the "Convini-Pack ZEAS", it also found other applications outside the air conditioning division. In the oil hydraulics business, for example, the same technology was used in a power motion control unit and in semiconductor chillers in the semiconductor business. Using the same motor, Daikin expanded its outside sales of compressors, thus contributing substantially to strengthening the competitiveness of other divisions in the company. Eventually, the company came to hold 26 patents related to the DC motor, including two basic patents, and it licensed the technology to other companies. The DC motor won

the All Japan Outstanding Invention Award for 2003.

The home-use water heater "EcoCute" was not developed using solely Daikin technology, and it used a natural refrigerant (CO_2) heat pump. The name "EcoCute" came to be used popularly by electric power companies and water heater manufacturers in Japan for all heat-pump type water heaters using CO_2. Daikin originally conducted joint research with Kansai Electric Power and Chubu Electric Power to develop the product. Since the refrigerant did not harm the ozone layer it was in accord with ecology, and it was economical because it used late-night electric power. Daikin later developed unique energy-efficient technology that achieved a high heat efficiency percentage and emitted CO_2 at a level only 50 percent that of ordinary gas water heaters. That technology contributed toward preventing global warming. Residences accounted for some 14 percent of Japan's total energy consumption at the time, and water heating accounted for 28 percent of the total energy consumed in residences. In order to achieve the Kyoto Protocol targets for reducing greenhouse gasses, therefore, it was important to lower the volume of CO_2 emitted by water heaters in residences. In that sense, Daikin's "EcoCute" water heater became a focus of attention in the Japanese market.

Toward Building Eight-Polar Markets for Global Air Conditioning

The global air conditioning and related markets in 2004 were estimated to be worth 41 billion dollars for air conditioners (a/c) and 40 billion dollars for freezers, servicing, and other areas. Ductless-type a/c equipment held about half of the overall market, and the Japanese market at 15 billion dollars (at the rate of one dollar = 110 yen) accounted for an overwhelming share of the total global market. In the U.S., meanwhile, sales of central a/c equipment held

an overwhelming share of the total a/c market, estimated at over 23 billion dollars. Both the U.S. and Japanese a/c markets can be said to have reached levels of almost total maturity. In expanding markets such as China and the countries of Europe, meanwhile, companies producing ductless-type air conditioners began aggressive sales offensives in the central a/c market. Once into the twenty-first century, besides manufacturers from Japan, Europe, and the U.S., manufacturers from South Korea and China also competed in the Chinese market, intensifying the competition. Japanese electric home appliance manufacturers, meanwhile, began expanding their production activities globally from the 1980s. From the early 2000s, however, they watched as their foreign markets were being slowly eroded, especially due to South Korea and China exporting inexpensive products, forcing them to fight difficult battles to retain market share.

Daikin's overseas a/c strategy in the 1990s went no further than operating Daikin Europe (DENV) in Belgium and Daikin Industries (Thailand) (DIT) as production centers. Daikin also attempted but failed to enter the U.S. air conditioner market. The total company's overseas operations, even including the Chemical Division's successful entry into the U.S. market, was no more than about 30 percent of its entire operations. Once into 2004, however, Daikin established overseas companies one after the other—22 air conditioning sales companies, 13 production centers, 8 chemical sales companies, and 10 chemical production companies—raising its overseas operations to 45 percent of its overall operations. In that way, Daikin finally moved all-out in developing its global business.

Daikin's first move in expanding its global strategy in the air conditioning business was in March 1972 when it established Daikin Europe N.V. (DENV) in Belgium. After bolstering DENV's op-

30th Anniversary of DENV's Founding

erations, Daikin then moved to expand its overall operations in Europe. From the 1990s, for example, it expanded DENV's production capacity. In Europe at the time, however, although countries in northern Europe were industrializing themselves, the weather there was generally cool and the interest in a/c equipment was generally subdued. Although there was a need for a/c equipment in the more southern European countries, the purchasing power there was not developed, making the market size small, which placed limits on how far production could be expanded. That situation changed from around the year 2000.

A major factor affecting a/c sales was global warming. In northern Europe, neither traditional building architecture nor more recent structures were fitted with sufficient window space to offset hot weather, and the year 2003 was particularly hot, leading to a sharp rise in the demand for a/c equipment. In southern Europe, meanwhile, introduction of the euro as the area's common currency led to increased industrialization, and to notably greater purchasing power. Along with the rapid spread of IT, the demand for office-use a/c equipment increased rapidly. In the backdrop of

Daikin Airconditioning Italy (DACI)

the increased market size, a/c manufacturers in China and South Korea also entered the market. One reason for this was the strong euro, coupled with severe price cutting by South Korean and Chinese companies. In that situation, DENV introduced a new market development strategy.

The first step in its market strategy was putting its sales network into order. Although it could be said that some progress was already being realized to unify the markets in European countries by using the euro, major differences remained in matters such as daily life patterns and business practices. DENV appointed distributors in each country and paid them sales commissions. From the early 1990s into the early 2000s, however, DENV gradually reorganized those distributors and made them subsidiaries directly under its control. The first of those distributors to become a DENV subsidiary was Megatherm, Daikin's distributor in France. Daikin bought out Megatherm in 1993 and renamed it Daikin Airconditioning France S.A.S. (DAF). Next, in June 1998, Daikin established Daikin Airconditioning Germany (DAG) in Munich, and in April 2000 bought out its sole distributor in Spain, afterward establishing Daikin Airconditioning Spain S.A. (DAS) in Madrid. Then, one after the other, it established Daikin Airconditioning Poland (DAPO) in Warsaw in 2001, Daikin Airconditioning Italy (DACI) in Milan in 2002, and Daikin Airconditioning UK (DAUK) in London

Daikin Airconditioning U.K. (DAUK)

in 2003. Daikin's strategy of working through these sales companies allowed a quicker penetration of European markets. One of its sales strategies was so-called "route sales," and it emphasized education related to installation, maintenance, service, and sales know-how for turning salespersons into a/c professionals. Another strategy was to provide back up support for retailers selling only a/c equipment. In those retailers, a/c experts concentrated their sales activities on design offices, in order to have the specifications for Daikin equipment built into design blueprints. Around that same time, Daikin introduced the "VRV", a Japanese-style ductless multi-type a/c, to the commercial use a/c market, and eventually made it standard equipment for use in the European market.

Through these sales companies, Daikin strategically introduced the most recent equipment to European countries, including an air conditioner equipped with an inverter and a new refrigerant. This led to the company's rapid growth in the European market. Also, its agents in Portugal (2004), South Africa (2005), and Greece (2006) became Daikin-owned sales companies. Eventually, Daikin boasted of eleven a/c sales companies in Europe. From 2005, moreover, with the aim of expanding sales to countries bordering on Europe, Daikin moved to put its a/c sales companies into order. In May 2005, for instance, it opened an office in Moscow, and after closing TEVA, its agent in Turkey, it established a

sales office in Istanbul. Daikin also began a detailed study of its operations in South Africa and in Dubai in the UAE.

The second move in Daikin's market development strategy was to introduce more order into its production system. The period from 2000 to 2003, in particular, a period during which Daikin's operations in Europe began expanding rapidly, in line with a gradual appreciation of the euro. Manufacturers in South Korea and China, meanwhile, expanded their market shares rapidly in Europe in the context of their weakened currencies. Although DENV, meanwhile, with its head office in Ostend, Belgium, bolstered its production capabilities and made efforts to reduce its costs, it did not have sufficient production capacity to respond to the expanding European market. Even to European standards, labor costs in Belgium were high, and thus there were limits to how far companies in Belgium could reduce their production costs. In a room air conditioning market where price competition was intense, Daikin began moving total production of a/c equipment using the new refrigerant HFC410, first marketed in 2004, to DIT in Thailand.

Not long after the Soviet Union began opening its markets in the 1990s, the countries of central Europe entered a decade-long take off period. Central Europe then developed into a hub of industrial production and entered a period of economic growth. The market for a/c equipment, meanwhile, began expanding to include Russia, Poland, the Czech Republic, and other countries. Analyzing market trends, Daikin realized that labor was abundant and relatively inexpensive in Central European nations, and the countries there had extensive experience with industrial production. Daikin thus planned to build a new plant there. Another point was that shipping from Thailand to Europe took almost a month, making it difficult to respond in a timely manner to the

rapidly changing European a/c market. The summer of 2003 was particularly hot in Europe, making Daikin's concerns a reality: the company met the shortage of products to satisfy that year's market demand. In the end, Daikin transported room air conditioners from Thailand via air delivery services. For several years the company had been considering the possibility of expanding its market in Europe and was aware of the problems it faced. It had already surveyed potential locations for a production site, and early in 2003 it purchased land for building a plant in Pilsen, located in the western part of the Czech Republic, not far from the border with Germany. Skoda Auto a.s., manufacturer of the famous Skoda automobile, was founded in Pilsen, and the city had the basic utilities to support industries such as automakers, automobile-parts and other machine makers. Daikin's plan was to build an all-out a/c plant in Pilsen and move production of commercial-use duct -type and cassette-type indoor units there from the Ostende Plant and to move the production of medium and large-size room air conditioners, multi-room air conditioners ("VRV"), and other products to Pilsen from its plant in Thailand.

With the extremely hot summer in 2003, the European market expanded much faster than Daikin expected. Viewing the market changes as structural, Daikin began a new study in October for expanding sales in Europe, and confirmed a clear policy of producing products in Europe for local markets. The company established a project team comprised of members from the DENV Manufacturing and Sales Divisions, the DIL Manufacturing Division, the DENV Supply Center, and for two weeks the team held concentrated studies and discussions. After considering the team's results, in November 2003 Daikin decided to change the product lineup for the new plant in Pilsen from commercial-use indoor units to indoor and outdoor units for small-size room air conditioners. The new plan also called for a production capacity increase for start-up in 2004 of 300,000 units a year, double the initial plan, and eventual local production of medium- to large-size room air conditioners. Those decisions were a major change in the direction of the company's strategy for increasing sales in Europe, and the speed of those decisions was truly the result of putting into practice the company's "fast and flat" management principle. The new strategy required major additional investments in plant and equipment, including more buildings in the new plant, more equipment for processing and assembling heat exchangers, and the installation of product testing equipment. The company also decided to establish new plant for producing compressors.

Daikin Industries Czech Republic (DICZ) (top)
Production Line of DICZ (right)

In May 2003, Daikin and DENV established Daikin Industries Czech Republic s.r.o. (DICZ), capitalized at 10 million euros, as a 50-50 joint venture. For several months the two groups discussed policy and other changes, and at the same time, began plant con-

Daikin Device Czech Republic (DDCZ)

struction in October. As a result of their discussions, they had to revise the plant layout and a final review of the equipment to be installed. Regarding the number of employees, initial plans called for 500 employees but the revised plan increased the number to 1,200 employees by 2005. Although various complexities emerged in the process of establishing the company and hiring the first employees, they were resolved one after the other, and DICZ began operations in September 2004. A new plant was also built in Bruno, an industrial city in the eastern part of the Czech Republic, with an annual production target of 600,000 swing-type compressors. The infrastructure in the new industrial complex where the plant was located was completely dependable. An industrial college was also located in Bruno, making the location attractive as well for acquiring outstanding personnel as well. In October 2004, Daikin established Daikin Device Czech Republic (DDC) as a wholly owned subsidiary. Operations began there in 2006.

The size of the European air conditioning market expanded rapidly from 3,108 million euros in 1997 to 5,310 million euros in 2002. Then, following a blistering summer in 2004, the market for air conditioning jumped to 6,900 million euros, and in 2006 jumped again to 7,538 million euros. Daikin sales in Europe increased from 628 million euros in 2000 to 724 million euros in 2002, to 1,134 million euros in 2004, and to 1,515 million euros in 2006. In the process, Daikin's market share increased from 14 percent in 2002 to 19 percent in 2006, a higher growth rate than that of the overall European market. During that same period, starting in 2004, Daikin passed Carrier Corporation to hold the largest air conditioning market share in Europe. That success was the result of Daikin quickly introducing various new policies, including a more orderly production system and a speedy expansion of its sales system.

The second part of Daikin's air conditioning global market expansion strategy was entry into the U.S. market. Daikin had previously entered the North American market in 1998 through joint development of air conditioning equipment with Modine, Inc. The joint venture, however, was unable to develop new products, and Daikin pulled out of the project in early 2000. The company next entered into business ties with Trane Company in November 2001 for all-out entry into the ductless-type air conditioning market in Canada and the U.S. and held great expectations for development of that business. Trane was especially competitive in the North America central air conditioning market, and Daikin had particular strengths in the ductless-type air conditioning markets in Japan and China. The aims of the ties between Daikin and Trane were to build mutually strong business ties by manufacturing and supplying products to eight polar markets for air conditioning, covering the Asia-Pacific region, China, Europe, Japan, North America, Latin America, the Mideast/Africa, and South Korea. For its part, Daikin established a separate "North America Task Force" in May 2004, thus initiating its third attempt to enter the U.S. market. Its plan included stationing about 40 employees in New York, including engineers, strategy planners, and

Agreement Signing Ceremony for Purchasing OYL Industries

personnel from sales and other divisions. Besides test marketing of ductless-type air conditioners, Daikin also considered possible M&A or expanding its business in the duct-type air conditioning market in the U.S., by buying out or forming new ties with some other company. Research conducted at the time indicated it was possible to buy McQuay International Corporation (MIC), which had a share of the applied market in the U.S., from OYL Industries Bhd. As events evolved, however, Daikin changed its global business strategy substantially by buying out OYL and began promoting the expansion of its worldwide business on its own. That purchase marked an end to Daikin's business ties with Trane.

The third part of Daikin's market expansion strategy was emphasis on further development of the ASEAN and Australian markets: Thailand had recovered from the Asian currency crisis; Australia was showing stable economic growth; and Daikin already enjoyed a major share of the local market in Singapore. In general, Daikin moved forcefully in the ASEAN countries where it already had encouraging sales, aiming to expand its market shares further. The markets in those countries were exclusively for non-inverter type cooling equipment that used the refrigerant R22. Daikin utilized DIT in Thailand as a production hub for products aimed at the ASEAN countries. Besides efforts to bolster its cost competitiveness, Daikin led other companies by introducing inverters in its air conditioners using R22. In that situation, Daikin shifted all production of packaged air conditioner "VRV" to DIT in 2005. Then, as DIT came to produce a full range of RA, PA, small-duct, and other equipment, it began supplying large volumes of products not only to the ASEAN countries but also to countries in Europe. The functions for producing volume items and exclusive cooling equipment were also shifted exclusively to DIT, strengthening the move to turn DIT into a business hub in the ASEAN region. Australia, meanwhile, had previously been a market for duct-type air conditioners, but in the background of a housing boom there, Daikin expanded its market share to become number one in Australia by emphasizing sales of "VRV" and "SkyAir" products. To expand its market position further, Daikin bolstered the sales and service structures of Daikin Australia.

Development of Strategy for Chinese Market

Daikin's air conditioning business in China started in 1997 with production operations by Shanghai Daikin Airconditioning Co., Ltd., Xi-an Daikin Co., Ltd., and Huizhou Daikin Co., Ltd. The company simultaneously introduced a system of 24-hour service. Competition in the Chinese market was more intense than in the European markets, with many local Chinese companies setting up operations randomly, resulting in fierce price competition. Daikin, however, introduced advanced, high value-added products that created their own high-end market. In the context of a sales campaign that called Daikin products the "Benz among air conditioners," Daikin won customers using a sales approach emphasizing the high quality of its products and its application of leading-edge technology. Sales, meanwhile, were mainly through Daikin exclusive dealers that dealt only in cash transactions, and

Beijing Headquarters of Daikin Investment (China) Co.

Daikin rapidly expanded its market share. Operations turned profitable in the third year after beginning local production. In its fourth year in China, Daikin cleared its accumulated loss and by its fifth year the company earned a return on its investment thus quickly succeeding in achieving its initial objectives. At the end of 2000, Daikin had four production centers and 18 sales centers in China, and in 2002 it expanded that organization to six production centers and 29 sales centers, plus three service companies and one research center. The overall Chinese market for air conditioning was valued at 530 billion yen, and Daikin's share was 7 percent, worth 34.6 billion yen.

Once into the twenty-first century, Daikin reviewed its organization and strategy in order to expand its markets in China. In September 2001, it established Daikin (China) Investment Co., Ltd. (DCI), capitalized at US$30 million. DCI oversaw all Daikin operations in China to make its investments more efficient. At the time, business-related regulations in China differed depending on the particular region. Foreign affiliates were also required to have joint ventures with Chinese companies. Those restrictions negatively affected the success of foreign affiliates. Following the Asian currency crisis from mid-1997 to early 1998, however, China's economy developed rapidly and the WTO began considering China's request for membership. Paralleling those developments, the Chinese government gradually relaxed its domestic business restrictions. In 1999, for example, the government approved an expansion of the functions of foreign headquartered companies, thus increasing the benefits to foreign companies when they established investment companies in China. In that context, Daikin in January 2003 bolstered the control function over its operations in China by establishing a Corporate Division inside DCI and appointing Ken Tayano, formerly with Shanghai Daikin Airconditioning (SDAC), in charge of accounting. Daikin also established capital ties between DCI and both SDAC and Huizhou Daikin, thus clearly placing all the Daikin companies in China under DCI. Besides its function as a holding company that controlled the local joint ventures in Beijing, Shanghai, and Guangzhou, DCI also collected information on local markets, prepared strategies for business ties, had research functions, and unified the company's sales functions. Air Conditioning Headquarters was inside SDAC, and a branch company was established inside Daikin in Guangzhou. The person assigned to the manager of the Guangzhou Branch was Fang Yuan of Daikin Investment Co. in Beijing. A native Chinese being appointed to head a foreign company was an exceptional promotion at the time, highly welcomed in Chinese business circles. Daikin was moving aggressively in China to assign even high-level managerial duties to local personnel. The company adopted a policy of having local employees deeply appreciate its management principles, and have them reflect those principles in their everyday duties. The Chinese employees warmly welcomed Daikin's corporate stance, an attitude that contributed much toward strengthening in-house morale.

In 2002, Daikin established a new strategy for its operations in China, and began a forceful expansion of its diverse business

divisions there. Besides increasing sales in the air conditioning division, Daikin also expanded its chemical business by building a new plant. It also began moving aggressively to develop its oil hydraulics business. In effect, all the company's business divisions moved forward in a comprehensive expansion strategy. To support that strategy, Daikin established air conditioning service companies and the Suzhou Chemical Plant one after the other. At the time, China was realizing high-level economic growth of about 10-20 percent/year, and redevelopment projects were being carried out simultaneously in about 40 Chinese cities with populations of five million persons or more, an unprecedented construction boom. In response to rapidly expanding needs, Daikin established two new companies in 2003 in China: Daikin Airconditioning Systems (Shanghai) Co., Ltd., (DASS; capitalized at $18.7 million) for producing commercial-use packaged air conditioners, "VRV" systems, and medium- and large-size room air conditioners; and Daikin Central Airconditioning (Shanghai) Co., Ltd. (DCAS; capitalized at $18.4 million) for producing fan coil units and water- and air-cooled chillers. Both companies were located within the precincts of SDAC, and both began production activities from July 2004. In November 2003, meanwhile, Daikin established Daikin Device (Suzhou) Co., Ltd., (DDS; capitalized at 2,320 million yen) inside the Suzhou Industrial Zone to manufacture compressors for use in room air conditioners, packaged air conditioners, and chillers. DDS began operations from September 2004. Also in September 2004, Daikin established Daikin Motor (Suzhou) Co., Ltd. (DMS; capitalized at $20.8 million) to manufacture motors; production began there in December 2004. Matsushita participated in DDS with 40 percent equity. Daikin and Matsushita combined their technology in this venture and began manufacturing motors for compressors.

Daikin Device (Suzhou), (top) Chairman Inoue and Sr. Executive Advisor Yamada Tour Plant at Opening(right)

For its air conditioning business, for fiscal year 2005 Daikin set a domestic sales goal in China of 80 billion yen and an export goal of 20 billion yen. Those were enterprising goals, equal to a three-fold total increase in three years from actual sales of 34.6 billion yen in 2002. Daikin bolstered its sales system in China through the consolidation and unification of operations, and set high sales goals of 170 percent for the second half of 2003 versus the previous year and 160 percent versus the previous year for 2004. Daikin also brought into China outstanding Japanese sales managers to train local managers and to provide hands-on guidance to Chinese sales managers at the front line of sales. In turn, those Chinese sales managers trained large numbers of newly hired local sales personnel, half of whom were sales engineers. By conducting comprehensive Daikin-style onsite sales training, project sales were strengthened, including holding technical sem-

inars for key persons in promising markets such as architectural offices, schools, and hospitals. Sales engineers responded to individual customer needs by proposing the air conditioning system most fitting for each situation. Daikin sales methods practiced by Chinese sales personnel bolstered the sales activities of retailers selling only Daikin's a/c equipment. In 2003, the Chinese government approved Daikin's application for establishing wholly owned service companies—the first such companies in the air conditioning industry in China—in north, east, and south China. Besides transferring Japanese know-how to those service companies it also became possible through them to move all-out in developing the solutions business.

Daikin moved forcefully in promoting the localization of its air conditioning business in China. It did so not only by increasing the number of production bases but also by simultaneously promoting the localization of product and technology development. Around that same time, as Daikin was building new production bases in China, roughly one hundred air conditioner models were transferred from Japan and produced in China. Including new models developed in China, they manufactured 300 different models in 2003. In 2004, the number of models transferred from Japan was about equal to the number of new models developed in China. In 2005, however, new models developed in China increased to account for 60 percent of the total number of models manufactured. In October 2003, meanwhile, as part of its moves to accelerate technological developments in the air conditioning field, Daikin established the Tsinghua-Daikin R&D Center inside Tsinghua University in Beijing, the company's first overseas R&D center. The University boasted of the world's top level of R&D capabilities in the air conditioning and energy fields, and Daikin aimed to fuse those capabilities with its own ability to

commercialize technology. The company held great expectations for the university to serve as a base, helping establish the lead in the air conditioning culture in China related to research for improving energy performance and responding to next-generation energy requirements.

Daikin announced comprehensive business ties with Matsushita in 1999, and specific results from that relationship began appearing from 2000. In China, the two companies built a system of cooperation and specialization. SDAC produced and sold packaged air conditioners while Matsushita Guangzhou produced and sold room air conditioners. From 2001, the two companies agreed to supply the resultant products to each other with their own brands and sell them through their own sales routes. The moderate results of the partnership consequently gave rise in 2003 to Daikin in Thailand and Matsushita in Malaysia also entering into a partnership, likewise based on mutual cooperation and specialization. Matsushita Malaysia also supplied Daikin Europe (DENV) with room air conditioners. In order to strengthen its position in the cost-competitiveness of large-scale a/c units, Daikin established Daikin Central Airconditioning (Shanghai) Co., Ltd. (DCAS), and halted production of those units in Japan, realizing a start to its full-scale transfer of the packaged air conditioning business to China.

Daikin rapidly expanded its air conditioning business in China. As of 2005, it had five production bases, 29 sales outlets, three service bases, one R&D site, and 6,000 employees. Including service-related income, total sales in 2005 were 74.4 billion yen, an 11 percent share of the overall air conditioning market. Air conditioners for commercial use were the main market for Daikin's products, reaching a 37 percent market share in the high-end zone with products such as cassette-type conditioners, "VRVs", and

Chairman Inoue tours Solution Plaza Shanghai

others. Totals sales in the entire domestic Chinese market in 2005 were 52 billion yen and Daikin stood out as the top company among the foreign air conditioning manufacturers. If the domestic Chinese manufacturers Midea, Gree and Haier are included, Daikin ranked fourth in the overall Chinese air conditioning industry. Operating profit on sales of the top three local manufacturers, however, were low at 2-4 percent. Daikin's ratio was 19 percent, far higher than U.S. companies, such as Carrier, McQuay, and others.

The year 2005 marked the tenth anniversary of the founding of SDAC and in early May Daikin held ceremonies to celebrate ten years of business operations in China. One link in the celebrations was the opening of Solution Plaza Shanghai in the shopping district along Huaihai Road. It was the first large permanent showroom of air conditioning equipment that Daikin established in China, with 1,800 m2 of floor space. The Daikin China Group displayed all its air conditioning equipment there, and opened a special area for visitors to experience what an advanced air conditioning system feels like.

Daikin also tackled all-out social contribution activities in China, and in the area of social welfare it began employing physically challenged persons. For education and fresh ideas related to

Jiangsu Plant of Daikin Fluorochemicals (China)

air conditioning technology, Daikin established the "Daikin Future Air Conditioning Prize." Related to the environment, Daikin announced that it would participate actively toward establishing environmental and energy conservation standards.

Aiming for World No. 2 Position in Fluorochemicals

Since China was achieving noteworthy industrial development in the early 2000s, it was expected that its fluorochemicals market would expand substantially in the near future. Because China produced fluorine, a basic material for the fluorochemical industry, Daikin's Chemicals Division viewed China as a strongly competitive location for establishing a global base for producing PTFE. In that context, in April 2001 Daikin established Daikin Fluorochemicals (China) Co., Ltd., (DFC) outside Shanghai in Changshu, Jiangsu Province. Initially, the new company was discussed as a joint venture with China Chemicals Engineering Corporation but after the Chinese government changed its policy regarding such joint ventures Daikin decided to establish a wholly owned subsidiary. That same September, DFC completed construction of

the Changshu Plant inside the Advanced Materials Industrial Park. Prior to the start of operations there, Daikin developed the market using imports from Japan. Because foreign-related users and some Chinese users preferred high-quality products, and because motor vehicle manufacturers, semiconductor manufacturers, companies in IT-related industries, and companies in other advanced technology industries had expanded their businesses quickly, the timing was favorable and demand began increasing steadily.

The Changshu Plant began operations with 250 employees. While the global market remained stagnant, the Chinese market saw an expanded demand for fluororesins. With that favorable background, as early as 2002 Daikin adjusted its business plans in China upward. Worded differently, Daikin came to view China as its third most important production base, after Japan and the U.S., and the company moved to strengthen its international competitiveness there. Besides aggressively introducing new technology and new products, Daikin upgraded its capacity for producing PTFE. The company also decided it needed a new global strategy. With the second investment in the Changshu Plant, DFC expanded the plan, constructed a new plant and began operations there in November 2003. Afterward, DFC moved to improve its production capacity and in September 2005 the plant reached full-capacity operations. In parallel with those moves, Daikin expanded its business of developing new refrigerants for air conditioners, increased sales to fluororesin processing companies, and expanded the business for exterior coatings of buildings. Overall, the company energetically developed its sales activities. In September 2004, Daikin also established the joint venture Ningbo Dongfang Daikin Scientific and Technical Communications Company with a local electric wire manufacturer. Also, in order to promote in a single leap the expanded use of FEP-LAN cabling, Daikin began lobbying efforts with the government and pushed toward promoting legal regulations and expanding the company's business.

In the U.S., meanwhile, after the burst of the IT bubble in the early 2000s, the business environment suddenly turned tough for the fluororesin industry and Daikin America Inc. (DAI) came to face a new task. In order to move away from that environment, it was necessary to transform into a business that would create markets. For that purpose, in June 2000 DAI established the Daikin Institute of Advanced Chemical Technology (DAI-ACT) in New York. Daikin's principle aim in establishing that research center was to become number one in the world in developing uses for its technology. Daikin provided researchers in universities and research institutions engaged in advanced research in fluorochemicals with fluorine materials, evaluation technology, and financial support. In return, the researchers provided feedback to Daikin. DAI-ACT was a virtual research center with no research facilities of its own. It developed by working with actual research institutions, and in the process built an outsourcing network.

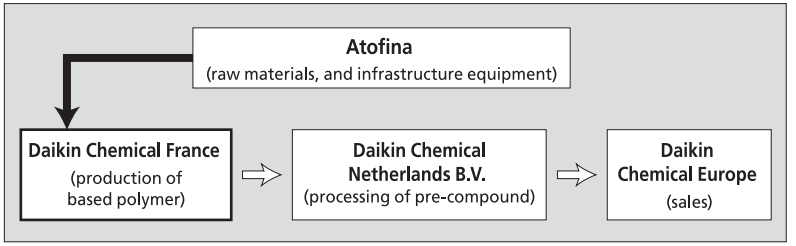
DAI aimed to establish itself as number two in the U.S. market after DuPont, and exerted great efforts to create markets and expand its market share. That included developing the market for EFEP, a unique Daikin product, and fluorine rubber, and expanding its share of the foaming agent market. In September 2004, Daikin bought out Cri-Tech Technologies, the largest compounder of fluorine rubber in the U.S., making it possible for Daikin to produce fluorine silicon alloy rubber compound at Cri-Tech Daikin was then jointly developing FESiV with Dow Corning Corporation. In the fluorine rubber field, Daikin set a target of moving ahead of DuPont and becoming number two in market share, behind only Dyneon. In response to environmental regulations,

Daikin Chemical France (DCF)

meanwhile, Daikin expanded its sales of fluorine rubber to the companies producing motor vehicle fuel piping, those producing EFEP used in underground piping at gasoline stands, and for use in bug filters. The company moved steadily forward with a strategy that aimed for number two position in the fluorine chemicals industry, behind only DuPont.

In June 2001, Daikin established Daikin Chemical France (DCF) in the outskirts of Lyon, and immediately began preparing for production operations by searching for a site on which to build a fluorochemical plant. Around that time, however, there was an explosion at a chemical plant in Toulouse scheduled to supply DCF with raw materials and equipment for its new plant. Atofina, the chemicals unit of the world's fourth largest oil group, owned that company, and DCF was moving forward with construction of a plant next to it. DCF altered its plans and decided to locate its new plant further away from the Atofina subsidiary company. Operations did not begin at DCF's plant until January 2004, over a year later than originally scheduled. DCF was Daikin's first all-out chemical production facility in Europe and it shipped all its output to Daikin Chemical Netherlands (DCN) B.V. DCN put into order a system that enabled local production of pre-compound processing of fluoroelastomers to meet a wide range of demand in Europe, such as for use in automobile parts and pipe sealing com-

Production and Sales Systems of European Chemicals Business



pound for the semiconductor and chemical industries. Through DCF and DCN, Daikin was capable of responding to local production for covering increased demand in the future.

Semiconductor production in Taiwan, meanwhile, was expanding rapidly. In the context of that expansion, in December 1999 Daikin and Taiwan Plastics Co., Ltd., established the joint venture Formosa Daikin Advanced Chemicals Co., Ltd. (FDAC). From September 2001, FDAC began producing high-purity etchant for use in the semiconductor industry. A month earlier, in August 2001, Daikin established the sales company Taiwan Daikin Advanced Chemicals, Inc. (TDAC). FDAC and TDAC then provided a strong foundation for expanding Daikin's business in Taiwan.

Although Daikin's Chemicals Division steadily established global production and sales bases, the burst of the IT bubble in the world's two most advanced markets—the U.S. and Japan—presented the Division, which had expanded its business considerably based on sales of FEP-LAN and other products aimed at the IT industry, with the new task of responding to sluggish demand. Sales in the Chemicals Division decreased from 96.2 billion yen in 2000 to 81.7 billion yen in 2001, forcing the Division to face a difficult business environment. In order to recover from that situation, from the end of February 2002 the Chemicals Division concentrated on matters related to the Daikin Technology Statement and cre-

ated a new direction in which to head. It pulled its ideas together in May 2003 in a Plan for Reform of the Chemicals Division's Fundamental Structure. The first measure mentioned in the plan was a "Declaration of a Safety Emergency Situation," in the background of a series of serious accidents occurring at Daikin chemical plants at the time. Second, as a reform in the Division's operations, emphasis was placed on making certain the policies of the Division were commonly shared with Daikin's chemical business operations in the U.S., Europe, and China, and that the vectors for operating those businesses were completely in tune with each other. In that context, the Division built a system of responsibility for promoting autonomous decisions by the overseas bases, and established an Overseas Planning Department for assuring a bi-directional exchange of information. The Division also decided to hold a Global Meeting of Top Managers and a Global Conference as venues for discussing global business issues. Third, in order for the Chemicals Division to move forward in specific ways in line with the Daikin Statement of Technology, the company established reform themes in technology, including reforms in the way of moving forward with the development of applications, establishment of basic technology and new technology for developing products for differentiating Daikin from its competitors, clarification of responsibility in the research division, further progress in the stable operation of manufacturing processes; and comprehensive cost cutting. DAI was not the only internal business entity that Daikin was asking to change its business structure into one for creating markets. The same held true for the Chemicals Division itself.

Even as the Chemicals Division introduced reforms into its operations, a series of accidents occurred at the Yodogawa Plant in Japan between 2001 and 2003. In July 2002 and March 2003, in particular, employees of partner companies died in tragic accidents. In other accidents, gas leakages and a release of resin powder into the air forced local residents to remain indoors on one occasion and to vacate their area on another. Those accidents were not viewed merely as safety management failures but as issues related to the structure of Daikin's chemical business. In that situation, the Declaration of a Safety Emergency Situation signaled Daikin's introduction of basic countermeasures for improving the structure of the Chemicals Division. The company emphasized two main points. First was to correct the thinking and the actions of all employees from the two standpoints of "dislike of accidents" and "dislike of decisions that tie to unsafe behavior." Second was to establish clear rules and follow them closely based on a reflection of past accidents. The company also aimed to establish safe operations by starting with quickly achievable goals. As an overall corporate response, moreover, Daikin established a Zero Accident Promotion Department, and appointed Senior Executive Advisor Yasushi Yamada to head a special committee in charge of safety, thus strongly promoting a system for ensuring workplace safety. About six months later, in January 2004, an explosion occurred in the Kashima Plant's tetrafluoroethylene manufacturing process. No one was injured, fortunately, and the accident resulted in a renewed awareness in the Kashima Plant, and the Yodogawa Plant, of a need to move all-out in bolstering and firmly following in-house safety countermeasures. Daikin assigned directors to the frontlines of operations to ensure that management decisions related to safety—and a strengthening of their execution and supervision functions—reflected the situation at the workplace level. Also, the company moved to improve the structure that caused the accident, and conducted comprehensive safety inspections of all equipment and facilities.

After the introduction of restrictions on fluorocarbons, a great disparity emerged among fluorine manufacturers in global markets depending on their technical development capabilities. Fluorochemical companies either reorganized themselves globally or reorganized their businesses. Daikin's Chemicals Division led the world technically in developing new refrigerants, and the restrictions on fluorocarbon presented the Division with the opportunity to increase its share of the refrigerant business. The Division also had a chance to establish a dominant position in the global market for fluororesins. In order to make the most of those opportunities, however, it was necessary for the Division to strengthen its product and application development capabilities. For responding to the company's expectations, the Division established a global production system and while feeling its way gradually introduced reforms in its business structure.

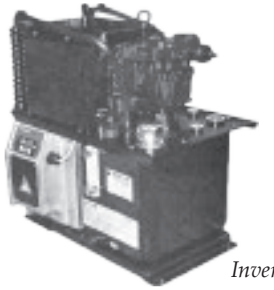
Business Results and New Developments in Diversification

Daikin's domestic oil machinery business shrank by about two-thirds because of the burst of the economic bubble. In addition, efficient and easy-to-manage electric servo motors were developed, resulting in lower prices and causing the market for small power shovels and garbage collection vehicles to be taken over by electrically powered machines. As a result, in 1996, in order to rebuild its business foundation, the Oil Hydraulics Division tackled a set of basic reforms. First of all, the Division was divided into the industrial machinery and construction machinery businesses. Each business then began developing strategies for energizing itself, including searching for alliances. From fiscal 1995 to fiscal 2000, however, combined sales for the oil hydraulics and defense systems businesses were less than 40 billion yen, and profits were quite low. In both fiscal 1996 and 2000, in fact, their business results were in the red.

In order to recover from the long period of business sluggishness, in 1999 the Oil Hydraulics Division created a task force for determining the direction in which to rebuild itself. The task force formulated four key points: (1) to aim for the top share of the domestic industrial machinery and hydraulic transmission markets; (2) to move all out in entering Asian markets; (3) to improve the Division's competitiveness and profitability in order to remain a major player in the parts industry; and (4) to promote strategic ties. The Division confirmed its reconstruction strategies clearly in the Fusion 05 Strategic Management Plan.

The efforts toward reconstruction of the oil machinery business finally bore fruit in 2000. In that same year, the Division reached a joint venture agreement with the construction machinery manufacturer Sauer-Danfoss Inc. (today's Danfoss Power Solutions), and in the industrial machinery business the Division developed and marketed a hybrid hydraulic pump called "Eco-Rich". As a new business, meanwhile, the Division successfully entered the parking system business.

Sauer-Danfoss was the world's top construction machinery manufacturer at the time, with global sales over 20 times greater than those of Daikin. The two companies had technical ties in the transmission field stretching back over 30 years, and enjoyed a relationship of strong mutual trust. They established two joint ventures in October 2001: Daikin Sauer-Danfoss Manufacturing Ltd. (capital 400 million yen; Daikin 55 percent equity) was a manufacturing company; Sauer-Danfoss-Daikin Ltd. (capital 400 million yen; Daikin 35 percent equity) was a sales company. Not only did those ties allow Daikin to take a major step forward in holding the number one share of the Japanese domestic market but they also gave Daikin the chance to acquire IT technical capabilities,



Inverter Hydraulic Pump "EcoRich"

develop an advanced SCM, and acquire expertise in customer-oriented marketing. The ties also enabled Sauer-Danfoss to acquire sales expertise and a customer foundation in Japan and Asia, and provided it the means for establishing a foothold in markets with great future potential. By making the most of the strong points of both companies, the new joint ventures became the leaders in their businesses in Asia.

The Oil Hydraulics Division developed the "EcoRich" hybrid hydraulic pump, equipped with the IPM (Internal Permanent Motor) developed by the Airconditioning Solution Institute for use with the compressor of packaged air conditioners. The Division made use of electric and control technology Daikin had in air conditioning to develop the "EcoRich" as an extremely energy-efficient product that consumed 50 percent less electricity than previous hydraulic equipment. The demand for "EcoRich" as a hydraulic pump for industrial use increased rapidly from its launch in January 2000, and it won a substantial market share. In that backdrop, the Oil Hydraulics Division in 2002 formulated a medium-term reform strategy for the hydraulics business related to industrial machinery, aiming to move from a business that offered simple hydraulic parts to a solutions business for conserving energy.

In the past, the Division targeted the industrial machine manufacturers as customers and now decided to set its sights on end

users as well, and began to develop markets. Based on that policy, Daikin placed "EcoRich" at the center of its systems. It also moved its core technology from hydraulics to motor drive and added equipment for inverter controllers. It started a new business offering packaged products that included an oil pressure pump, a water pressure pump, and a machine drive mechanism such as a decelerator—which users had procured until then by themselves. The hydraulic pump system Super Unit marketed in 2002 achieved substantial energy savings of 60 percent less electricity consumption during operation compared to previous products, making it an innovative product offering high-energy efficiency. For the new technology they used, the "EcoRich" and Super Unit products both won technology development awards from the Japan Fluid Power System Society. Both were game-changing products for conserving energy. "EcoRich" in 2002 and Super Unit in 2003 also won the Technology Development Award of the World Power Systems Society.

Daikin called its new business the Power Motion Control Business, and publicized it energetically among end users. While offering end users energy-saving diagnoses of entire plants, Daikin developed its solutions business by making proposals for overall energy-efficient packages, including air conditioners, air cleaners, and other products from the Air Conditioning Division. Among machine tool manufacturers, meanwhile, Daikin conducted direct sales activities with end-users strongly aware of energy conservation. For the industrial machine market, Daikin developed low-noise, general-use equipment mounted with high-pressure super "EcoRich" pumps. Those pumps became very well known in the market, and Japan's major automobile manufacturers purchased them directly by name.

Daikin entered the parking systems business later than other

companies, but was the first and only company offering hydraulic equipment. Land prices in Japan decreased continuously for ten years after the burst of the bubble economy, and as new condominiums became more affordable people started returning to reside in Tokyo and other urban centers. In addition, a demand increased in Tokyo, Osaka, and other large cities for vertical parking systems. In that context, Daikin entered the vertical parking system business in 1991 and began building a business foundation. Competition was tough, however, and Daikin was forced to reduce the prices of its parking systems. The outlook for further growth worsened, and in 2005 Daikin decided to withdraw from the business.

Daikin established Daikin Hydraulics (Suzhou) Co. Ltd., in 2010, and entered the Chinese market for industrial equipment. It began producing "EcoRich" products and inverter oil hydraulic pump units customized for Chinese customers, and began sales in economically advanced cities such as Beijing, Dalian, Guangzhou, Shanghai, and others.

In the defense business, Daikin moved steadily toward realizing by 2010 its plan to have the private sector account for 50 percent of its overall business. The Defense Division remodeled the former hydraulic factory for the defense-related products, moved aggressively to develop products that put its in-house technology to best use and were destined for consumption by private companies in the domestic market. Through calls for new product ideas, market surveys, and a study of ways to apply existing technology, one of the new products Daikin tackled was a Fiber-Reinforced Plastic (FRP) composite cylinder. It was an ultra-light, high-pressure gas cylinder, strengthened by wrapping glass fiber around an aluminum liner. Although imports controlled the market up to that point, Daikin was able to enter the market by applying technology it used in metal pressing processes. In 1976, Daikin developed a portable oxygen cylinder called "Lite-TEC" for use by patients suffering from respiratory insufficiency. It entered the business of home oxygen therapy, and began to diversify its product line. In order to apply the same technology to an area other than medical equipment, Daikin developed an FRP composite cylinder for use by firemen as an air cylinder.

In August 2001, Daikin began marketing an ICU apparatus unit called "Dear M10" for use with small animals. This apparatus used high-pressure oxygen, with a temperature/humidity control system, and also fitted with safety functions. It was so compact it was easily attached to the cages used in veterinary hospitals for small animals. It allowed the oxygen concentration in animal cages to be maintained at a maximum of 40 percent. The heating and cooling equipment operated quietly, using the electronic cooling technology of Daikin's Airconditioning Research Center. That technology prevented a loss of oxygen and sudden temperature increases by opening windows automatically in emergencies or unusual power outages. As an aside, Japan experienced a pet boom from then until now, and owners paid for advanced medical attention from veterinarians for their pets. From that viewpoint, Daikin expected an increase in the demand for such an apparatus.

Daikin established its Electronic Division in 1996 by reorganizing its Electronic Equipment Department. The company had positioned the former department as a Strategic Business Unit (SBU) and had tackled its business aggressively. Among its main businesses was "Interact," a Graphics Control System for factory automation based on technology developed by Control Technology Corporation (CTC) of the U.S. Daikin imported the Interact software into Japan from CTC in 1994. The software was expensive,

however, because it required a network connection, unlike the previous type that only used a touch panel. It caused numerous technical problems as well and could not compete with the previous model's improved performance. In the context of the product causing so many problems, Daikin quit that business in 1997.

The DVD production system "Scenarist" that Daikin developed in 1994 was the most advanced system of its time, and at one point it had a 90 percent share of the domestic market. Technology development was so rapid, however, that Daikin could not keep pace and in 1998 it had to withdraw from that market in Japan. Two years later, in 2000, it also withdrew from the same market in the U.S.

Afterward, Daikin redesigned its software business in the domestic market into a solutions business that responded more closely to the needs of the times. By 2003, the new business became active in seven areas, including visual R&D support solutions, digital virtual broadcasting solutions, and unified environment solutions for media policies. In particular, an improved version of the R&D support software "Space Finder" marketed in 2011 became popular, and as of this writing the number of users is still increasing. Sales of the "Fielder Rise" software for equipment CAD increased steadily, meanwhile, as Daikin's air conditioning sales companies won sales support from design offices and building contractors. Even as Daikin itself continued to improve the product's quality, the company's service engineers also made increasingly favorable suggestions related to improving quality further, also promoting sales. Even after 2012 the company continued to maintain increased profits.

Corporate Ethics and Environmental Response

Daikin grew and developed as an excellent global corporation with a strong technological backbone. At the same time, as a company trusted in global markets, Daikin established a strict in-house code of ethical standards, adopted an aggressive external stance in considering the natural environment, promoted social contributions, and conducted its activities with a strong awareness of its corporate social responsibility. While competing in business, Daikin quickly grew to become an excellent company. At the same time, it expended great efforts to establish a strong foundation of corporate ethics. The social background, the strict way that Daikin views its corporate social responsibility, accounts in part for the company being able to conduct its corporate activities speedily.

In the spring of 2003, Daikin established a task force for reviewing its code of ethics. The task force began studying how to establish a "perfect" code of ethics for strict adherence to laws and regulations and total prevention of problematic incidents. Right around the turn of the century, several unethical incidents occurred in succession in large corporations in Japan and the U.S., and the entire matter of corporate social responsibility came into question. In response to public criticism, many corporations reviewed their stance toward social responsibility, and moved to establish internal systems to assure full compliance. In the midst of that social trend, Daikin decided to renew its code of ethics and make certain internally that it was following the code closely. The company made the efforts needed to verify its internal systems and to improve the knowledge and awareness of all employees toward compliance. In June 2003, Daikin established a Corporate Ethics Committee and a Corporate Ethics Department. COO Kitai assumed the position of officer in charge of corporate ethics and the company prepared a list of related laws and regulations; put into order internal regulations and related manuals; and added to

or reviewed those already available. Daikin also prepared a corporate ethics handbook for group companies to use for having their employees practice all-out compliance. The company also established a consultation service at its head office to provide specific advice to employees. In addition, compliance leaders were appointed in the head office, the plants, and in the eight main overseas companies. While promoting the activities directed by the head office, the leaders moved to share information about the unit they represented. As the leaders occasionally handled emergency responses, they confirmed that the code of ethics was being practiced throughout the organization.

Concerning environmental issues, starting in 1998 Daikin began publishing Environmental Report (today's CSR Report) annually to publicly reveal its environmental stance. In 1999, the company announced environmental accounting, and held a group environmental conference in Osaka around the same time as part of efforts to have the company's environmental management principles shared widely throughout the company. In fiscal 2000, based on calculations from guidelines the Ministry of the Environment established, environmental preservation activities cost Daikin a total of 6.7 billion yen. That level of expenditures allowed the company to comply with legal controls, such as environmental standards, and allowed the company's main products to reach levels of energy conservation well above government standards. The company completed its switch to new refrigerants having no adverse effect on the earth's ozone layer. In 2002, in order to promote environmental management still further, Daikin set environmental standards for the Daikin Group in basic policies contained in a report titled "Taking the Environmental Lead in Society," thereby widely promoting environmental standards throughout the group companies. In the following year, Daikin unveiled Environ-

Environmental Reports

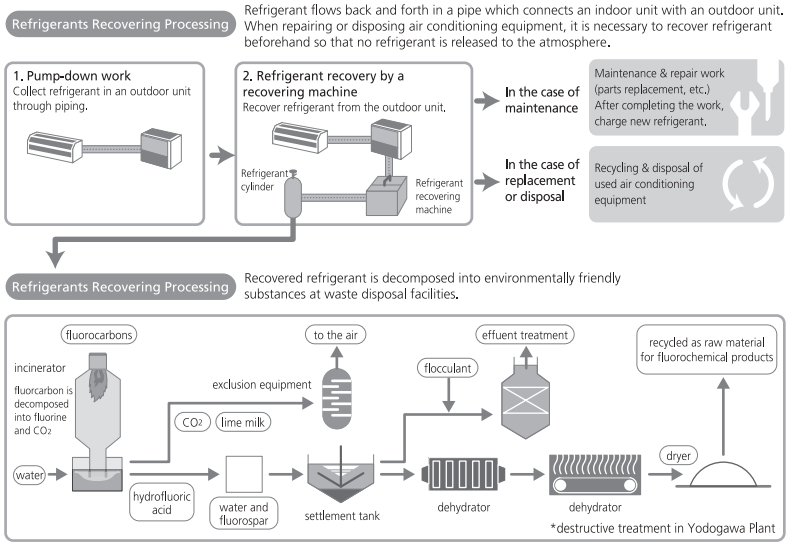
mental Action Plan 2005, a plan for strengthening the company's environmental management on a global scale. During the same year, all the domestic offices of the companies in the Daikin Group obtained consolidated ISO 14001 certification. In order to expand use of the environmental management system to parts and materials suppliers, the company officially decided in 2004 to require its suppliers to obtain ISO 14001 certification, a strengthening of the program of "green" procurements it initiated in 2000. During the same period, the company moved vigorously in disclosing environment-related information in its annual Environmental Report, bolstering its environmental communication and showing its affiliates in Japan and overseas its managerial stance of achieving the greatest positive environmental effects for the least capital expanded.

As a company producing fluorocarbons, Daikin was among the first companies to tackle environment-related problems seriously. It succeeded in the volume-production of the new refrigerant HFC32 in March 1997 as the world's first such refrigerant. It followed that with volume production of HFC125 starting in March 2001, making the company a pioneer in the mass produc-

tion and wide dissemination of new refrigerants with a zero negative effect on the earth's ozone layer. With completion of a plant for mass producing HFC32 in 1999, Daikin began calling itself an advanced company in terms of the global environment, and it produced and introduced an action plan based on four main points: 1. the development of low-impact products for the global environment, including energy-conscious air conditioning equipment, and the total recovery of refrigerants; 2. all-out management of the environment, including reduction of the volume of energy used in production activities, and management of chemical substances; 3. creation at the industry level of a social system tied to the recovery and disposal of refrigerants; and 4. the active disclosure of information such as publishing environmental reports. Next, in 2002, the main Daikin air conditioners made and sold in Japan and the countries of Europe were completely switched to using HFCs. In terms of air conditioners used in homes, meanwhile, it was said at the time that room air conditioners consumed 25 percent of the total electric power used in Japanese homes, and Daikin had already expended great efforts to develop and expand the use of energy-efficient room air conditioners. The summer of 2003 in Japan was extremely hot and Japanese consumers came to show greater interest in more expensive energy-efficient air conditioners. Sales of those models steadily increased and in 2004 came to account for 84 percent of total air conditioner sales.

As another direct response to environmental issues, Daikin began promoting the business of recovering refrigerants. The company put into place a nation-wide system during 2002 in which Daikin Contact Centers remained open 24 hours/day all year round to receive requests for recovering air conditioner refrigerants, regardless of the equipment's manufacturer or model. After a Contact Center received a request it contacted the Daikin

Refrigerants Recovery Business



Service Division and a refrigerant recovery team proceeded to the caller's premises to recover the refrigerant. Refrigerant manufacturers were not legally responsible for recovering and disposing of used or unneeded refrigerants but Daikin, as the leading manufacturer of refrigerants, felt a responsibility to do so. Today it has 14 facilities throughout Japan, including the Kashima and Yodogawa plants, and cooperative business partners, for destroying or otherwise disposing of refrigerants. In 2005, moreover, Daikin also began putting into order a refrigerant recovery system in Europe, in response to new Waste Electrical and Electronic Equipment (WEEE) regulations.

In the recycling of industrial waste, the Machinery and Chemicals divisions began tackling zero emissions from 2000. The Machinery Division aimed to achieve that goal by 2003; the Chemicals Division aimed to achieve it by 2010. The definition of "zero emissions" is for a company to reuse or incinerate 99 percent

or more of the unneeded materials generated in its plants. The Machinery Division achieved zero emissions in September 2001 at the Sakai and Shiga plants where its equipment is produced, in January 2002 at all its factories, and in 2004 at all subsidiaries handling machinery. In 2004, the Chemicals Division achieved zero emissions at all its plants. The volume of emissions decreased dramatically during this period, from 2,745 tons to 43 tons. Of the emissions generated, 99 percent was recycled for further use. Overseas, meanwhile, a great disparity emerged between countries concerning recycling systems. In particular, many countries have not established systems for recycling sludge generated at chemical plants for use in construction materials. Despite the efforts made by Daikin's overseas offices to achieve zero emissions, therefore, the recycle rate for 2004 was just slightly over 50 percent. Since the volume of waste increases in proportion to the rapid increase in overseas production, the introduction of measures for recycling waste became an urgent task.

Daikin's positive approach to global environmental issues has won the company high praise both in Japan and overseas. In January 2002, it won the Japan Industrial Journal's Eleventh Global Environment Award, the most prestigious environment-related award in Japan, first presented in 1991. Next, in March 2002, Daikin won the EPA Stratospheric Ozone Protection Award for 2002 presented by the U.S. Environmental Protection Agency. Originally established in 1990, the award is presented to companies that take innovative action and demonstrate exceptional leadership and originality in protecting the ozone layer. The EPA presents the awards to individuals and organizations in 29 countries for 420 or more activities. All the awards reflect a positive evaluation of social systems being built for protecting the environment, such as Japan's first volume production of HFCs, promoting the use of air conditioners using HFCs, and the recycling of refrigerants.

As globalization and the increasing use of IT progressed, Daikin's sales and production bases rapidly globalized and came to face harsh competition in the areas of sales and the development of technology. Daikin thus took steps to strengthen its R&D system, and patents covering differentiation technology became important company assets. An important matter that emerged was the more effective use of patents. One result was the theme included in Fusion 05: "Thoroughly promote patent strategies to win out in the era of competition through the control of intellectual property." Under that theme, Daikin emphasized the need to move aggressively in protecting its intellectual assets by quickly increasing and bolstering its effective patents, introducing measures to counter the copying of Daikin products in China, and taking steps to reduce risk related to patent infringements. "Effective" patents referred to key patents for strengthening Daikin's competitiveness, such as patents on products that discriminated from others or created markets. In situations of extremely harsh competition, rival companies cannot be allowed to catch up. Also, royalty income from licensing patents can contribute considerably to business performance, making the strengthening of patent-related matters a top priority item.

Daikin had to strengthen its R&D capabilities in order to increase and bolster the number of its effective patents. It thus introduced a system in January 2003 that rewarded employees who discovered patentable advanced technology. In Japan, there was wide newspaper coverage surrounding the lawsuit over compensation paid to an employee for turning over patent rights to the company for a blue-light emitting diode. Consequently, there was a growth in companies that abolished limits on in-house compensation paid for obtaining patents. Daikin framed a new

system for key patents that contributed considerably to sales and compensated their inventors well. Patent value was measured in terms of their contribution to business performance within a year after acquisition and once confirmed, patents with high-performance were either given an early stage bonus or fundamental compensation. No other company had such a unique and generous system.

As seen thus far, Daikin respected "the willingness to work" of its employees, and in order to expand the re-employment of workers who reached retirement age it introduced a system that offered a variety of employment formats. The company also made efforts to create environments in which women could feel comfortable on the job. In 2001, the company discontinued the job classifications "all-around workers" and "general workers," and moved aggressively to employ women, to expand the range of work available to them, and to open the way for hiring women in managerial positions. From the summer of 2003, Daikin also moved quickly to establish a system for allowing maternity leave, thus enabling female workers to work and raise their children at the same time. As a result, in fiscal 2004 the number of female senior managers increased to eight, and female workers with children came to account for 31 percent of all female employees. The percentage of women in the overall Daikin organization was 8.6 percent, slightly higher than the average for all Japanese companies.

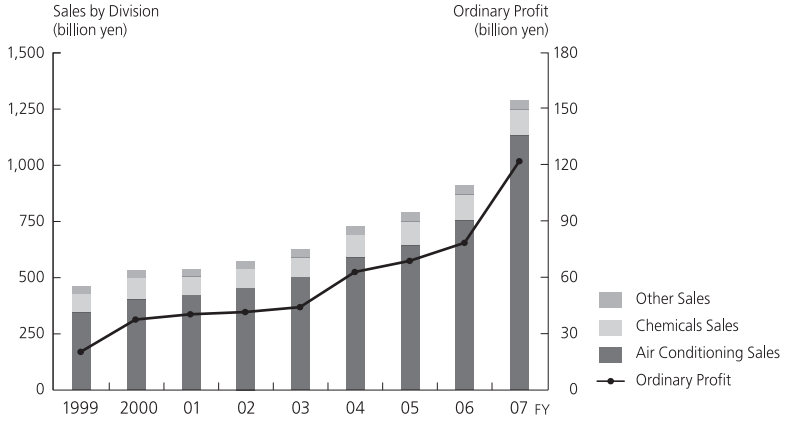
Daikin stands out among Japanese companies for its positive results concerning the employment of disabled persons. Daikin Sunrise Settsu, Ltd., a company Daikin co-established in 1993, participated in the National Exhibition for Promoting the Employment of Disabled Persons held in 2004, and introduced the activities of its disabled employees. Daikin's approach of "Making people the axis of management" garnered attention from Japanese

companies moving at the time to recover from the generally poor business situation through restructuring. In a special issue, the influential weekly magazine Nikkei Business introduced Daikin's approach to utilizing disabled employees in an article titled "Daikin Industries: Management with Surprising Use of Human Resources." Daikin succeeded in establishing a personnel system in which each member is determined and enthusiastic.

Daikin also provided support for culture and the arts, and in 1995 established the Daikin Foundation for the Promotion of Modern Art. The company donated 100 million yen to the Foundation in 2004 to commemorate the company's 80th anniversary, thus allowing the Foundation to conduct wider activities related to art museums. Daikin also supported sports activities, such as the annual women's professional golf tournament, the "Daikin Orchid" Ladies Golf Tournament, held on Okinawa and which still serves today as the start of the golf season in Japan. Partly because of that tournament, female golfers from Okinawa became more active in professional golf. In those and other ways, Daikin's support has contributed much toward promoting Okinawa's industry and economy.

Daikin's business performance during the ten years after President Inoue assumed office, between fiscal 1994 and fiscal 2004, showed increased revenues and increased profits every year. Consolidated sales for 2004 were 729 billion yen, drawing closer to the goal of becoming a trillion yen company, a main numerical index for Japan's largest companies. One of the conditions that made that growth possible was the rapid expansion of the company's overseas business, from 32 percent of total business in 2000 to 45 percent in 2004. Of the 92 companies included in the company's consolidated financial report, 45 are overseas subsidiaries. Daikin has 92 overseas business bases, and 9,800 of its 19,000 employees

Daikin's Sales by Division, and Ordinary Profits



are overseas employees, thus accounting for over half of the total number.

Viewed by division, the growth and expansion of the air conditioning business has been noteworthy. For many years Daikin maintained the largest share in the commercial-use air conditioner market in Japan, and in 2003 it also became the market leader in room air conditioners. Daikin's major products in the air conditioning business overseas are commercial-use air conditioners. The company succeeded in developing strong international competitiveness in that area and grew rapidly. The company is also highly evaluated for its environmental consciousness and energy saving performance.

The Chemicals Business, meanwhile, was suffering from a sluggish business performance in Japan and in the U.S., but total sales, which decreased following the burst of the worldwide IT bubble in 2001, gradually recovered until in 2004 they surpassed total sales in 2000. Meanwhile, although Daikin's non-consolidated ordinary profits in fiscal 2003 decreased slightly, consolidated ordinary profits increased considerably from 40 billion yen in fiscal 2000 to 63.5 billion yen in fiscal 2004. As a result, overall business results showed increased income and increased profits even on a non-consolidated basis.

Daikin began emphasizing "management by ratio" from 1999. In 2004, its ROA was 6.7 percent and its ROE was 15.2 percent, showing that the company was gradually building a highly capital efficient business structure. Daikin's current aggregate value is 712 billion yen, and the series of reforms it introduced over the 11 years since 1994 changed its overall structure. Its growth structure is proof that it also succeeded in becoming an excellent company in terms of management quality. As its next goal, Daikin has begun taking the steps needed toward becoming an excellent world-class company.

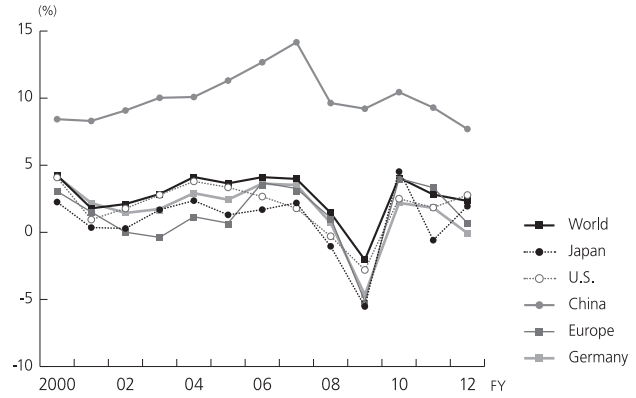
Chapter VI

Challenging New Heights (2006–2014)

Achieving Global No. 1 Position in Air Conditioning

In the mid-2000s, the global economy was doing extremely well, as was the U.S. economy, based primarily on increased sales of new housing. Business in Asian economies, meanwhile, turned brisk due mainly to vigorous exports to the U.S. China came to be called "the world's factory" because overseas companies invested directly there, investments that collectively contributed to economic expansion in China of over 10 percent. Reflecting that expansion, the total national income in China increased, leading to a larger domestic market and to further industrial investment in plant and equipment. The favorable domestic Chinese economy and its rapid growth continued through the period before and af-

Global Economy before and after Lehman Crisis (rate of economic growth)



ter the Beijing Olympics of 2008 and Expo 2010 in Shanghai, China's first World's Fair. Economic growth also led to increasingly higher wage levels. One result was that other Asian countries replaced China at lower wage levels and began experiencing rapid economic growth. Another result was that Japanese exports of high value-added raw materials and equipment to China and other developing countries in Asia increased, thus allowing Japan to bolster its position as a sophisticated industrial Asian nation experiencing high-level economic growth.

The year 2008, however, witnessed the bankruptcy of Lehman Brothers (LB), one of the largest financial services companies in the U.S. LB's failure was a major factor that caused the favorable global economy at the time to fall into a "synchronized" recession.

In the U.S., the higher value of personal assets led to an increase in the mortgage value of homes, which in combination led to a housing boom. Homeowners, however, gradually began borrowing from banks at levels they could not pay back, resulting in an economic effect called "dependence on borrowings." Subprime loans aimed at low-income consumers, in particular, were designed so that once the loans passed the deferment period the payment sum increased substantially. Afterward, more borrowers were unable to repay their loans and went into bankruptcy. The financial institutions providing the subprime loans were caught with huge amounts of non-performing loans, and they moved frantically to collect their loans. The bank packages that included those loans lost credibility and the financial market dropped suddenly. In August 2008, for example, LB, the fourth largest investment bank in the U.S., filed for bankruptcy due to losses it incurred related to the sharp drop in subprime loan products. Merrill Lynch and other leading investment banks, and AIG, the largest U.S. insurance company, likewise faced managerial crises tied to loans. Some housing loan companies such as Fanny Mae and Freddy Mac, bankrupted and were federalized. Because many financial institutions around the world owned too many financial commodities incorporated with subprime loans at the time, the so-called Lehman Crisis spread quickly, causing a global financial crisis. The affect of that crisis on EU countries was especially serious and long-lasting.

Stagnant consumption in the U.S. led to reduced imports from Asian countries, seriously affecting the economies of the developing countries there. At the same time, Japanese companies investing heavily in China and other countries in Asia, and expanding their exports to Asian countries, began to feel the adverse effects of the depressed business circumstances. Japanese exports of around one trillion yen/month prior to the Lehman Crisis dropped to one-half of that amount at the beginning of 2009. As a result, Japanese economic growth, highly dependent at the time on increased exports, turned stagnant. Amidst the growing economic uneasiness in Western countries, however, investments in the Japanese yen, considered to be relatively safe, increased.

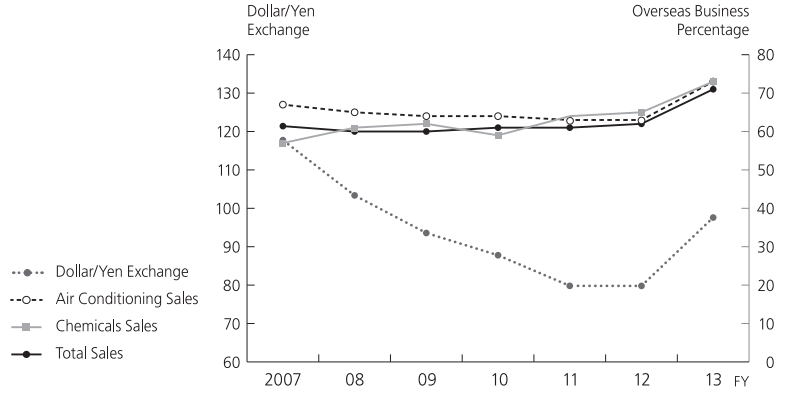
Those investments caused the yen to appreciate rapidly, which then led to a further decrease in Japanese exports. Japan's economic slowdown worsened and became prolonged.

From then to about 2013, a so-called paradigm shift—a structural change—occurred in the global economy. It was actually an economic crisis that originated with Greece's financial collapse and worsened as the world's financial problems spread to Spain, Italy, and other South European countries. That difficult situation continued with no indication of an early recovery. In the U.S. and European countries, sovereign risks were realized as a decrease in the grading of U.S. government bonds.

Following the end of the Shanghai International Exposition, China's economy began decelerating and the government's efforts to make the nation's industrial structure more sophisticated were unsuccessful. At the same time, China's competition with emerging nations in Asia became increasingly difficult. Around the same time, moreover, on March 11, 2011, a magnitude 9 earthquake, the strongest earthquake recorded in recent Japanese history, severely rattled the eastern part of the country. It generated a 40-meter tsunami tidal wave that struck the coastal area in eastern Japan. The earthquake caused horrendous damage, including the meltdown of a nuclear power plant and the related evacuation of thousands of residents. Many lost their homes permanently. That same summer, there was severe flooding in Thailand, and many hurricanes struck the U.S. Another large-scale natural disaster that struck two years later, in early November 2013, was Haiyan, the strongest typhoon ever to hit the Philippines.

Domestic economic disparities emerged among the advanced countries. In Japan, for example, there were two major trends: the trend toward an ageing society, and the trend toward having fewer children. Elsewhere in Asia the development of emerging nations was noteworthy, and the world's economic map began changing noticeably.

Trends in Exchange Rates and Overseas Business Percentage of Daikin



Daikin globalized and developed itself rapidly during the 7-8 years from around 2005. Its development, though, did not proceed entirely smoothly, for those years marked a period of tumultuous adjustments to global economic events. It was also a period during which Daikin as a group made continuous efforts to increase its earnings capabilities. Early in 2006, for example, Daikin established a policy of "constantly challenging new themes as we move toward creating a bright future." In April 2006, Daikin introduced Fusion 10, an ambitious strategic management plan that moved the company a strong step forward toward becoming a truly global company. Next, in May, Daikin acquired OYL Industries, Inc. (OYL) in Malaysia, thereby increasing the number of its group companies to more than 200 and its global work force to 33,000 employees. Negatively influenced by Lehman Crisis however, the company's business results dropped abruptly during the 2009-10 period. After 15 consecutive years of increased revenues and profits, the company experienced two consecutive periods of de-

Announcement of Business Ties with Goodman (CEO Inoue and CEO David Swift)

creased revenues and profits. From 2010, the company's business results finally recovered, supported especially by favorable results in the chemical business, and at the end of that year it became global No.1 in the air conditioning business. Still, the U.S. was considered the Mecca of the air conditioning business, and it was there that air conditioning had its beginnings. Only after a company became a major player in the U.S. air conditioning industry could it be considered a truly excellent global company and perhaps the world's leader. In that context, in 2012 Daikin bought out Goodman Global Inc. of the U.S., thus making it a truly excellent global company and the largest air conditioner manufacturer in the world. By making good use of Goodman's organizational strengths, Daikin also bolstered its position further as No.1 in the global air conditioning business.

Based on the Fusion 10 Strategic Management Plan it introduced in April 2006, Daikin set 2010 as the target fiscal year for maximizing its corporate value as a truly excellent global company. The three main points the company emphasized in that business plan were: 1. having Daikin become the global leader in the air conditioning business; 2. having Daikin also become the global leader in introducing change and creativity to its organization, and inventing value and innovation through original technology;

and 3. having Daikin realize strong earnings capabilities and a powerful financial structure with high capital efficiency. Concerning the first point, Daikin set a goal for 2010 of increasing the scale of its air conditioning business to one trillion yen, which would allow it to catch up with Carrier Corporation. While Daikin was drawing up that management plan, its negotiations for buying out OYL progressed considerably. In that backdrop, Daikin decided instead in June 2006 to review its Fusion 10 strategic management plan and accelerate its synergetic effects with OYL in order to shorten the payback period for its investments from 13 to 8 years, and raising its targeted air conditioning sales to 140 billion yen for fiscal 2010. Actually, air conditioning sales for fiscal year 2007, the year Daikin acquired OYL, were 110.5 billion yen, up 47 percent versus fiscal year 2006, thus increasing Daikin's total air conditioning business above the trillion yen mark. Concerning the second point, in 2006 Daikin introduced to the European market "Daikin Altherma", a home-use heat-pump type water heater with a high energy-efficiency performance. It also developed a new type of air conditioner that boasted of a new refrigerant and new functions. That product later tied directly to the high-end "Urusara 7" air conditioner marketed in 2011. Finally, concerning the third point, up to March 2008 Daikin realized fourteen consecutive reporting periods of increased income and increased profit, which enabled it in fiscal year 2008 to realize its goal in the "Fusion 10" plan.

OYL was an air conditioning company established in 1974 in Kuala Lumpur, Malaysia. It developed its business centered on the OEM production of large-size applied systems for York HVAC. In 1990, the Hong Leong Group bought out OYL, and the company gradually expanded afterward in the background of a rich capital base by buying out several companies, including McQuay International, an American manufacturer of air conditioning equip-

ment, and American Air Filter, a manufacturer of industrial-use air filters. Its sales for the period ending in June 2005 were 168 billion yen and operating profits of 11.5 billion yen. Daikin opened discussions with OYL from the autumn of 2005 concerning OEM production. In the process of those discussions the possibility emerged of Daikin possibly buying out OYL. At the time, OYL had already developed into a global company. It was the world's fourth largest company in the applied systems industry, and the third largest in the production and sale of industrial-use filters. As a global company it had operations in Asia, including China, North America and Europe. In that situation, Daikin and OYL continued their buy-out discussions and reached an agreement in May 2006 for Daikin to acquire OYL for about 232 billion yen. Combined OYL and Daikin sales in the air conditioning market at the end of June 2006 were 825 billion yen. In 2008, their combined sales exceeded those of Trane Inc. and placed it in a position to overtake Carrier Corporation, the global leader in the air conditioning industry.

The main merit of OYL's acquisition was that it complemented Daikin's existing business areas. OYL had particular strengths in the applied systems business, in production technology and software engineering, and it was especially competitive in producing and distributing low-cost products. It also had powerful business bases in China and the U.S. Daikin decided to increase its share further in the U.S. market and began negotiations with OYL around that same time about purchasing its subsidiary, McQuay International Corp., an air conditioning manufacturer that had expanded its applied business in the U.S. While Daikin talked with OYL about purchasing McQuay, however, the discussions widened to include buying out OYL's air conditioning and filter-related businesses. Because OYL's parent company, the Hong

Announcement of Business Ties with Gree (CEO Inoue and CEO Zhu Jianghong of Gree)

Leong Financial Group, did not have an especially strong appreciation of the air conditioning business, OYL hoped that the business discussions with Daikin would expand to include its air conditioning-related businesses. The talks then moved forward quickly and Daikin acquired OYL outright. That purchase expanded Daikin's size to over 33,000 employees globally, turning it into a global company with the majority of its business originating outside Japan. To support the acquisition of OYL, Daikin used cash on hand, borrowed funds, and in May 2006 publicly offered a capital increase for the first time in 37 years, newly raising around 52 billion yen.

In March 2008, Daikin formed comprehensive business ties with Gree Electrical Appliances Co. Ltd., China's largest manufacturer of home-use air conditioners. Daikin pursued the ties primarily to acquire know-how related to producing home-use air conditioners inexpensively. Daikin also aimed at building a more competitive position in the domestic Chinese market, promoting the Chinese market's move toward inverters, and winning an influential market position in China.

The Lehman Crisis in September 2008, however, forced Daikin to revise its global marketing strategy significantly. First of all, despite having added McQuay International as a member of the

Daikin Group through the acquisition of OYL, the U.S. air conditioner market remained in the doldrums from when the subprime loan issue surfaced in 2007. Also affected by the Lehman Crisis, business cooled down significantly. The European market, as well, which had expanded rapidly in line with "Daikin Altherma" water heater's favorable sales performance, saw total sales of 1,917 million euros in fiscal year 2007, and saw annual sales in fiscal year 2009 drop to 1,608 million euros. The yen value versus the U.S. dollar which had steadily increased from 2007, increased rapidly to hit the 80-yen mark following the Lehman Crisis of 2008. The Japanese government's market intervention at that time was ineffective, and the yen continued increasing in value until it hit the 76-yen level in November 2011 and kept that level until October 2012. For Daikin, besides a drop in exports, the consolidated sales and operating profit of its overseas subsidiaries worsened for two consecutive years, fiscal years 2008 and 2009. Although many companies saw their operations fall into deficit for those two years, and Daikin experienced reduced profits to 60 billion yen in 2008 and 40 billion yen in 2009, the company remained in the black by practicing 49 themes for earning short-term profits. In that context, Daikin was evaluated highly as a recession-proof company. Chairman Inoue expressed his appreciation to all the employees in the group companies for conducting their duties cheerfully and sincerely and working as diligently as possible.

As events turned out, 2011 proved to be a year of major disasters for Japan. In particular, the magnitude 9.0 Great Eastern Japan Earthquake (the Higashi Nihon Earthquake) that struck on March 11 was accompanied by a tsunami tidal wave that inflicted widespread damage on the northeastern part of the country. Beginning on March 12 the tsunami damage spread to include a meltdown of three of the six nuclear reactors at the Fukushima No. 1 Nuclear

Power Plant. Between the damage from the earthquake and that from the tsunami, over 18,500 persons either died or were declared missing and presumed dead, and 400,000 houses /buildings were destroyed. The total value of direct damage from the earthquake was calculated as between 10 and 25 trillion yen. World Bank calculations set the amount of the economic loss to be the largest in the history of natural disasters. Even at the end of 2013, the affected Tohoku area was still recovering only slowly from the earthquake. Of the 280,000 persons displaced by the earthquake, an estimated 80,000 were directly affected by damage at the nuclear plant. As of this writing, most of those persons still have no homes to return to, and they have been forced to live in temporary housing. The earthquake and tsunami also had extremely strong negative effects on industrial activities over a widespread area that eventually revealed a transformation of world maps outlining global industrial activities. Also, because of serious damage to the Naka Plant of Renaissance Electronics in Hitachi Naka City, Ibaraki Prefecture, there was a strong negative influence on the production of electronic products and the supply of parts to customers in the automobile industry, electric products manufacturing, and various other industries. That influence was not limited to Japan but extended globally, especially to the U.S. and some European countries.

Following the Lehman Crisis and two consecutive years of reduced income and profit, Daikin made a V-shaped recovery in its March 2010 business results. It then introduced its "Fusion 15" Strategic Management Plan in April and subsequently made it safely through a period it called a "paradigm shift." It then set a goal of becoming a truly excellent global company. Although the company's actual business performance for fiscal year 2010 were sales of 1,160 billion yen, and profits of 75 billion yen, it set a goal

Fusion 15: **Promotion and Implementation of 11 Group-wide Core Strategy Themes**

I. 4 New Growth Strategy Themes

Innovation that incorporates the changes of the era as growth

1. **Fully enter emerging markets and the volume zone**
   Create products and a sales system that meet diverse market needs around the world to rapidly assimilate the economic growth of emerging countries and develop large-scale business in the volume zone.
2. **Develop solutions business that meets customer needs**
   Establish a business model that increases value for customers by offering systems and solutions that fit social trends to acquire a new source of earnings.
3. **Expand environment-related innovation business**
   Sophisticate Daikin's original environmental technologies and create new business opportunities by anticipating environmental regulations that differ by country/region ahead of competitors to expand environmental business.
4. **Accelerate growth through alliances, partnerships, and M&A**
   Instead of relying only on own resources, make full use of alliances, partnerships, and M&A as routine management tools to generate new products and businesses and accelerate structural reforms.

II. 4 Management Constitution Reform Themes

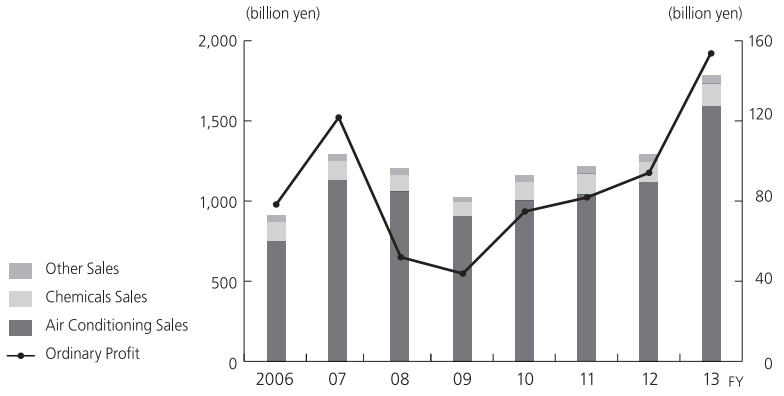
Sophistication of our management platform to succeed in the new era

1. **Innovate product development, production, procurement, and quality capabilities**
   Accelerate development of bases, reinforce the production structure, and strengthen procurement capabilities to accelerate generation of products that best fit the needs of world markets and establish globally superior cost performance.
2. **Strengthen global marketing function**
   Make collective Group efforts to reinforce marketing research capabilities of identify signs of and changes to social and industrial structures ahead of competitors in order to accelerate formation and implementation of original Daikin strategy
3. **Comprehensively develop capacity to utilize IT**
   Innovate IT systems through integrated management of information, process standards and management globalization
4. **Fundamentally reinforce profitability**
   Achive the world's top-class earning power as well as nimble but robust financial standing that insures flexible and fast management (less than 75% of the 2013 break-even point ratio)

III. 3 Themes to Enhance HR Capabilities Based on People-Centered Management

1. **Implement and sophisticate People-Centered Management a source of our Group's competitiveness**
2. **Accelerate development of measures to secure and develop quality HR that go beyond past measures**
   (1) Reinforce hiring capabilities through Group-wide effort
   (2) Establish career paths and compensation systems at active to local employees
   (3) Accelerate development of HR to lead future business
3. **Speed up management localization and promote two-way communication between the head office and local basses**

Business Performance of Daikin



of increasing those figures by 2015 to 2,050 billion yen in sales and 190 billion yen in profits. The company outlined eleven main core themes for achieving those goals: 1. entry into newly emerging nations and volume zones, speeding up merger and acquisition activities, and two other new growth strategies; 2. four themes related to revamping Daikin's business structure, including renewal of product development capabilities; and 3. three themes related to more sophisticated "people-centered" management, and localization of management. Strengthening personnel was an especially urgent task in the context of the company's rapid growth and increasing globalization. Chairman Inoue often spoke about his belief in "the unlimited potential of Daikin's personnel and the ongoing effort to improve employees qualitatively by assigning them to positions that best fit their capabilities." He also pointed out that internal communication tends to weaken as an organization expands, and emphasized how Daikin had long nurtured as its corporate stance the idea that face-to-face communication becomes increasingly important when changes occur rapidly, and that "flat" information should be commonly shared with emphasis on the worksite. Another of his favorite theories was that

Masanori Togawa (right) assumed Presidency, COO Togawa and CEO Inoue

"if managers at the working level do not notice or cannot imagine the first signs of change occurring at the workplace, they will not be able to apply to the company's operations the type of management that is filled with mobility and is capable of producing environmental change." He emphasized the importance of having a perspective that allows one to view matters from the most appropriate overall position, to learn how to conduct true communication, and to strengthen one's awareness of matters affecting those at the leading edge of business. At the point where Daikin was conducting over 60 percent of its business overseas, its Japanese employees accounted for only 25 percent of the company's total staff. The employees in most Japanese companies are Japanese, and they relate easily to each other, breathing almost in unison. If Daikin tried to operate its overseas businesses the same way as ordinary companies in Japan, however, the result could be a serious lack of internal communication and even managerial failure. Chairman Inoue felt that complexity strongly.

In July 2011, Yukiyoshi Okano resigned his president and COO positions and became a Senior Executive Advisor. Masanori Togawa replaced him in both positions. Togawa strongly supported President Inoue for many years as General Manager of the Executive Secretarial Department and Senior Executive Officer-in-

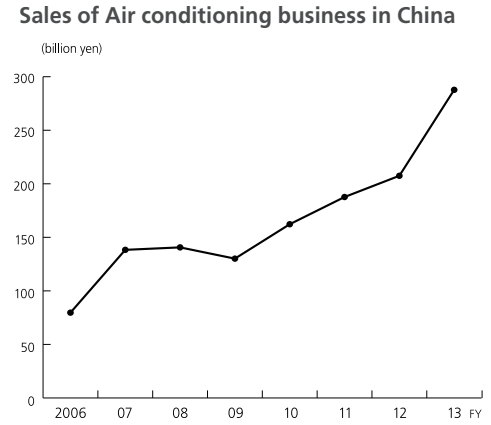
Charge of Human Resources and General Affairs. Earlier, as Senior Executive Officer-in-Charge of general affairs he participated in drawing up Daikin's Fusion 15 Strategic Management Plan, and represented the company at press conferences. Under Chairman Inoue, Togawa also carried out Daikin's managerial policies. The motive force behind the company's overall business recovery was the improved chemical business that in fiscal year 2010 recovered to the fiscal year 2007 level, the year before the Lehman Crisis The drop in the air conditioning business was not serious but even after recovery it reached only around 90 percent of its previous level. The key products and technical developments in that recovery were related to air conditioning technology. As part of its "Fusion 15" plan Daikin succeeded in selling the R32 refrigerant globally and introducing the innovative "Urusara 7" air conditioner. Also, in order to continue maintaining its Global No.1 position in air conditioning, Daikin promoted the development of new technology based on a global strategy. It developed new compressors, for example, so that it could sell them worldwide as standalone units. That will be discussed later in this history in the section related to the air conditioning business.

New Developments in the Chinese Market

Daikin's buy-out of OYL was its first on such a large scale. To have the buy-out proceed as smoothly as possible, therefore, Daikin established a Synergy Committee that studied a plan to allow the company to pay back its OYL-related investments within a period of eight and a half years. One of OYL's subsidiaries, McQuay China, became an important base for Daikin to enter the applied business in China. McQuay China had three plants, located in Wuhan, Shenzhen, and Suzhou. The Shenzhen Plant produced applied systems and was the main plant operated as the joint venture be-

McQuay China,
Wuhan Factory (top)
Suzhou Factory (left)

tween McQuay China and China Aerospace Science and Technology Corporation (CASC) since 1994. Daikin viewed the applied market in China as particularly important for future growth. After Daikin bought out McQuay in 2006, and moved to bolster the new venture, the company sent Chief Operating Officer Masayuki Moriyama to manage McQuay China. One of Moriyama's first actions was to raise development expenses to 3 percent of total sales, triple that of OYL, in order to promote the development of new equipment. He also promoted quality control. The company previously added the cost of product quality warranties to the price for factory shipping. With that method, however, the assignment of responsibility for product quality was unclear. Moriyama resolved that problem by clarifying that responsibility through a system in which sales personnel charged the factory the costs for



repairing poor-quality production items. The plants were also asked to do their utmost in analyzing in-house quality-control issues. To bolster sales the company established a Key Accounts Sales Department for responding to the need for acquiring sales contracts with companies expanding their business all over China, including real estate business, large manufacturers, and chain stores. In general, those companies handled procurements through their head offices. The Key Accounts Sales Department teamed with the company's local branches, thus bolstering the company's overall sales activities in China.

In these ways, Daikin successfully expanded its business in China, with emphasis on the applied systems market. For the 2008 Beijing Olympics, Daikin installed equipment in eight different locations, including the Athletes' Village and the main stadium, affectionately called "the Bird's Nest," thus building a firm reputation in the Chinese market. In the applied market in China, in particular, a business area completely untouched prior to Daikin's acquisition of OYL, Daikin moved into third position in the market, behind only York and Carrier. Viewed in terms of the overall Chinese air conditioning market, including commercial installa-

tions and residential-use equipment, Daikin was in third position, after Gree and Midea. Until it acquired OYL, Daikin mainly targeted markets in China's coastal cities and emphasized the sale of high-end industrial-use air conditioning equipment. After the acquisition of OYL, however, the company added applied products to that sales line, as the second main pillar of its business.

In China, cities in the inland and western areas were growing remarkably. Up to that point, Daikin's main market was in coastal cities and among offices and high-class housings. But now the company had to build a sales network quickly in the developing cities in inland and western China. McQuay China responded to China's building construction boom in provincial cities by introducing new models of applied systems quickly expanding its sales volume. As a result, its business expanded rapidly, and became number three in the Chinese applied market behind York and Carrier in 2011. It expanded further after that, and in 2013 passed Carrier to become number two in the Chinese applied market.

Gree had many outlets in southern China. Daikin entered into a joint venture (JV) with Gree in 2008 centered on the development of technology and consolidated purchasing. They agreed on five basic business points: 1. Daikin would ask Gree to produce some of the small-size inverter air conditioners Daikin was selling in the Japanese market; 2. Daikin and Gree would jointly develop inverter-type home-use air conditioners for global markets; 3. Daikin and Gree would jointly produce key components; 4. Daikin and Gree would jointly purchase raw materials and components; and 5. Daikin and Gree would jointly produce metal dies. One of the main aims of these business ties was for Daikin to acquire know-how related to Gree's low-cost production capabilities. The emergence of a middle class in the Chinese market resulted in a major increase in the demand for low-price air conditioners. Gree and Midea were China's two top companies in the popular-priced room air conditioners market at the time, and both companies were successful in securing sales in that market. In that context, if Daikin hoped to expand its business in the overall Chinese market, it was important for it, first of all, to succeed in that volume market. Daikin's joint venture with Gree introduced several innovations to reduce costs, such as replacing the expensive magnets formerly used in compressors with inexpensive ferrite magnets, and reducing overall expenses such as by localizing the electronic parts and raw materials the joint venture used. It also made effective use of standard locally made devices and components, and produced piping, plastic molded products, and other items at its own manufacturing facility, thus realizing lower costs for a wide range of production processes.

Another important goal of the joint venture was to have Gree's products switch to inverter models. With economic growth, mainland China began rapidly consuming much more electricity, and in 2011 it became the world's leading consumer of electricity. Most of the nation's electric power generation facilities, however, depended on coal as their fuel, and China's air pollution turned critical. The Chinese government also viewed the increased environmental pollution seriously and related to air conditioners it revised the nation's Energy Conservation Law in 2010, making it illegal to sell products with low electrical efficiency. In 1998, Daikin introduced an inverter-type room air conditioner to the Chinese market which reduced electricity consumption by about 60 percent. Daikin assumed the lead among manufacturers of air conditioners in China. In order to reduce electric power consumption further in the Chinese air conditioner market, however, it was necessary to spread sales of popular-type inverter air conditioners. The coverage of inverter air conditioners in Japan had already

reached almost 100 percent in the market, and their energy efficiency was improved almost three-fold compared to equipment sold 20 years earlier. Viewed globally, however, the mainstream products were still non-inverter type air conditioners, and inverter types accounted for only about 7 percent of the Chinese market. In Europe where there was a strong interest in energy conservation, inverter air conditioners still accounted for only 20 percent of the market. In the U.S., where duct-type air conditioners were still mainstream, inverters were hardly used at all. Gree held the largest share of the Chinese market. If Gree decided to introduce inverter-type air conditioners in China, therefore, that decision would have a major impact on the industry. From Daikin's viewpoint, the industry could even be expected to turn entirely toward introducing inverter-type equipment. Daikin had a clear purpose: to accomplish an all-out entry into the Chinese room air conditioning market, introducing inverter-type equipment with Gree, through the disclosure of inverter technology, one of Daikin's core technologies. Daikin aimed to build a global market and introduce inverter-type air conditioners as standard equipment into Europe and the U.S. market.

The idea of opening its inverter technology in such ways met with strong resistance from Daikin's engineers in Japan. They viewed inverter technology as a type of black-box technology and some of them were naturally concerned about the danger of having the company's intellectual property rights stolen. The merits to Daikin of having its inverter technology become a global standard were substantial, however, and Daikin would learn much from Gree about low-cost production technology. Daikin also understood how it would also benefit by satisfying needs in a newly emerging market. In the end, Daikin decided to offer its technology to Gree but set certain restrictions. Its control technology, for

Joint Ventures with Gree GDD (left) and Gree GDM (right)

example, remained proprietary.

The new models jointly developed with Gree were modeled after Daikin products and Gree cooperated considerably on the general design and the local procurement of components and materials. With the required dies and key components, Daikin established two joint ventures in February 2009: Zhuhai Gree Daikin Precision Mold Co. (GDM), and Zhuhai Gree Daikin Device Co. (GDD). GDD produced swing-type compressors and electrical equipment, and supplied inexpensive components to Gree, Daikin Air-conditioning (Shanghai) Co., Daikin Air-conditioning (Suzhou) Co., and Daikin Industries (Thailand).

Daikin (CHINA) Investment Co. more than doubled the number of its Chinese dealers in fiscal 2010. Although it did that mainly to meet demand in the central and western parts of the country, the action also let the company meet the demand in areas around large cities. As the Chinese government pushed forward with regulations to conserve energy, and it prohibited the sale of low-efficiency non-inverter type air conditioners from May 2010, the demand for inverters strengthened considerably. Daikin Investment strengthened its organization in China into fiscal 2012 until nationwide it eventually had 3,842 dealers, 1,313 "PROSHOPs," 570 "AIRSHOPs," and 5,576 "RA shops," thus totaling a sales organi-

"PROSHOP"

"AIRSHOP"

zation of over 11,000 outlets. Besides existing professional dealers, who sold and maintained mainly commercial-use air conditioners, "PROSHOPs" also sold and installed home-use "VRV" air conditioners mainly to well-to-do individual customers. "AIRSHOPs," small retailers located in the outskirts of cities that sold room air conditioners to ordinary households. "RA shops" were retailers smaller than "AIRSHOPs," and they sold only room air conditioners. Daikin developed these new sales channels as the company's first challenge in the Chinese market.

Concerning the production system for popular-type air conditioners in the so-called volume zone, in February 2011 Daikin decided to build a new plant. It established Daikin Air-conditioning (Suzhou) Co., Ltd. in December of the same year, and built a new plant for it on land adjacent to GDM and GDD in the Suzhou Industrial Park. By the time the new plant moved into full operation, it grew to three million air conditioners in annual production scale, making it Daikin's largest air conditioner production plant in the world. From April 2012, Daikin moved the production of air conditioners from its Shanghai Plant to Daikin Air-conditioning (Suzhou). The company then switched the Shanghai Plant to producing "VRV" air conditioners. Afterward, "VRV" production there proceeded smoothly.

New Factory for RA in Suzhou

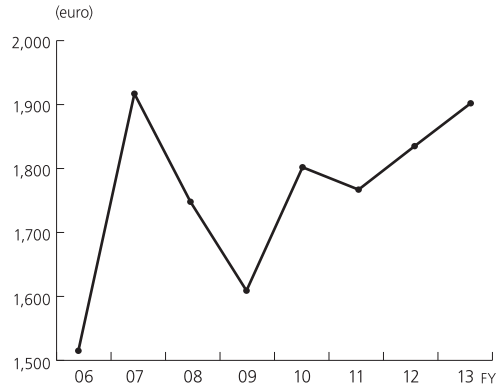
RA production at the Suzhou Plant reached one million units in fiscal 2013.

Bolstering Business Operations in Europe, the Mideast, and Africa

In Europe, even after passing Carrier Corporation and achieving No.1 market position, Daikin continued to expand its business rapidly. Daikin established a sales company in Greece in 2006 and in the Netherlands in 2007, thus increasing the number of its sales companies to twelve. That powerful network accounted for almost 90 percent of Daikin's total sales. Besides expanding its business through those sales companies, Daikin also succeeded in expanding its sales of highly profitable products such as multi-type air conditioners for buildings and homes. For 2007, Daikin Europe (DENV) achieved sales of 1,917 million euros and a high operating profit ratio of 20.5 percent, its best business results up to that point.

The Lehman Crisis in 2008 caused a serious debt crisis in Europe, leading quickly to a cooling down of consumption and investment. Up to 2009, Daikin's sales dropped almost by 20 percent. Afterward, in response to lower market prices, Daikin introduced low price products from OYLM, such as RA, "SkyAir", and PA. It also introduced products to the applied market, including large screw chillers and air handling units made at the Cecchina Plant

Sales of DENV



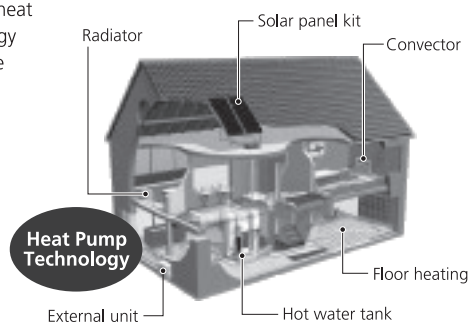
of McQuay (Italy; MQI), thus responding to market changes by maximizing synergies between the companies in the Daikin Group. Daikin moved into the heating systems business and developed markets in newly emerging countries. As a result of such efforts, sales turned upward, and in 2013 recovered to 1,902 million euros. The operating profit ratio, however, dropped from 20.5 percent realized in 2007 to 11.6 percent in 2012. Those figures recovered slightly afterward in 2013 to 13.1 percent. The structure of the European market changed at this time. The sales of highly profitable items languished, while the markets of newly emerged nations expanded.

As Daikin's overall business developed favorably, it decided on all-out entry into the heating systems market. Although summers occasionally got quite hot in European countries, the general need for heating systems is always strong. In 2006, Daikin developed and marketed "Daikin Altherma", an air source heat pump system. The EU generally demonstrates great interest in environmental matters, and in 2005 it adopted regulations that aimed to reduce the environmental load during the overall life cycle of products that utilized energy. The all-out application of those regulations began in 2009. France was especially enthusiastic. At the time, nuclear energy accounted for 70 percent of the electric power France required, and there were calls to level that demand. One result was that from 2007 the French government provided a 50 percent incentive to consumers using heat pumps. Next, in 2010, the EU adopted the environmental targets included in the "Europe 2020 Report," the European Mid-term Growth Strategy. One of the main targets in that report was by 2020 to reduce the volume of greenhouse gas emissions by 20 percent compared to the 1990 level. Another target was to raise renewable energies to 20 percent of the total energy supply. In addition, energy consumption would be reduced by 20 percent compared to predictions through improved energy efficiency. In the middle of these various efforts to reduce the environmental load, DENV's Product Planning Department developed "Daikin Altherma", the air source heat pump mentioned above. That heat pump system's outstanding functions allowed it to offer highly energy-efficient floor heating, low temperature radiators, and hot water supply apparatus. It was viewed as a new room heating method to replace the former combustion heating method, and was highly evaluated for

"Daikin Altherma"

For heating and hot water heating

A system that utilizes the heat from heat pump technology to heat floors and produce hot water



its contribution toward sustainability. Next, in 2010, Daikin won the European Eco Label, the first time for a product in the home heating industry to win the award. In 2011 the company's heat pump was recognized for its ability to create renewable energy. Both those awards contributed toward increased sales of the product. Besides the low-temperature "Daikin Altherma", Daikin bolstered its line-up during this period by also introducing a high-temperature product and a unified-product, gaining a firm foothold in the heating systems market. Back in 2007, Daikin Europe N.V. bought out the German company ROTEX Heating Systems GmbH, bolstering its lineup of heating systems. ROTEX's main businesses included the manufacture and sale of high efficiency combustion boilers, oil and hot water storage tanks, and other products. Daikin and ROTEX both benefitted from the synergetic effect of using each other's sales networks, and Daikin learned much about the European heating business.

The so-called European debt crisis erupted in October 2009 after the Greek financial crisis. That crisis spread throughout Europe and did not end merely sluggish demand caused by prolonged recession of the European economy but greatly changed Europe's demand structure. Around the same time period, Spain experienced the burst of its real estate bubble, employment unease spread throughout Italy, and sales of room air conditioners in the countries of southern Europe—the countries with the largest European air conditioning markets— dropped sharply, as they also did in France. In order to restructure its business, Daikin resolved not to withdraw from the European market and instead began improving its existing structure. Its focus included a strengthening of its business, with DENV playing the principal role, increasing its market share in the low-price products range, bolstering its product development capabilities in Europe, maximizing its

Hendek Factory of Daikin Turkey A.S.

Pan-European business efficiency, and pursuing lower costs. In order to support the business, Daikin opened offices in Moscow, the Mideast (Dubai), and Turkey (Istanbul) between 2005 and 2007. Next, it established Daikin McQuay Mideast in Dubai in 2008, and in 2011 established Daikin Turkey A.Ş. (DTAS) in Turkey, thus accelerating its entry into markets in the emerging nations. The percentage of the overall European market accounted for by the emerging nations which was 7 percent in 2007, doubled to 14 percent in 2010. The company's European sales continued to increase, and the sales in the emerging markets also increased to become 25 percent of total European sales in 2013.

Since the outlook for increased demand in the air conditioning business was not bright within the general European market, Daikin moved to expand its business in the markets of the emerging countries bordering Europe. As those countries gradually came to account for a larger market share, sales in the low-price zone contributed to a larger percentage of total sales. Combined with lower sales prices caused by the poor business situation, the operating profit ratio of Daikin's business in the EMEA (Europe, Mid-East, and Africa) countries also decreased. In that situation, Daikin moved to bolster the cost competitiveness of its products in the low-price range. Because benefits could be realized by work-

ing through DTAS, the company's Hendek Factory, positioning it as a production site for products in the low price range. OYLM supplied the Hendek Factory with parts, and from 2012 the plant began producing RA. In the future, the production of low-priced items at OYLM's Malaysia Plant and products imported from Gree in China will be shifted to DTAS. Also, Daikin will expand its overall range of products while continuing to develop inexpensive products, allowing the company to expand its share in newly emerging markets where Chinese and Korean manufacturers now account for larger market shares.

To strengthen its product development capabilities, Daikin placed Daikin Device Czecho as a consolidated company under DENV. Its main duties were speeding up the development and evaluation of compressors, and it strengthened its competitiveness among low-priced products. In July 2011, Daikin established the European Development Center (EDC), speeding up the formulation of unique European strategies and bolstering its development functions. Formerly, Daikin developed new products in Japan, and modified them for sale in Europe. That method, however, did not allow Daikin to respond quickly to the market's diversity and unique needs. Nor could the company respond to the needs in the rapidly expanding volume zones of sales in southern and central Europe, Turkey, the Middle East, and Africa. In that context, Daikin placed the design and marketing divisions of DENV, DICZ, ROTEX, and DTAS under EDC, and DTAS remained the development base for regular RA equipment. Daikin also made ROTEX entirely responsible for boiler products in the EMEA region, and established a system of joint development with DTAS.

Daikin moved in various ways to maximize the managerial efficiency for its overall business in Europe. One step it took was to promote transfer of the production of indoor units of room air

conditioners for local use, previously conducted at the Ostend Plant, to DICZ. Labor costs at the Ostend Plant were high, labor conditions were strict, and total production volume was expanding rapidly after "Daikin Altherma" went on the market in 2006, making it an inappropriate facility for producing products that fluctuated with the seasons, such as RA. Also, the major earthquake that struck eastern Japan in 2011 caused a shortage of parts supply from Japan, and DENV moved at that time to achieve the overall optimization of its production system in Europe, aiming to bolster its production system there. It also moved to bolster the product development functions of the Ostend Plant and retained the production of commercial-use products such as "VRV", "Sky-Air", and small-size chillers. DENV shifted the production of other products mostly to DICZ and elsewhere. DICZ was originally an RA production base for the European market, but DENV gradually shifted to DICZ the production of products for the European market from the Ostend Plant and from Japan. Simultaneously, DICZ bolstered the functions for developing RA and "SkyAir" products, as well as popular RA for the Turkish market. Later, DENV shifted its production of popular-type equipment to the Hendek Plant of DTAS. In order to fulfill its responsibility of providing products to the markets of Europe, DICZ built new production lines, and made especially strong efforts to reduce costs. The company introduced robots, on the one hand, and also pushed forward with the rationalizing of production through the use of handy and inexpensive devices. The RA production of OYLM models began at the Hendek Plant, and GSI was introduced later. At the time, the Ceccina Plant of McQuay Italy (MQI) was fighting for No. 1 position in the applied business in Europe and relocated the production of large-size chillers there from DENV's Ostend Plant. MQI also tackled the preparation of design standards for an

air handling unit, and the Hendek Plant began producing the same product as the Ceccina Plant. While clarifying a system of divided production duties, DENV and DIL also put into order their increasingly complicated capital ties with subsidiaries in Europe. DDC's compressor plant, which was under DIL's jurisdiction, was moved under DENV for consolidated reporting. Also, DICZ was made a 100% subsidiary of DENV. Up untill then, DIL and DENV had shared DICZ's capital evenly. In such ways, the company gradually shifted toward concentrating and bolstering its supervising functions over the businesses in Europe, the Middle East, and Africa.

Next, in order to optimize its overall European business, a strong need emerged for DENV to unify the internal operations of Daikin group companies, such as accounting, public affairs, IT, and so forth. Although it was inevitable that each company in the Daikin group would not always select the most appropriate method of operation, they agreed to reduce costs by cutting fixed expenses and worked hard to bolster the organizational structure in the middle to long term, promoting the overall growth of the Daikin Group in Europe. When considering IT, for example, the DENV Head Office and all their sales affiliates cooperated closely. Accounting operations were entrusted outside as a package. Inventory and procurement management of all sales companies were integrated into DENV, and each sales company focused on shipping products to its customers. These systems enabled personnel and cost reductions throughout Daikin's businesses in Europe.

Daikin's business foundation in Turkey was bolstered by acquiring all the shares of Airfel Co., a major Turkish heating and air conditioning manufacturer with headquarters in Istanbul. It produced and sold gas boilers, heating-related equipment, and indoor

units of applied systems. RA imported products from Gree and sold them under the "Airfel" brand. As a dealer, it also imported and sold completely built-up "VRV" and chillers from Mitsubishi Heavy Industries and McQuay. Daikin began selling air conditioners in Turkey in 1975, through a dealer. After that dealer bankrupted, Daikin then established a DENV Turkey Office in May 2007 in Istanbul, and began sales and marketing efforts there. That was the first all-out sales office opened by a Japanese air conditioning manufacturer in Turkey. That office then appointed a new dealer, through which it began selling a wide variety of air conditioners, including RA for use in homes, "VRVs", and applied systems. Daikin also introduced heat-pump heating systems, to actively develop that market. Mitsubishi Heavy Industries held the top market share in Turkey's "VRV" market, through Airfel Co. as its dealer. Airfel already owned in-house production, sales, and product development capabilities, and held the top domestic market share. Turkey was in the middle of continuingly rapid economic growth at the time, and one quick way for Daikin to bolster its business foundation there and participate all-out in the Turkish market was to acquire Airfel. Doing so would also give Daikin a foothold in the Caucasus region and in Europe, the Middle East, and Africa (EMEA countries), emerging markets with great future potential. The principal Airfel shareholder was Sanko Holding, one of the leading corporate groups in Turkey, which initially hesitated to sell its Airfel shares to Daikin. But President Onder of Airfel was confident that by becoming a member of the Daikin Group Airfel would be certain to develop rapidly as an integrated general air conditioner manufacturer. He convinced the Sanko Holding that was in everyone's best interest to move forward with Daikin. After completing the purchase, Daikin renamed the company Daikin Turkey A.S. (DTAS), and moved quickly to bolster its

manufacturing and product development functions. DTAS began production at its own plant and sold its output under its own brand, both first-time experiences for the Daikin organization. At the same time, the company continued to use the "Airfel" brand on heating systems and OEM equipment procured from suppliers outside the Daikin Group. DTAS also continued to produce equipment such as air handling units and fan coil units, but it introduced newly improved specifications and unified them under the Daikin brand. In 2013, DTAS accounted for 35 percent of the Turkish "VRV" market and 15 percent of its RA market. Even for applied systems, including heating systems, DTAS had a 15 percent market share. The company thus succeeded relatively quickly in strengthening its foundation as a comprehensive air conditioner manufacturer.

Kazakhstan and other countries in Central Asia continued to show high-level economic growth based on the export of natural resources such as oil and natural gas. DTAS obtained trading rights from DENV in the Central Asian countries, and tackled reconstruction of a sales network. One result was the steady expansion of DTAS's export business. Sales in Turkey and its surrounding countries increased 3.5-fold compared to the pre-buy-out period, and sales value increased to 696 million Turkish liras.

Bolstering of ASEAN Business

Daikin set three principal business goals for its companies in the ASEAN-Oceania region: first was bolstering its No. 1 position in Australia and Singapore; second was early achievement of No. 1 position in the Thailand and Indonesia markets; and third was rapid expansion of its business in Malaysia and Vietnam. Concerning its first business goal, in 2005 Daikin bolstered its No. 1 market position with a share of 25~30 percent. For its second business goal, its market share reached 9~10 percent in the ASEAN region in 2005, and for its third goal its market share in Malaysia reached just 1 percent, also in 2005. In Vietnam that year, its market share was only 6 percent. In the general ASEAN region, Matsushita Electric (changed name to Panasonic in 2008) and Mitsubishi Electric competed fiercely in the low-price RA market, while Carrier, York, and Trane competed in the market for large, business-use air conditioners. In that situation, Daikin bolstered its sales network, developed and marketed equipment exclusively for cooling, and centered around DIT it moved vigorously to bolster activities aimed at upgrading its brand power, improved its service and distribution resources, and improved its Supply Chain Management. The following introduces some of the business activities Daikin conducted in the main countries in the region.

■ **Thailand:** DIT in Thailand, starting in 1990, was Daikin's only production base in the ASEAN region. Daikin positioned DIT as a global production center, and exported products such as RAs and "VRVs" to Europe, Japan, the ASEAN nations, and other regions. Once Daikin began all-out production operations at DICZ's Pilzen Factory in the Czech Republic, DIT had to establish itself as a production and sales base in Asia. Because the ASEAN region was still viewed as a market for cooling equipment rather than for air conditioning equipment, DIT established the DIT Development Center in 2005. It developed cooling equipment there, and developed the ASEAN market for the equipment.

During the final three years of the "Fusion 10" strategic management plan, it became obvious that DIT would be unable to supply RA indoor and outdoor units, "SkyAir" outdoor units, and the compressors needed for those units. In that situation, DIT shifted 40 percent of the total production of RAs—the volume being

shipped to Europe—to DICZ. DIT successfully expanded its sales in the ASEAN region, and in 2008 it moved to increase the production capacity of its existing factories, started the construction of a third factory, and began moving to upgrade its production capacity for compressors. Just after those moves, however, the Lehman Crisis occurred, delaying the company's construction plans almost two years. DIT began operating its No. 3 Factory in 2010, and produced RA and "VRVs". It exported 15 percent of its total output to Japan and 80-85 percent to countries in Asia and the ASEAN region, in the process becoming a key ASEAN production and sales point. The company's cumulative production from 1990 surpassed the 10-million-units mark in 2008, and from 2010 it introduced a full-production two-shift system. That same year the company's production and sales of RA surpassed one million units.

Concerning the sales system in the Asia-ASEAN region, Daikin had already established 100 percent owned sales companies in Australia, Malaysia, Singapore, and Thailand, and DIT was supplying them with products. Daikin also began establishing sales companies in other countries and areas in the region during this period, successfully bolstering its sales network. That included setting up wholly owned subsidiaries in countries such as the Philippines in 2009 and Indonesia in 2012. In 2014, it turned Viet-Kim Company, its agent in Ho Chi Minh City, into a wholly owned subsidiary to support its sales capabilities further. In Singapore, in particular, economic growth and per capita income were both at high levels. Inverters were the mainstay products in Singapore's air conditioning market, and Daikin was the leading air conditioning manufacturer there. Thailand was mainly a non-inverter market, but because of government energy efficiency restrictions according to the U.N. Climate Change Conference

Viet-Kim Company

(COP 20) most of the local producers were screened out and Daikin gradually demonstrated its strengths.

■ **Malaysia:** Daikin's acquisition of O.Y.L. Industries (OYL) gave it a production base in Malaysia, providing the company a firm support for all-out participation in the ASEAN volume-zone market. Prior to its acquisition by Daikin, OYL had its own factory in Sharam, and in 1978 it began producing York brand air conditioners there in a joint venture. From 1983 it also began an Electronics Manufacturing Service (EMS) for Mitsubishi Electric and from 1984 began producing RA under the "Acson" brand, a unique OYL brand. Once into the 1990s, OYL bought out McQuay with its subsidiary AAF and J&E Hall. In 2006, the year that Daikin acquired OYL, it built a new plant in Sungai Buloh, where it had an R&D Center and a warehouse. It moved air conditioning production there from the old plant, and the new plant began a new start in business as OYL Manufacturing (OYLM).

Daikin's first mission after its acquisition of OYL was the start of production operations at OYLM's new plant. Related to the plant's relocation, however, a shortage of parts occurred and sales for the first year fell below those for the previous year, and OYLM thus stumbled at the start of its operations. Although products at

OYL Manufacturing

OYLM were produced and sold for lower prices and costs than Daikin's GMS was able to achieve, Daikin viewed the inferior product quality as a major issue, and took over a year to improve the poor quality. Also, as the company moved toward achieving its "Fusion 15" goals a problem it ran into was expansion of its exports to emerging markets. OYLM had to reduce production costs by all possible means, aiming mostly at Chinese companies such as Gree that were producing products for much lower costs than OYLM. Since lower costs were impossible if OYLM followed Daikin's in-house product quality standards, OYLM established its own in-house standards and moved to reduce costs while meeting those standards.

OYLM also established a Group Liaison Committee for Creating Synergies. With the year 2010 as a target date, the company also began moving energetically to realize synergy-related savings of 20 billion yen. Those efforts steadily developed. For fiscal 2007, the profits of Daikin's overall air conditioning business were up by 5 percent compared to the previous fiscal year. OYLM's profits for the same period were up by 44 percent, a very high rate of increase. In that same period, however, clear frictions emerged in the thinking between Japanese engineers transferred from Japan and local technical personnel. One result was that a large percentage of local employees, including managerial and technical personnel, ended up leaving OYLM. Benefitting from that experience, Daikin made the most of the outstanding features of OYLM and promoted many improvements to increase the motivation of the company's employees, such as improvements in the production processes based on the Production of Daikin System (PDS), introduction of a new model GSI, and the development of inverter models. Once clear results from those activities began to appear steadily, OYLM's engineers also evaluated the results positively. One result was that the positive aspects of the Daikin production system came to be appreciated and took firm root. Local personnel highly evaluated the improvements that the introduction of safety education made to operations.

In 2008, the year that air conditioning production finally began operating smoothly, sales turned sluggish from September, influenced negatively by the Lehman Crisis Once into 2009, overseas markets dropped rapidly by 40 percent compared to 2008. One result was that sales came to be centered on the domestic Malaysian market. In that market, Daikin Air Conditioning (Malaysia) marketed DIT products, Group Associated Co. (C&L) marketed OYLM products, centered on the York brand, and Acson Malaysia marketed "Acson" brand products. Daikin's overall share of the domestic Malaysian market was about 40 percent. It would not be an easy task to increase domestic Malaysian sales above that level and cover for the drop in overseas sales. Additionally, together with the conclusion of Mitsubishi Electric's EMS contract, total sales for 2009 fell to about 80 percent of 2008 sales. From 2010, OYLM made greater efforts toward increased sales in Europe and the Middle East. One result was that in 2011 overall sales were 1,042 million ringgit, a figure that tied for the previous best-ever annual sales results. Exports accounted for 50 percent of the total,

an indication of the favorable overseas sales performance.

Also in 2011, Daikin acquired Airfel, OYLM's previous sales agent in Turkey. OYLM was in charge of transferring its production know-how and the production of certain products, resulting in strong managerial motivations for OYLM. Later, Daikin moved to unify its products under a single brand starting in Europe, Turkey, and other overseas markets, and from 2014 it promoted unification of the Daikin brand in the Malaysian domestic market.

■ **India:** A main feature of the air conditioning market in India is that 90 percent of the marketed equipment is exclusively for cooling. Market forecasts for the near future predict a sharp increase in demand, with expectations for noteworthy growth in the volume-zone market. Manufacturers are thus expected to market new low-price products, suggesting that a shift toward local production might be beneficial. In 2000, Daikin and the USHA Shriram Group established a joint venture that began producing and selling RA products. Four years later, however, that company fell into deficit operations. Daikin then bought out the joint venture that same year and established the wholly owned sales company Daikin Airconditioning India Pvt. Ltd. (DAIPL). Daikin adjusted that company's capital and wrote off the accumulated losses in 2005.

Commercial-use air conditioners comprised the main market in India at the time. But as India's economy grew, the demand for commercial-use air conditioning equipment also increased, and the government strengthened power-saving regulations. Growth was especially notable in the market for RA, "VRV", and "SkyAir" equipment for installation in high-rise office buildings and apartment complexes. Initially, Daikin supplied the market with products through DIT, and then gradually expanded its business network through sales of "VRV" and "SkyAir" products, as well as McQuay chillers.

Neemrana Factory

In early 2009, Daikin completed construction of its new Neemrana Factory in India, and from October began local production of "VRV" products there. From April 2010, the company also began producing chillers locally. It then aimed at all-out entry into the volume zone of business and in July 2012 began production of room air conditioners. In 2011, DIT and OYLM commissioned the Neemrana Factory to develop a specialized non-inverter-type air conditioner exclusively for cooling. Development activities began there in 2012, and the factory steadily bolstered its capabilities afterward.

DAIPL sales in India for fiscal year 2009 were 3 billion rupees. In fiscal year 2010, however, the company introduced Daikin's Business Expansion Project in India and developed a 5-Year Sales Expansion Plan. That plan eventually resulted in sales in fiscal year 2012 valued at 15.8 billion rupees. For the three-year period from fiscal year 2009 to fiscal year 2012, sales expanded approximately 5-fold. In fiscal year 2013, Daikin assumed number two market position in sales in India, behind only Voltas, a local company. Daikin successfully entered the volume-zone air conditioning market despite India's floundering GDP beginning in 2011.

■ **Indonesia:** Indonesia is another rapidly expanding market for air conditioning equipment. In particular, its population of 231 million people places it second in market size after only India among the ASEAN nations. From 1976, Daikin assigned PT. Imora Makmur (Imora) to be its sole distributor in Indonesia. Initially, Imora concentrated on selling "VRV" and "SkyAir" equipment. As Indonesia's economy grew, however, RA equipment became widely used and the RA market expanded remarkably in scale. Years later, in order to participate more aggressively in the volume zone of the market, Daikin terminated its sole agency contract with Imora. Then, in December 2011, Daikin established PT. Daikin Airconditioning (Indonesia), capitalized at US$20 million, under joint management with Imora. Daikin introduced products aimed at the Indonesian market's volume zone, starting with air conditioners exclusively for cooling that DIT developed. While utilizing Imora's sales network, Daikin Indonesia also imported knowhow from DIL for developing sales outlets, thereby aiming to win the leading share of the Indonesian market.

In December 2012, moreover, Daikin acquired PT. Tata Solusi Pratama (TSP), McQuay's agent in Indonesia and made it a 100 percent subsidiary, changing the company's name to PT. Daikin Applied Solutions Indonesia. In this way, Daikin bolstered its "VRV", applied business, and engineering business in Indonesia.

■ **Australia:** Daikin Australia (DAS) gradually expanded its local market smoothly from 2000. From 2005, however, sales slowed noticeably, causing Daikin to send a vice president to DAS. From 2006, the company energetically reviewed its Australian sales network. For room air conditioners, DAS bolstered its support for medium-size dealers, and in order to expand its "VRV" sales it moved vigorously to reorganize the efficient dealers handling competitor products and superior contractors. It selected sales strategies based on product type and the special features of particular areas. In 2006 DAS also bolstered its plant and production facilities in order to reduce costs and increase the production of best-selling products such as home-use duct equipment. The production of products for local consumption joined together duct-type indoor units and inverter outdoor units made by Daikin. This equipment strongly supported DAS sales as the main products being sold in Australia. Government regulations in Australia for power savings strongly encouraged DAS to develop more power-saving products. The company put into place a low-cost, mass-production system by producing the main parts in-house.

In 2013, Daikin sent another executive from Japan to become the new president of DAS. One of the first tasks he tackled was overall revision of the company's sales system as it headed toward introducing "Fusion 15". To boost product attractiveness, DAS introduced a new duct-type product that bolstered the company's leading market position. Concerning new high-rise office buildings and condominiums, so-called high-end buildings with construction emphasis on their environmental effect, DAS introduced high-performance low-energy consumption "VRV4" equipment, as well as bolstering the company's sales system. Next, in a move toward securing factory profits, the company moved to realize greatly reduced costs by improving productivity and reducing the cost of raw materials. Through those various efforts, DAS realized sales of 40 billion yen in fiscal year 2013, a 120 percent increase versus the previous year. Such efforts drew the company closer to achieving its goals in the "Fusion 15" Plan of 45 billion yen in sales and a 30 percent market share.

■ **Brazil:** For Daikin, the countries in Central and South America

were undeveloped markets. In Brazil, in particular, wage levels were high and the disposable income of the middle class was said to be double that of both China and Indonesia. The use of air conditioning had already spread at a high level, and from 2010 onward, after emerging from the effects of the Lehman Crisis, the demand for air conditioning was expected to enter an all-out period of expansion. In May 2010, Daikin increased the capital of McQuay's local company McQuay Ar Condicionado Brasil (inactive at the time), and in August moved the company's office from Rio de Janeiro to San Paulo, at the same time changing the company's name to Daikin McQuay Ar Condicionado Brasil Ltda. The company also hired new local employees, installed an IT system, and received assistance from DIL to make a new start in business. It actually started its new business from April 2011, at which time it also leased a local production plant, established service locations, and provided education to key members of cooperative service stations. It also established contact centers with service available all day, every day, throughout the year. In this way, Daikin prepared a system for all-out entry into this growth market.

DMB began operations by selling imported equipment. Then, from January 2012, it began producing "VRV" duct-type indoor units in a factory it leased. During that same year it also began successfully selling 2,000 "VRV" units, and acquired the top share of that domestic market. In order to aim at achieving a revised target of 10,000 "VRV" units, DMB had to expand its line-up of RA and "SkyAir" products and to organize an installer's network. Local competitors, however, were producing those same products in the Manaus tax-free area. DMB paid either an 18 percent import duty or a 35 percent industrial product tax, and thus could not compete with the competitors who had factories in the tax-free area. In that situation, in March 2013 DMB decided to build an all-

Manaus Factory

out production base in Manaus and to begin local production there of "VRV", RA, and "SkyAir" products. That factory began operating from June 2014. Initially, DMB considered entering the applied market with McQuay products, but once into 2013 sales in Brazil turned sluggish, and it became necessary to reconstruct the sales system in the countries of Central and South America and to bolster the sales system all the more. The Brazilian government, however, introduced measures to protect the best interests of domestic companies, which made Brazil unfit as a central stronghold in Central and South America. In 2013, Daikin opened a local office in Mexico, and built an air conditioning factory in the state of San Luis Potosi. Sales for Central and South America in 2018 were planned to be 100 billion yen, 10-fold those in 2013.

Buy Out of Goodman, and Third Attempt to Enter U.S. Market

Daikin designed its first plan to enter the U.S. air conditioning business in 1980. Although it established Daikin Airconditioning America (DAA) in 1981, shortly afterward it became involved in a struggle with its sales agents before too long and withdrew from the market. The company liquidated DAA in September 1988 but retained its New York Office, hoping at that time for a future chance to reenter the U.S. market. Before too long, a chance

emerged for Daikin to invest in chemical operations in the U.S. For that purpose it established Daikin America Inc. (DAI), and in 1994 began production operations at a plant in Decatur, Alabama. Its second opportunity to challenge the air conditioning business came in 1998 after it established Daikin Modine Inc., a joint venture with Modine Manufacturing Co. That venture, however, also ended in failure, and Daikin and Modine each bore half of the resultant losses. Including that failure, Daikin's move to purchase OYL was the company's third unsuccessful attempt to enter the U.S. air conditioning market.

In October 2005, the Global Strategy Headquarters of Daikin Industry Inc. (DIL) learned from one of its ASEAN managers that OYL wanted to divest itself of its air conditioning business. Daikin's special interest at the time was McQuay International Inc., a company under OYL. McQuay was the fourth largest company in the global applied business, and in order for Daikin to restructure its business in the U.S., an overwhelmingly applied market, it badly needed McQuay's technology and market share. The negotiations for Daikin to buy out McQuay ended up, as narrated earlier, with Daikin instead buying out OYL's air conditioning business, a move that substantially promoted Daikin's globalization. Besides moving Daikin quickly forward in the U.S. air conditioning business, that move also strengthened expectations for a speeding up of Daikin's global applied business.

Along with the acquisition of McQuay International, in May 2009 Daikin established Daikin McQuay Applied Development Center (today's ADC) in the outskirts of Minneapolis, Minnesota. With the goal of developing global models of large industrial-use air conditioning equipment, Daikin assigned about 70 development members to ADC from Japan, the U.S., and Europe. In order to bolster McQuay's competitiveness in the U.S. and Canada, Daikin also promoted steps to improve ADC's service system. In August 2009, Daikin bought out Geyco Inc., a service company located in Quebec, Canada, and Thermal Technology Inc., a service company located in Minneapolis, Minnesota. In a related move, McQuay International, Inc., a wholly owned subsidiary of Daikin Industries, Ltd., opened the Daikin McQuay Applied Solutions Plaza showroom for large-scale air conditioning equipment on May 18, 2010, in Jersey City, New Jersey.

Daikin Applied Development Center

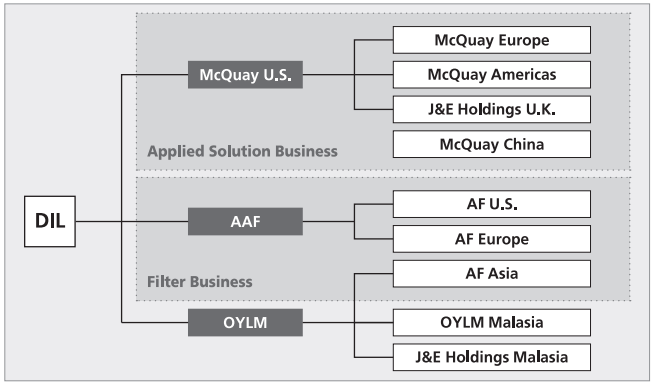
AAF McQuay Inc (AMI) was established during the period after the Lehman Crisis when business in the air conditioning industry in the U.S. was still lifeless. AMI's total sales in 2011 slowed to $795 million (?). Development expenses expanded, however, such as those invested in the Applied Development Center, causing the company's financial situation to worsen. One result was that in February 2012, McQuay U.S. (including ADC) and AAF U.S. were separated from AMI. McQuay U.S. was renamed Daikin Applied Americas Inc. (DAAI) in August 2012. From 2011 new products developed using Daikin technology and marketed under the Daikin McQuay brand sold well. From 2012, the direct sales outlets in New York, Atlanta, and south Florida, used the Daikin McQuay name for their offices. On that business foundation, and using the Daikin brand, the applied solution business in

the U.S. improved quickly. The main aims of using the Daikin brand name were its promise of advanced technology, sustainability, and high product quality. The Daikin name was soon widely recognized throughout the U.S. applied market. All the companies related through business ties to DAAI changed their names to add the word "Daikin" to them. Daikin then aimed at entering the entire Central/South America market in a single leap.

In terms of sales of ductless RA and "VRV" equipment, Daikin bolstered its exclusive sales network, and in November 2005 established Daikin Air-Conditioning America (DACA) as a sales company. DACA increased its sales steadily, from $21 million in 2006, to $45 million in 2007, to $96 million in 2008. Although the effects of the Lehman Crisis slowed the pace of its growth for several years, sales in 2011 expanded to $151 million and expanded again in 2012 to $183 million. After Daikin purchased Goodman, it became possible to expand the sales of ductless-type air conditioners throughout Goodman's North American sales network. Daikin turned over DACA's assets to Goodman in July 2013 and then liquidated the company.

Daikin first began considering the possibility of buying out Goodman Global Group, Inc., in 2005, around the same time it was thinking of buying out OYL. It felt that either company would provide it a foothold for its globalization, and it compared both in terms of how Daikin might benefit from owning each company. Goodman held a large market share in the U.S. at the time, and purchasing it would benefit Daikin as part of a strategy to bolster its market position. As a global strategy, however, Daikin decided it would be more appropriate to acquire OYL. Not long afterward, the investment fund Apollo Global Management LLC bought out Goodman. But then, in October 2007, Apollo sold Goodman to Hellman & Friedman LLC (H&F). Even after the Lehman Crisis,

Reorganization of OYL (April 2011)



Goodman continued to expand its share of the North American market for residential air conditioners, based largely on its overwhelming price competitiveness. It could not expand its business into overseas markets, however, because the investment funds forced restrictions on it. That was in 2009, when Daikin and Goodman first contacted each other. After Daikin recovered from the negative business effects of the Lehman Crisis, it began all-out research related to Goodman and in June 2010 began discussions with H&F about possibly buying out Goodman. Negotiations became prolonged, however, when the two companies began discussing price. At that point, in March 2011, a major earthquake struck eastern Japan, negatively affecting Daikin greatly and forcing it to review its future business plans. In that backdrop, Daikin and H&F temporarily halted their negotiations. They reopened their talks after Daikin recovered from the effects of the earthquake and it became possible once again to consider the future outlook of Japan's air conditioning market. That was in March 2012. The new negotiations proceeded smoothly, and at the end of July 2012 the two companies agreed on a buy-out price of US$3.7 billion. During those negotiations, a third party company made

a buy-out offer to H&F that was greater than the price Daikin and H&F had been discussing. Top management of Goodman, however, viewed the long-term synergetic effects of the Daikin's offer as more beneficial to Goodman, and for its part H&F convinced its investors that they would benefit more through the deal with Daikin.

Goodman's three most highly evaluated strengths were a powerful sales network, low-cost production, and lean management. Its products were not complicated, and it had a highly effective, high-speed volume production system, which gave it cost competitiveness; its dealers worked directly with its production plant, which gave it dependable sales and service systems; and it realized lean management through a supply chain management (SCM) system that tied together procurement, R&D, production, and delivery. As a result of its effective organization, Goodman passed Carrier in the North American residential air conditioner market in 2011, and became No. 1 in the industry with a 25 percent share of total units sold. Its share in the volume zone, however, was higher at 30 percent. On the other hand, its share of the market for high-end products was low at 5 percent. Johnson Controls Inc. (JC), a company that also offered to buy out Goodman, provided equipment, controls and services for air-conditioning, refrigeration and security systems. JC possessed no in-house technology in the air conditioning premium zone, however, and it had no global network, which Goodman badly required. For Goodman, therefore, it was clear that the synergetic effect of combining with Daikin was strongly positive. Daikin possessed technological capabilities related to the environment and energy conservation, and had "VRV" brand strengths. Daikin expected positive results from combining Goodman's low-cost technology with DAAI's management. Utilizing Goodman's powerful sales network would

Goodman's Cooling Factory

also allow Daikin to expand its share of the North American market, thus allowing it to expect a major positive synergetic effect from ties with Goodman. In addition, Daikin expected that applying Goodman's knowhow related to cost competitiveness to newly emerging economies and volume zones in the markets of the advanced countries would help to improve its overall profitability. Specifically, with 2015 as a target date, Daikin set a goal for itself, Goodman, and McQuay of securing a large enough share of the North American market to place them in third place after only Trane and Carrier. Doing so would also enable Daikin to become No. 1 in the global air conditioning business.

The cost for buying out Goodman, in the context of the yen becoming increasingly stronger during the negotiation process, was estimated in August 2012 to be 296 billion yen. Because the yen became stronger, Daikin ended up benefitting greatly from the drawn out negotiating process with H&F. Near the end of 2011, however, news of Daikin buying out Goodman was leaked to the press (Japan Economic Journal?) in Japan, and Daikin's stock price dropped sharply. Because Goodman was tardy in developing overseas markets the company was practically unknown in Japan. Also, because Goodman's major shareholder, H&F, was an investment fund, there were feelings in Japan's stock market

that the company's selling price to Daikin was too high. As a result, Daikin's move to raise funds in Japan by increasing its capital did not proceed smoothly. The company eventually raised 50 billion yen by issuing corporate debentures, and borrowed the remaining 250 billion yen in US dollars through the emergency response facility for yen of the Japan Bank for International Cooperation (JBIC). During fiscal 2012, JBIC handled 23 cases for emergency loans, and among them the loan to Daikin was the largest. From Daikin's standpoint, the loan from JBIC was highly favorable: it had a low interest rate, and zero exchange risk.

Because Daikin pursued the best possible synergetic effect at the time of its OYL buy-out, it ended up alienating feelings among some of the company's managers and engineers. One result was that at the time of the Goodman buy-out, Daikin emphasized strongly that the transaction was not simply a business acquisition but was a move to acquire outstanding human resources with rich experience, to obtain the time needed to educate those human resources, and to secure plentiful information related to the U.S. market. In order to achieve global growth there were limits to what could be achieved by depending on oneself. As Daikin learned during the acquisition of OYL, it is natural to depend on M&A but unless the two parties are mutually convinced it becomes difficult to expect favorable results. Daikin wanted to keep the number of Japanese employees sent to the joint venture at an absolute minimum in order not to affect the Goodman corporate culture negatively. The two companies adopted a policy of creating a relationship that would be mutually beneficial. They also agreed that at the request of Goodman, Daikin would appoint two full-time managing directors and one non-regular managing director. Daikin made continual efforts not to change the existing employment or management plans, to restructure Goodman's plants and sales network from a long-term viewpoint, and to strengthen mutual communications. Goodman, on the other hand, valued getting rid of the restriction by the investment funds and promoting its future prospects for growth.

Sophistication of Technical Developments

In February 2002, Daikin clarified its goal of "Contributing to society through leading-edge technology" and issued a Technology Statement emphasizing the company's commitment toward realizing major technological reforms. The company then began improving its R&D system and speeding up the development of advanced technology. It also bolstered its global cost competitiveness, developed products with higher value added, and expanded its environmental technology and solutions businesses. Once into the second half of the 2000s, the managerial environment surrounding Daikin's air conditioning business was affected by a strong social concern for the global environment, by the growth of emerging markets, and by the growth of the solutions business. In all those areas, the speed of change accelerated further. If Daikin could grasp the market changes quickly and respond to them speedily, the period of global change would present the company with a chance for a major leap forward.

Although Daikin introduced game-changing technology such as "Ururu Sarara" and "GMS" in 1999 and until around 2004 introduced many improvements and innovations to various other technologies such as the new RA and air cleaner series, it did not go so far as to develop products based on new ideas. On the other hand, changes appeared in the awareness of consumers, and consumer product claims increased—leading to an increase in the cost of claims—and Daikin's competitors introduced many new products, offsetting the competitiveness of Daikin's main prod-

ucts, leading to a situation where Daikin had to quicken and strengthen further its technical development capabilities. Daikin viewed that situation as a managerial issue and the Air-conditioning Headquarters, sales departments, Research Center, and the Corporate Division began developing reforms aimed at reestablishing the "Daikin Technology Statement." Eight years after introducing the Statement brought the company to the year 2010. The basic policy supporting those reforms was to aim at having the world's most outstanding group of engineers. Daikin faced three main tasks as it moved to achieve that goal: 1. the reform of technical capabilities for giving birth to specialized products; 2. assuring sufficient product quality for building a relationship of trust between the company and its customers; and 3. strengthening the company's human resource capabilities by raising the technical prowess and managerial competence of each employee. And finally, all employees, including the company's officers and engineers, agreed to pull together as a team and concentrate on achieving the tasks facing them.

In splitting up the global market among Daikin Industries ("Daikin") in Japan and its worldwide subsidiaries, Daikin moved to bolster its development activities and speed up its augmentation of local engineers to promote activities closely tied to meeting regional needs. After Daikin acquired OYL in 2006, its air conditioning market expanded quickly to a global scale. With that development, the air conditioning needs for each global region became more diversified, and Daikin's Air-conditioning Technical Headquarters could no longer respond sufficiently by itself to satisfy those needs. Even considering only China, the air conditioning needs differed greatly from the east coast region centered on Shanghai, to the northern inland area centered on Beijing, to Hong Kong and the tropical region to its south, and finally to the western inland area. In order to promote the development of products that reflected the various local needs, there was an urgent need to educate and train local technical personnel.

In China, where the market for air conditioning was expanding rapidly, it was necessary for Daikin to expand its market share and strengthen its brand power. For those two purposes Daikin had to introduce into the Chinese market not only expensive equipment, nicknamed the "Benz" among air conditioners, its forte up to that point. It also had to develop and introduce low-price equipment for wider market coverage. In May 2010, Daikin established the Technical Development Research Center in a corner of its Shanghai Plant and began developing products related to air conditioning. In China, price competition was especially severe in the RA market. Since the product life of RA equipment was relatively short, it was particularly important to develop new models. That was especially true because it was also important to develop non-inverter type equipment to meet related demand in the Asian and ASEAN markets. For the evaluation of components, the Center established the same inspection equipment as in the Kanaoka Factory in Japan, resulting in a dependable system for evaluating components made in China. The Center utilized that same system to evaluate components consigned from Japan. Using core technology imported from Japan, moreover, the Center moved forward with in-house systems developing original products and arranged products. It also used information it received from Gree in China to increase the number of material manufacturers to evaluate. Also, as a result of promoting procurement by working closely with the Suzhou Factory in China, the Center realized noteworthy reductions in the procurement cost of raw materials.

The idea of developing "differentiated products" based on

Sales Promotion for High-performance Room Air Conditioner

advanced technology was especially important in terms of Daikin continuing to maintain its position as the leading company in the global air conditioning industry. Good examples were the all-aluminum micro-channel heat exchanger Daikin developed in 2011 and loaded aboard heat-pump type air conditioners, and the switch to the HFC32 refrigerant, both of which were game-changing technical developments. The heat-exchanger tube was made of copper over all the years since it was invented, replaced by aluminum tubes developed jointly by Daikin and Sumitomo Light Metal Industries, Ltd. Daikin also developed technology for loading the outdoor unit of heat pump air conditioners, a first in the world. That technology resulted in a 40 percent heat transfer coefficient improvement. By converting materials, moreover, the heat-exchanger became 30 percent lighter, greatly reducing production costs. Daikin introduced the "ZEAS GoGo," fitted with an aluminum heat-exchanger, in May 2012.

Roughly around this same time frame, Daikin was severely affected by the Great East Japan Earthquake and the resultant tsunami waves. The earthquake caused a meltdown at the Fukushima 1 Nuclear Power Plant. Renesas Electronics Corporation, a company producing microcomputers for Daikin, halted production because of the earthquake, and the short supply of microcomputers almost forced Daikin to halt its production activities. Daikin's Air Conditioner Production Headquarters concentrated about 200 engineers on development of a microcomputer for breaking up orders and placing them with various companies. In the context of those efforts, Daikin was able to secure enough air-conditioning production to respond to the market's needs. Because of that special effort, however, the company was late in responding to other technical development needs. In October of that same year, flooding in Thailand did not affect the DIT Factory directly but caused delays in the procurement of parts. As a result, parts were supplied directly from Japan, which caused delays in the development of new technology. Daikin eventually overcame those many difficulties, and began marketing the "ZEAS GoGo" products about a month later than originally scheduled, which was in time for summer sales. That was all made possible by the execution abilities of Daikin's engineers.

Daikin offered new technology in the "Urusara 7," "Ururu Sarara" R series room air conditioner it marketed in November 2012 that differentiated it from previous products. It was a game-changing product, using the HFC32 refrigerant, offered the industry's highest-level of energy conservation and guaranteed a high environmental performance. The product also made room air circulation, heating, and cooling more efficient and had a new structure that increased the energy efficiency of its dehumidifying performance. The structure of the indoor unit also featured many im-

"Urusara 7"

provements. "Urusara 7" was also the world's first air conditioner to use the HFC32 refrigerant. Compared to the earlier HFC410A, the HFC32 had low global warming potential and high energy efficiency when used for either heating or cooling. For those reasons, from about 2002 there was a move to use it as a refrigerant. But at the time the HFC410A refrigerant had become an international standard, and other companies gave up on the HFC32. Even afterward, however, Daikin continued its development of HFC32, and acquired many patents for using it in air conditioners. "Urusara 7" was protected by patents, which made it difficult for other companies to catch up to Daikin, proving it was a game-changing product. "Urusara 7" received various awards in Japan including the "Prime Minister's Award" of the 5th Monodzukuri Nippon Grand Awards for excellent engineering, the "Economic, Trade and Industry Minister's Grand Prize," for excellent energy conservation equipment. A Red Dot Design Award also gave it high social evaluations.

In addition, clear trends emerged concerning increased interest in energy conservation, and more attention was paid toward airtight homes and homes secure from outside heat, thus increasing heat efficiency. That in turn led to issues such as so-called "sick" homes, condensation on walls, and the spread of ticks and mold. In that context, new home-building standards required continuous ventilation. In Japan, however, where humidity differs greatly depending on the season, it is not possible to maintain humidity at fixed levels if ventilation is constant. Daikin developed the "Desica Home Air" unit for maintaining humidity at comfortable levels throughout the year. "Desica Home Air" was for commercial use and aimed at adjusting humidity and providing circulation. It was introduced in November 2012. The unit provided outstanding energy savings, and reduced power consumption by 30 percent, compared to when the air conditioner was used concurrently with a humidifier and ventilator. In 2011 the product won the MITI Invention Award, a nationwide competition among inventors.

In response to the social needs in Japan for reduced consumption of electricity following the Great East Japan Earthquake, Daikin developed many kinds of power saving products and services. In total, Daikin is assumed to have contributed to electricity savings of about 600 thousand kW. As for solutions for conserving electricity in Japan, there was great concern following the earthquake about whether sufficient electric power could be provided in the mid to long term. Daikin also merged its previous "AirNet" Center and EMS Center and introduced a service for monitoring electricity consumption by region. It also developed a service for controlling electrical equipment in buildings at the optimum level. To support new products to conserve electricity, Daikin closely studied the development of solar power, storage batteries, and LED lighting. Daikin marketed a solutions service for solar power systems in April 2012. In that service, Kyocera Corp. developed panels, Omron Corp. developed power controllers, both on an OEM

Technology Innovation Center (Completion Model)

basis, and Daikin packaged them with other companies' "EcoCute" heat-pump water heater which gained superiority in the market.

In November 2008, around the time that Daikin was being negatively influenced by the effects of the Lehman Crisis, discussions arose about possibly building a Technology Innovation Center (TIC). Specific moves in that direction began in May 2010, and steps were taken to form a concrete plan. In Japan at the time, the market and products had both matured, and if further growth were expected in the future, innovations for providing a breakthrough were needed. TIC developed a centripetal force that positioned it as the "technology Mecca" of the global Daikin Group. Daikin referred to TIC as its collaborative ground, a place for developing technology and products in an open system unifying technology from different fields. Floor space in the structure housing TIC was 70,000 square meters, and total construction costs were 42.5 billion yen. Plans called for the grand opening of TIC in November 2014. Of a total of more than 2,000 R&D engineers in Daikin, about 1,600, not including those working in the plants, would be assigned to TIC. Daikin planned to build TIC inside the Yodogawa Plant grounds. Immediately after the project was approved at a Directors' Meeting, however, the Great East Japan Earthquake struck Japan, and Daikin had to delay the TIC construction plan. The size of the project was also downsized to 700 engineers and 49,000 square meters, and construction was rescheduled to begin in November 2013. The facility's scheduled opening is now November 2015.

The goals of the TIC were an acceleration of the development of core technology such as heat pumps, inverters, fluorochemicals, and others. For that purpose, Daikin concentrated its R&D functions in TIC, especially on technical themes with high universal appeal, such as core technology, basic technology, and other types of technology expected to contribute to Daikin's global business. Further, TIC would foster interaction among engineers working in diverse fields inside and outside Daikin, in effect aiming to make TIC an open innovation location. TIC exchanged comprehensive agreements for cooperation with Osaka University, Nara Institute of Science and Technology, and Kyoto University.

Reorganizing Chemical Business, and Challenging Global No. 1 Position

Daikin's Chemical Business Department faced a severe drop in its business results from the mid-2000s. As competition in the global chemical business heated up, Daikin lost its competitiveness in both product quality and in terms of cost. Then, in fiscal 2006, forecasted business results were for the chemical business to fall 9.5 billion yen into the red. In that situation, from February 2006 the "CEO Project" was introduced aimed at fundamentally restructuring the company's chemical business. Daikin clarified 20 reforms for action by the sales, production, R&D, and planning departments, and steps were taken to analyze and research the reason for the chemical business's deficit and to establish policies for clarifying and resolving problems. Included among the 20 reforms were measures such as reducing inventories—which had

burgeoned to be valued at more than 40 billion yen—and understanding the company's needs by having sales and R&D work closely together. Reforms also included bolstering marketing capacity such as developing new customers, promoting product development, and developing new business such as fine chemicals, lithium ion batteries and fluorocoatings. The company marketed "OPTOOL," for example, in May 2007, a surface finisher for smartphones, PC tablets, and touch panels. Efforts were also made to prepare a step-up system for responding to accidents.

Daikin began tackling the "CEO Project" from fiscal year 2007. It took from then until the end of September 2008, a period of about 18 months, to overcome the negative business situation in the Chemicals Division. That success also tied to allowing Daikin to identify the direction of reforms for its overall business. In the past, that was particularly necessary for clarifying the state of inventories in the chemicals business. During fiscal year 2007, Daikin aimed at an inventory in its chemicals business of 34 billion yen, and to achieve that target it began tackling the reduction of excess inventories. Up until the Lehman Crisis, the thinking throughout Daikin was that inventories were "bad." At one point Daikin was forced to halt its production activities, and a feeling of crisis spread throughout the company that led to a strong move to reduce costs. In that backdrop, from the second half of fiscal year 2008 the Chemical Division played a key role to introducing structural and organizational reforms as it aimed to increase its profits. The first point for structural reforms was the bolstering of its R&D and product development capabilities, including establishing an R&D Center and a Technical Services Department. A second point of reforms included bolstering the company's business planning functions, a third aimed at bolstering its sales capabilities, and a fourth aimed at bolstering the company's manufacturing capabilities.

Daikin's chemical business in China in 2006 was centered on the three production facilities of Daikin Fluorochemicals (China) Co., Ltd. (DCC) in Jiangsu City producing PTFE, Daikin Fluoro Coatings (Shanghai) Co., Ltd. (DFS) in Shanghai producing fluorine coating materials, and Daikin Telecommunications (Ningbo) Co., Ltd. (DTN) in Ningbo producing LAN cabling.

In the area of refrigerants, Daikin had joint venture ties with Arkema Co., Ltd. (former Atofina) of France in the fluorochemicals industry for producing HFC125, a raw material essential for producing R410A and other HFC blended refrigerants. Daikin established Arkema Daikin Advanced Fluorochemicals (Chagshu) in February 2008, and built reactors on the land adjacent to the DCC's plant in Jiangsu, China. Daikin began all-out production there from May 2010. Because forecasts were for an increased demand for HFCs in China and the developing countries in Asia, Daikin established Daikin Arkema Refrigerants Asia Ltd. in Hong Kong in November 2007, thus establishing a sales system that covered the entire Asia-Oceania region.

Daikin established a joint venture for fluororesins called Ningbo Toho Daikin in October 2004, and began developing the FEP-LAN market in China. Those efforts were unsuccessful, however, and the JV was liquidated in June 2013 and Daikin withdrew from that business. Because demand for the raw material fluorite rose considerably, Daikin entered into a joint venture with China Central Fluoro Industries Group Co. Ltd., owner of the largest fluorite mine in China. In February 2007 the two companies jointly established Jiangxi Datang Chemicals Co., Ltd. (JDC) for producing anhydrous hydrofluoric acid. Production operations began at JDC in December 2009.

The Chinese fluorine market expanded so quickly that DIL

had to send a specialist group there from Japan to conduct marketing operations and get the business safely off the ground. In November 2009, a Chinese Project was newly organized in China and large-scale investments were made in new production facilities one after the other to expand Daikin's various businesses there.

Daikin Fluorochemicals (China) (DCC) built a fluoroelastomer plant and started commercial production of "DAI-EL" in January 2013. DCC also built a new plant and began volume production of "Zeffle", an infrared reflective fluorocoating. New facilities were installed to produce a 4F monomer used as the raw material for "Zeffle", and commercial production of it began in June 2013. In May 2012, DCC installed new facilities for producing FEP, aiming to start commercial production in March 2015. That move was in response to a rapid expansion of the production of machinery and motor vehicles in China. The fluorocarbon materials market also expanded to meet the demand in the parts industry. DCC also aimed to enter the downstream areas of demand for fluorocarbon resins and in October 2010 participated in Shanghai Valqua Fluorocarbon Products Co., Ltd., a processing manufacturer of fluorocarbon resin parts.

In the U.S., the fluorocarbon resins market floundered in the context of the Lehman Crisis. Daikin America Inc. (DAI) had delayed its plans to bolster its facilities, but demand recovered considerably in 2011. Daikin turned again to bolstering the "Neoflon" ETFE facilities, and began commercial production from October 2012. Related to the use of solar batteries, the demand for products such as "Neoflon" ETFE and "Zeffle" increased greatly. At the end of 2013, DAI dissolved its JV with 3M, and became 100% owner of MDA Manufacturing, a manufacturer of chemical intermediates.

This expansion of Daikin's overseas operations contributed toward recovery of the Chemicals Business Division. In 2008, sales decreased more than 10 percent and the company reported a business loss of 9.5 billion yen. Business began recovering rapidly from 2010, however, and in 2013 the company recorded sales of 140 billion yen. Because of lower prices, however, operating profits reached a peak of 20 billion yen in 2011, and in 2013 they dropped to 15 billion yen.

Changes in Japanese Market, and Reorganization of Business Structure

Japan's population reached a peak in 2008, and afterward began trending downward. The total number of households in Japan expanded only slightly from 2007. One result was that the number of housing starts decreased from 1,060,000 units in 2007 to 788,000 units in 2009—following the Lehman Crisis—and then increased slightly to 883,000 units by 2012, and in 2013, just before an increase in Japan's consumption tax, housing starts increased to 980,000 units. The increase fell short of the increase recorded in 2007. Japan's air conditioner market, which was said to have already matured in the 1990s, reached a ceiling in the early 2000s. The use of air conditioners had spread to cover almost 100 percent of the market, and the spread of energy saving-type air conditioners was also close to the saturation level. New domestic demand for air conditioners dropped sharply, and competition focused on replacement demand, resulting in a zero sum game. The situation was such that unless the air conditioning manufacturers introduced revolutionary new models to stimulate demand, sales would not increase. The size of the market for residential air conditioners in 2006 was 7,520,000 units and for commercial use were 797,000 units. In 2009, right after the Lehman Crisis, those same figures were, respectively, 6,775,000 and 609,000 units, both sharp

drops from 2006. Although RA sales in 2010 were up 20 percent, and PA sales in 2011 were up almost 30 percent, the growth potential fell again afterward. RA sales in 2013 were 9,012,000 units while PA sales were 804,000 units.

In that situation, Daikin—which had an overwhelming market share at home—faced a critical situation in which it had to bolster its domestic sales capabilities. In 2009, Daikin moved to reorganize its domestic air conditioning headquarters in three main ways: by developing products based on market-oriented marketing, by promoting a nationwide sales strategy aimed at volume-sales customers, and by expanding its business directed at environmental solutions. Compared to its competitors, Daikin realized that it lagged in its response to the needs of the time in both its strategy and policies. One of its first steps was to unify its three planning departments into a single Business Strategy Office. It also established a Customer Support Center to promote increased sales of system products. Its solutions business was pulled together in the newly established Corporate Sales Division. Daikin's aim was to promote three main businesses in the new system: the heating and hot water supply business, the applied business, and the "whole service business" that provided overall solutions for buildings and plants.

In the first half of fiscal 2008, business cooled down in the context of the Lehman Crisis, and Daikin's sales in Japan decreased by 16 billion yen compared to original expectations. If matters continued as is, Daikin would face the danger of its operations falling into the red. To assure itself a short-term profit, Daikin prepared for an emergency. One of the first steps it took was to relocate 160 employees. It also developed new sales outlets, expanded sales by Daikin exclusive dealers, expanded sales of air cleaners as an influenza countermeasure, and promoted wider

sales of the "EcoCute" product via special business ties with Kansai Electric Power Co. Those several moves had a positive effect and Daikin's drop in sales ended up smaller than the overall market drop. Daikin's market shares increased year on year and in 2009 they were 18.5 percent for RA products, 45.1 percent for PA products, and 15.7 percent for "EcoCute" products. Profits dropped, however, with operating profits down 60 percent in a comparison of 5 billion yen in fiscal 2008 and 2 billion yen in fiscal 2009. The PA business, in particular, decreased 12 percent in number of units sold, and the division fell into the red.

The Air Conditioning Sales Department moved again to expand its business of proposing environmental solutions. It also tackled the introduction of "Number One and Only One" products in order to raise their prices and increase sales. In November 2010, the Department received approval from the Board of Directors for proposed sales reforms it presented related to domestic air conditioning sales. The company thus began moving toward reform of its sales companies. What those reforms actually meant was: 1. reduce the number of domestic sales companies from the current 20 to ten companies by promoting mergers in large cities; 2. concerning products aimed for sale through mass marketers, i.e., RA, "EcoCute", and air cleaners, combine the volume sales divisions of the 20 existing sales companies, and establish a new sales company specializing in sales to mass marketers. The aim of the first reform was to bolster the direct-sales franchise dealers, as well as the heating, hot water supply, and ventilation businesses in addition to the air conditioning business, in order to develop the proposal capabilities of the energy-saving system. The primary aim of the second reform was to raise sales efficiency. The new sales company introduced an organization that included a one-to-one section with each volume seller, the main customers. In fiscal

year 2010, the outlook was for deficit operations for small-size room air conditioners and the "EcoCute" products. But with the strengthening of sales capabilities and the efforts by the Airconditioning Production Headquarters to reduce operating costs, Daikin's new target was to aim for profitable operations for all its businesses by fiscal year 2013.

Daikin began reorganizing its sales companies in 2011. It reduced the 20 sales companies in operation between Hokkaido and Okinawa to ten companies, with amalgamation of sales companies particularly in heavily populated areas. As a result, Daikin HVAC Solution (Tokyo) Co., a new sales company, was established that covered Tokyo and four surrounding prefectures. Daikin HVAC Solutions (Kinki) Co., meanwhile, covered the prefectures in the Kinki region. All in all, five large-scale companies emerged, selling heating, ventilation and air conditioning (HVAC) solutions businesses, each with annual sales of 100 billion yen or more.

Daikin also established the new sales company for responding to volume-sellers and called it Daikin Consumer Marketing (DCM). DCM was then put in charge of unified nationwide sales to the general headquarters of volume sellers, and also sales to their local headquarters and stores. In response to that, the Air Conditioning Sales Headquarters of Daikin bolstered its Corporate Sales Division, and actively developed spec-in sales aimed at large-scale multiple retailers such as volume sellers and convenience stores.

The strengths of Goodman, which Daikin purchased in 2012, were a powerful sales network, low-cost production, and lean management. The transfer of those strengths to Daikin was important for its air conditioning business. In particular, the direct ties between dealers and the plants, and creation of a service system based on an SCM that tied together all activities from procurement to development, manufacturing, and distribution contributed substantially to reforming the structure of the domestic air conditioning business. Daikin moved to build an efficient supply system that modeled on Goodman's system, including building independent and direct sales type distributors conducting marketing for realizing the optimum strategy in each area, and introducing methods for developing dealers. Daikin also tackled construction of an effective supply system, combining and discarding types of equipment, and selecting key models. In this way, the company improved the accuracy of sales plans for responding flexibly to market changes.

Commercial-use equipment accounted for half of the domestic air conditioner market in Japan in the early 2000s, and 70 percent or more of that market was for equipment for buildings. In particular, the market for air conditioning equipment for large-size buildings expanded during the period 2010~2014. The size of the market for peripheral equipment and maintenance services expanded at a faster rate than the market for air conditioning equipment. Competitors built powerful sales systems for that market and nurtured directly related engineering companies. In 2010, Daikin Air Techno Co. merged with Daikin Facilities Co., and in 2011 Daikin moved the applied business of Daikin Air Techno back inside its Domestic Air Conditioning Department, bolstering its business aimed at large-size buildings. The new system not only bolstered the sales route of facility constructors but responded aggressively to renewal demand for air conditioning equipment in large buildings. That became the turning point for establishing a circulatory-type business model.

Daikin also established Solutions Plaza for directly grasping user needs and then reflecting those needs in product development, resulting most importantly in the emergence of differentiat-


Solution Plaza "Fuha Tokyo" (left), Solution Plaza "Fuha Osaka" (right)

ed products, an increase in sales, and higher prices. Stimulated by the Solutions Plaza established by Daikin China, the new Solutions Plaza had not only an exhibition function but also functioned as a showroom for brand-publicity, and a place where dealers could hold business discussions. In 2011 Daikin established "Fuha Tokyo" in Shinjuku, Tokyo, and in 2013 it established "Fuha Osaka" in Umeda, Osaka. Daikin also established Asahikawa Lab in Asahikawa, Hokkaido, aiming to expand its heating and hot water businesses. In Japanese, incidentally, "fuha" is the sound of breathing. Daikin used the word to express the energy of air.

Included among the products Daikin developed while tackling reforms from 2010 was the "ZEAS" air conditioner for use in stores and offices. Greatly different from previous products, it boasted of top-level energy conservation, outstanding comfort features, and it was environmentally friendly. It also developed the "Urusara 7" room air conditioner, which offered heating and cooling without the unevenness of humidity, and consumed only about half the electricity of previous equipment. These new products were introduced in 2012 or later and sold well. But the yen quickly weakened from late 2012. Daikin forecasted increased production costs of about 150 billion yen for fiscal year 2013, because the company was producing volume-zone air conditioners, "SkyAir", air cleaners, and important parts such as compressors in China. It was not an easy matter to cover those foreign exchange losses through lower production costs and higher product prices. At any rate, top management emphasized higher selling prices to cover those losses, and those working at the sales level did their utmost to increase sales. As a result, "Urusara 7," which won the Energy Conservation Award for fiscal year 2012, became the trigger for higher sales prices. Also, Daikin was the first in the industry to use the HFC32, introduced in the "Eco ZEAS" high-class PA equipment. In 2013, introduction of the top-class "five-star ZEAS" enabled Daikin to succeed in switching its sales focus to high-class equipment. Those successes also enabled the company to keep its profit decrease in fiscal year 2013 at the lowest possible level. From fiscal year 2014, the company then secured the basic capabilities for earning increased income and increased profit.

Daikin acquired the rights to manage American Air Filter (AAF) through its purchase of OYL, but it had to overcome several problems before realizing a synergetic effect. With 20 production bases located variously in the U.S., Europe, China, and Southeast Asia, AAF held second position in the global filter market. It had particular strengths in volume zone markets such as general buildings and hospitals. After purchasing AAF, Daikin exported PTFE filter materials from its Yodogawa Plant to AAF's plants around the world to have them processed into air filter units and marketed locally. Compared to Daikin products in the past, AAF was able to reduce the production costs of the new products by about 30 percent.

Through technical support, Daikin nurtured sales personnel who could acquire spec-in orders. Then, together with AAF's direct sales personnel, they worked actively to expand sales. Even

Yuki Factory of Nippon Muki and Filter Factory

with those efforts, however, the product's price was high compared to existing glass filters, about three times as much, and it was thus not cost competitive. In that situation, AAF introduced new facilities in the Suzhou Plant for producing PTFE filters and lowering their sales prices substantially, making it possible to begin an all-out challenge in the existing glass filter market.

In order to aim for global No. 1 position in the filter market, it was necessary for Daikin to raise the technical level of its air filters and to improve its product development capabilities. In 2009, Daikin bought out Nippon Muki Co. (NM), a subsidiary of Nippon Sheet Glass Co. NM held the top share of the Japanese air filter market and developed many products with advanced functions as well as products no other company had, and was No. 1 in the Japanese air filter market in terms of technical capabilities. Another of its strengths was its domestic sales organization. AAF could develop new markets by selling the unique products of NM. Another benefit was increasing its sales capabilities regarding the Japanese market and Japanese companies. NM, on the other hand, could utilize Daikin's global knowhow, thus moving forward with its tardy globalization, and making it possible to sell high value-added products. Through Daikin's buy-out of NM, Daikin Industries (DIL), AAF, and NM were able to work together to develop a global strategy. In the U.S. and European markets, the three companies shifted away from AAF's former approach of mainly selling inexpensive filters to selling high-performance filters. In the Asian market, AAF expanded its market centered on electronics, and established a firm position as top company in the market. In order to bolster the foundation of those various businesses, the technical personnel in DIL, AAF, and NM were joined together in a Global R&D Center newly established inside NM's Yuki Plant. Also, they promoted a Global No. 1 strategy regarding the power and industrial business in developing countries, such as large-size filters and large-size dust-collecting apparatus for power plants. In such ways, sales in 2013 for AAF's overall business were $712 million. The company had grown to where it could just about touch No. 1 in the industry.

Response to Global Environmental Issues, and Pursuit of Diversity

Daikin established its first environmental action plan in 2005. The company moved globally at that time to reduce its fluorocarbon emissions, develop energy saving air conditioners, and reduce its exhaust emissions. In 2006, however, the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report warned the world that if humanity continued its economic activities as is, Earth's future would face a critical situation. Daikin realized it was vital for it to tackle global warming if it wished to continue in business. In Daikin's position, in particular, two if its central businesses were refrigerators and air conditioning equipment and fluorocarbons, areas that relate closely to global warming. Daikin established four themes related to corporate social responsibility (CSR): the environment, product quality and customer satisfaction, human resources, and social contributions. Japan's energy

saving technology related to air conditioning products was outstanding but if viewed globally, including in the developing countries, the spread of energy- saving air conditioning equipment was still at a primitive stage. Along with the future economic growth of developing nations, it was clear that refrigerators and air conditioners could be expected to become more widely used, leading to an increase in energy consumption and fluorocarbon emissions. As a result of Daikin tackling this issue, the use of inverters spread to China and then to other countries worldwide. Daikin was also able to develop new air conditioners using a new refrigerant and to reduce their negative effect on the environment to about one-third the previous level. Another issue that surfaced around this same time was the need to reduce CO_2 emissions by fluorocarbon plants, which accounted for the most CO_2 being emitted from Daikin's plants. While moving forward with investment in its plants and equipment, Daikin promoted the environmental compliance of OYL and early on established and carried out environmental action plans in Daikin Europe and Daikin U.S., thereby carefully monitoring the achievement of their environment-related goals. As a result, during the five years from fiscal 2005 to fiscal 2010 Daikin easily cleared its goal of reducing its CO_2 emissions globally to half or less of their levels prior to 2005. Daikin also introduced activities it called "green heart factories" that focused on energy and resource savings and less waste. From 2007, Daikin participated in a large scale reforestation project in Indonesia, and from 2011 it moved to protect the habitat of "Shiretoko," which is located on Hokkaido in Japan and designated a UNESCO World Natural Heritage site. Concerning these strategies, instead of its traditional Environmental Report, Daikin began publishing the "Daikin Group CSR Report" from 2006, focusing on the group companies. Next, in 2007 the company published

a top commitment saying that the entire Daikin global group would regard climate change action as a matter of the greatest importance and do its best to meet society's expectations. That was a declaration stating that Daikin would move forcefully to find solutions to environmental issues. In October 2008, Daikin signed the UN Global Compact, which expressed a move to protect the personal rights of individuals and their response to environmental issues and published a top commitment saying that Daikin would continually work toward their actualization. In Daikin's CSR Report of 2013, the company publicly clarified its promotion of the core strategies of Fusion 15 emphasizing the simultaneous achievement of environmental contributions while expanding the company's business and bolstering human resource capabilities.

Daikin's thinking is that human resources are the source of a company's competitiveness. They also heighten a company's organizational strengths even though there are different senses of value among human resources with different backgrounds. Actually, such differences contribute toward strengthening a company. With Daikin's increased globalization, the make-up of its employees became widely varied. Among Daikin's overseas companies, about 40 percent had local personnel serving as their presidents and about 45 percent had local personnel serving as directors. Local top management in the overseas companies was active.

As employee diversification progressed in these ways, it became increasingly important to nurture global-oriented managers and ordinary personnel. Daikin's approach up to that point was to develop personnel through their in-house duties. Previously, the company emphasized OJT for educating its employees. The company trained its Japanese managers and ordinary employees through management education programs and internal business classes that responded to changes in the times, developing their

Daikin Ales Aoya

capabilities through quality-oriented educational programs. But as business became increasingly globalized, a need emerged for more widely varied educational programs. Daikin thus decided to establish an education center in 2007. The company purchased land facing the Sea of Japan in Tottori City, about three hours from the Osaka Head Office, and established a global education center there it called the Daikin Ales Aoya, opened in May 2008. "Ales" derives from a Latin word meaning "flight" or "fly into the future." The facility became a center for training personnel essential for developing Daikin's future in the approaching new period and for developing future business.

Foreign employees in Daikin Industries, Ltd. (DIL) in Japan, on the other hand, accounted for less than 1 percent of the total. Daikin introduced the system of rehiring employees after their retirement age earlier than many other Japanese companies, and in 2010, the twentieth year after introducing that system, over 90 percent of retired employees were rehired, meaning that veteran employees are increasing in the company. That system has been highly evaluated, and in May 2012 Daikin received the Fifth Diversified Management Award in the Diversification of Employees Section from Toyo Keizai Inc., the Japanese publisher of influential economic affairs magazines. Daikin introduced a program in 2011

aimed at educating female employees, and in February 2013 the Tokyo Stock Exchange and the Ministry of Economy, Trade, and Industry jointly selected the companies in Japan most active in employing females and called them "Nadeshiko Brands." In the first competition, Daikin was selected as one of 17 "Nadeshiko Brand" companies. In 2013, DIL had 21 female managers. That number cannot be considered "many" in the Japanese context, but females accounted for 35.1 percent of all new Daikin employees that year.

Daikin established Daikin Sunrise Settsu, Ltd. (DSS) in 1994 to support the employment of disabled persons. In 2003, that company had 47 employees, of which 43 were disabled. Afterward, companies in the Daikin Group moved to employ more disabled persons. When DSS began operating a new plant in June 2009, it expanded its business operations into documentation and preparing CAD drawings, as well as processing and assembling of components and manufacturing chemical products. As of March 2013, Daikin employed 104 disabled persons (including 65 with physical and 22 with mental handicaps). Including all the companies in the Daikin Group, disabled persons today account for 2.34 percent of the entire workforce. In addition, Daikin accepts 40-100 trainees each year from schools for the disabled and training centers for mentally incapacitated individuals. In March 2009, Daikin won certification from the Ministry of Health, Labor and Welfare in Japan as an outstanding company for hiring disabled persons, and in December 2012, in a campaign by the United Nations Economic and Social Commission for Asia and the Pacific called "Ten Years of Disabled Persons in the Asia-Pacific Area," President Otake of DSS received the Prime Minister's Award. DSS also energetically invites visitors to tour its plant, and is a role model in Japan for the employment of disabled persons. Daikin promoted ac-

Daikin Sunrise
Settsu Factory's interior (top)
Prime Minister's Award (left)

tivities from 2007 to reduce the environmental footprint at all companies in the Daikin Group, and established in-house standards for the environment. In December 2011, DSS cleared that standard and won certification as a Super Green Heart Factory.

Making use of DSS's widely varied experience with disabled persons Daikin Air-conditioning (Shanghai) is moving energetically to employ disabled persons. Companies in Shanghai are obliged to employ disabled persons at a rate of 1.6 percent of all its employees. As of the end of March 2013, Daikin Air-conditioning (Shanghai) employed 65 disabled persons, 2.1 percent of its total workforce. Daikin Industries Thailand employs 13 disabled persons. As seen by DSS's figure of 7 percent in ordinary income to net sales, the disabled are not viewed as special employees. They are hired so that they may develop and contribute to society through their participation in production activities. Daikin promotes the employment of disabled persons by creating a work environment that allows them to have hope for the future.

Celebration of 90th Founding Anniversary

Looking Toward Future

Daikin Industries, Ltd., celebrated its 90th founding anniversary on October 25, 2014. The company held the actual celebration five months earlier, in May, with about 2,000 persons attending from Japan and group companies in 30 overseas countries. Some of the undertakings Daikin introduced to commemorate its anniversary were a project for planting trees to promote the creation of fresh air, publication of its 90-year history in Japanese, English, and Chinese, and completion of the Technology and Innovation Center and the Seminar House at "Daikin Eau de Ciel Tateshina", both of which had been under construction. The project for planting trees included Japan (Shiretoko in Hokkaido) and six other countries, thus contributing globally toward a cleaner environment.

In the course of its 90-year history, Daikin Industries created many new businesses and much new technology. By always aiming to do well, the company fashioned a tradition of continuously organizing for success. Especially during the twenty years from

Project for Preservation of Wildlife in Thailand and Indonesia

1994 to the present, Daikin experienced rapid and widespread global changes in its business. In the midst of those changes, Daikin stood out from other companies in developing new businesses, products, and markets, and it expanded rapidly. Strong leadership made that growth possible. In particular, the foresightedness of Daikin's top managers in decision-making must be emphasized, as well as the high-performance capabilities of employees taking on difficult tasks. Management also applied the basic philosophy of being "people centered" and made efforts to create an outstanding working environment to maximize the willingness and capabilities of the company's employees. Also, at all times management displayed a flexible response to rapid growth and globalization.

Daikin's most recent ten years witnessed the purchases of OYL and Goodman, business ties with Gree, and other significant business integration. The company also actively developed new markets, including the "volume zone" of newly emerged nations. As one result, Daikin came to have business bases in 145 countries around the world, and overseas dealings came to account for 80 percent of the company's total sales. In that process, the company developed into a major corporation with 60,000 employees worldwide.

Emphasizing management based on people, Daikin thus expanded and grew rapidly. In place of the centrifugal tendency of most group organizations, Daikin's emphasis pulled together many people with different cultural backgrounds into the worldwide Daikin Group to form a strong organization that ties each group company closely to Daikin Industries Ltd., the parent company.

The annual policy of the Daikin Group announced at the beginning of 2015 was "Create the Future, Exceed in a Changing World." It emphasized the five main objectives: 1. never fail to notice the structural changes occurring in global economic society; 2. bolster "three powers" to achieve the company's F15 quantitative goals: monozukuri skills, a strong sales network, and outstanding, talented employees; 3. quicken our business progress by emphasizing a "flat and fast" approach with our people and in our organization; 4. tackle compliance and enhancement of our corporate ethics; and 5. with a view toward ten years in the future, each employee should contribute toward creating a company filled with great expectations.

In his 2015 New Year's Message, current President Masanori Togawa of Daikin spoke about the company's future as follows: "The capabilities of all employees should be applied toward realizing what the Daikin Group will look like ten years from now." Viewed in terms of the company's future technical competence, besides its own core technology Daikin should introduce new technology acquired outside through business ties and M&A. Doing so will allow the company to create new products and develop additional new technology. Daikin should also move forward with opening its technology to other companies around the world, and maintain its leadership in determining the future direction of new technology. Daikin should also promote the synthesis and

systemization of technology, and significantly expand its solution capabilities.

While moving forward with revolutionizing technology, there is also a need for the company to reorganize its existing business portfolio. That need is pointed out in the annual policy the Daikin Group announced for 2015. Daikin originally developed as a corporation based on strong competition between its two main business pillars of air conditioning and fluorochemicals. Although air conditioning provides almost 90 percent of Daikin's total business today, the company does not intend to allow its existing business fields to influence its future too severely.

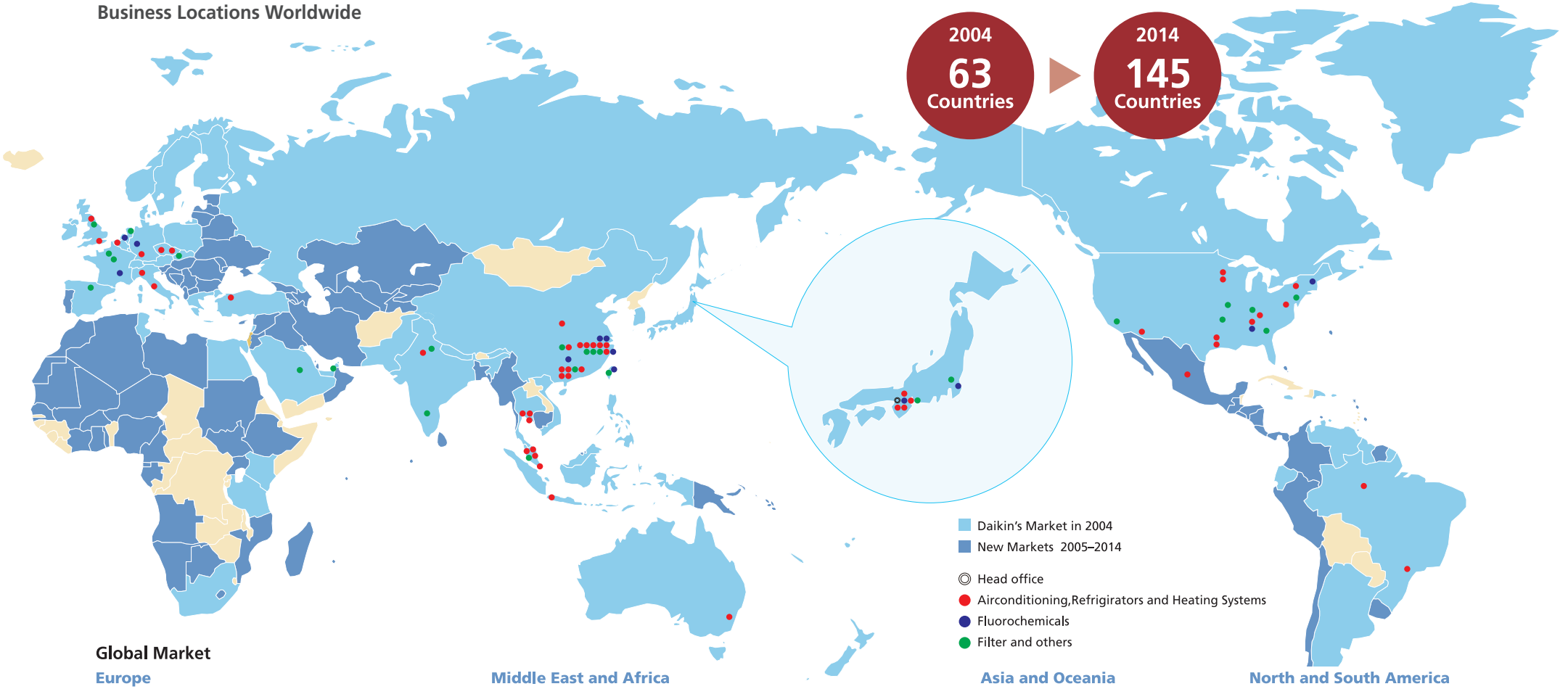
New areas of business with great promise include wide-ranging and complex areas such as the environment, space, and general comfort. Based on the prediction for a serious food shortage in the future, attractive businesses might also include those for ensuring the freshness of food during transfer and storage. Another area of opportunity is the management of energy resources in newly developing countries suffering from a shortage of electricity, and high-level control of the air quality related to producing medicines and foodstuffs.

It appears that while changes in the global economy are occurring faster today than in the past, the direction of change is becoming more diversified and the world seems poised to enter a period of uncertainty. Daikin recognizes that in human society's pursuit of affluence brought about by economic progress, serious problems have emerged related to the earth's environment and energy. The company believes that through the technology it has accumulated over the years, one of its corporate missions is to make continuous efforts to resolve those problems.

In international society, the exchange of people and things has become much more active, and mutual understanding has advanced noticeably. It is important, therefore, for each Daikin employee to become more aware of global matters. As well, to provide leadership in the new global situation, managers of companies in the Daikin Group should develop a strong will and a clear future vision for leading each of their organizations. They should compete by rising above their limitations, and thus contribute to the future growth of the overall Daikin organization.

Appendices

Business Locations Worldwide



Global Market

Europe

Country	Country	Country
Albania	Germany	Portugal
Armenia	Greece	Reunion
Austria	Hungary	Romania
Belarus	Ireland	Russian Fed.
Belgium	Italy	Serbia and Montenegro
Bosnia Herzegovina	Kazakhstan	Slovakia
Bulgaria	Kyrgyzstan	Slovenia
Croatia	Latvia	Spain
Cyprus	Lithuania	Sweden
Czech Republic	Macedonia	Switzerland
Denmark	Malta	Tajikistan
Estonia	Moldova	Turkey
Finland	Netherlands	Turkmenistan
France	Norway	Ukraine
Georgia	Poland	United Kingdom
		Uzbekistan

Middle East and Africa

Country	Country
Algeria	Jordan
Angora	Kenya
Azerbaijan	Kuwait
Bahrain	Lebanon
Botswana	Lesotho
Burkina Faso	Libya
Cameroon	Madagascar
Cote d'Ivoire	Mali
Egypt	Mauritania
Ethiopia	Mauritius
Equatorial Guinea	Morocco
Gabon	Mozambique
Ghana	Namibia
Iran	Niger
Iraq	Nigeria

Asia and Oceania

Country	Country	Country
Oman	Australia	New Zealand
Qatar	Bangladesh	Pakistan
Saudi Arabia	Brunei	Papua N.G.
Senegal	Cambodia	Philippines
Seychelles	China	Singapore
South Africa	Fiji	Solomon Islands
Sudan	India	Sri Lanka
Syria	Indonesia	Tahiti
Tanzania	Japan	Thailand
Togo	Korea	Taiwan
Tunisia	Malaysia	Vietnam
UAE	Maldives	
Uganda	Myanmar	
	Nepal	
	New Caledonia	

North and South America

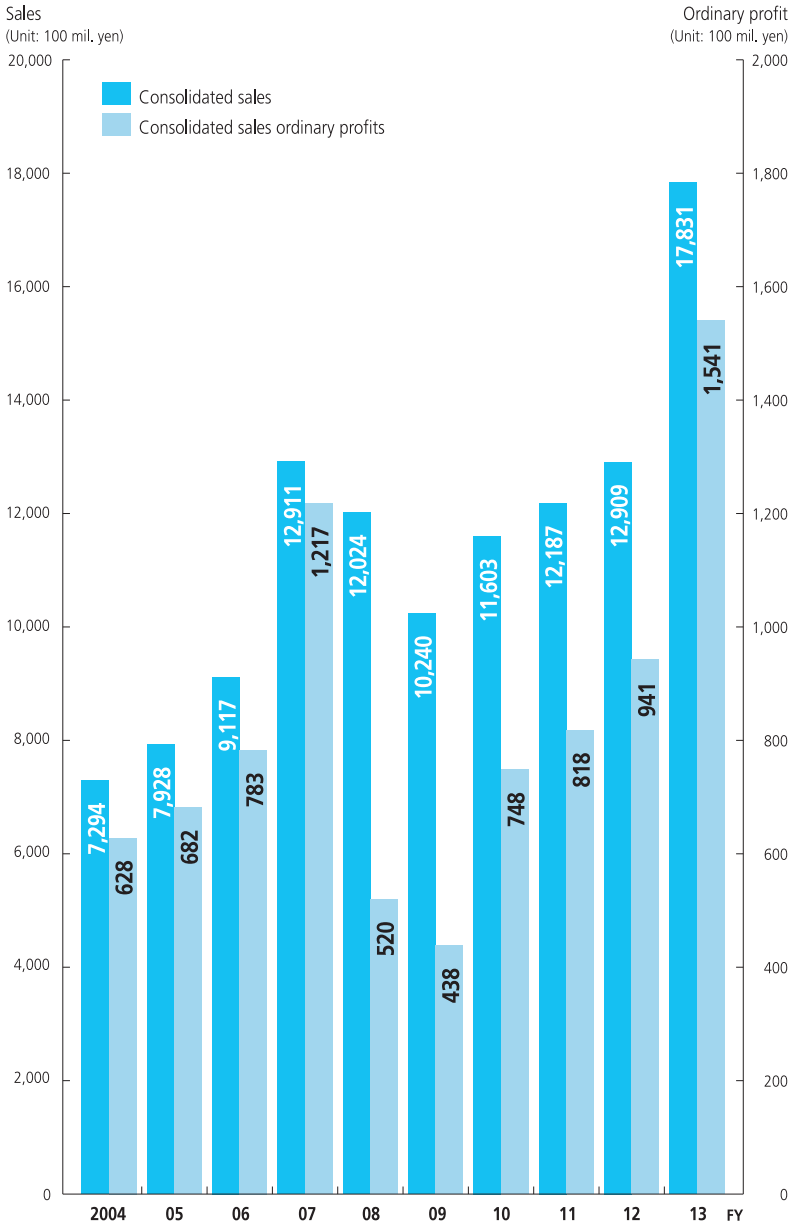
Country	Country
Argentina	Guadaloupe
Aruba	Guatemala
Bahamas	Guyana
Barbados	Honduras
Bermuda	Jamaica
Brazil	Mexico
Canada	Nicaragua
Cayman Is.	Panama
Chile	Peru
Colombia	Puerto Rico
Costa Rica	Suriname
Curacao	Trinidad & Tobago
Dominica	Uruguay
Ecuador	U.S.A.
El Salvadar	Venezuela

Global Manufacturing Bases

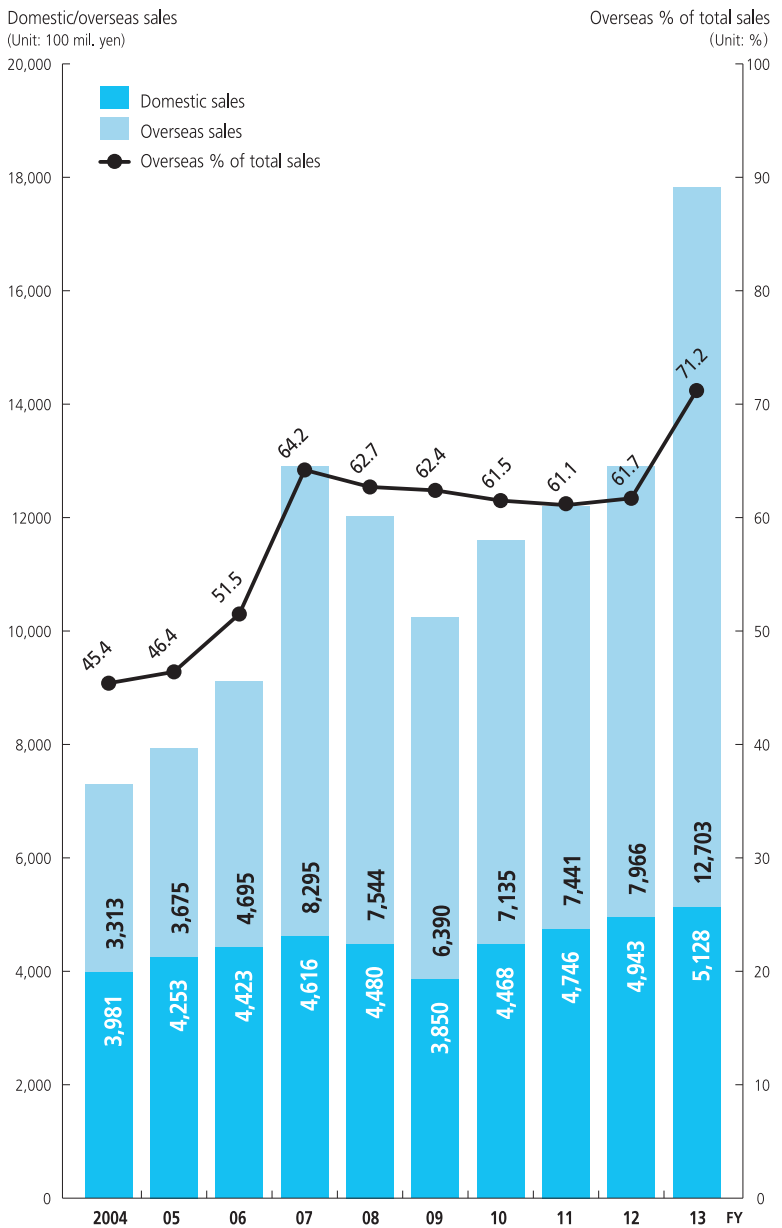
Country	Division	City	Company
Japan	●	Yuki City, Ibaraki	Yuki Plant of Nippon Muki Co., Ltd
	●	Kamisu City, Ibaraki	Kashima Plant
	●	Kusatsu City, Shiga	Shiga Plant
	●●●	Settsu City, Osaka	Yodogawa Plant
	●	Sakai City, Osaka	Kanaoka Factory of Sakai Plant
	●	Sakai City, Osaka	Rinkai Factory of Sakai Plant
China	●	Shanghai	Daikin Air-Conditioning (Shanghai) Co.,Ltd..
	●	Shanghai	Daikin Fluoro Coatings (Shanghai) Co.,Ltd.
	●	Suzhou	Daikin Device (Suzhou)Co.,Ltd
	●	Suzhou	Daikin Motor (Suzhou) Co.,Ltd.
	●	Suzhou	Daikin Air-Conditioning (Suzhou) Co.,Ltd.
	●	Suzhou	Daikin Refrigeration (Suzhou) Co.,Ltd.
	●	Suzhou	Daikin Hydraulics (Suzhou) Co.,Ltd.
	●	Suzhou	McQuay Air Conditioning & Refrigeration (Suzhou) Co.,Ltd.
	●	Suzhou	Daikin Medical Technology (Suzhou) Co.,Ltd.
	●	Suzhou	AAF (Suzhou) Co.,Ltd.
	●	Changshu	Daikin Fluorochemicals (China) Co.,Ltd.
	●	Changshu	Arkema Daikin Advanced Fluorochemicals (Changshu) Co., Ltd.
	●	Jiujiang	Jiangxi Datang Chemicals Co.,Ltd.
	●	Xi'an	Xi´an Daikin Qing'an Compressor Co.,Ltd.
	●	Wuhan	McQuay Air Conditioning & Refrigeration (Wuhan) Co.,Ltd.
	●	Wuhan	AAF (Wuhan) Co., Ltd.
	●	Shenzhen	Shenzhen McQuay Air Conditioning Co.,Ltd.
	●	Shenzhen	McQuay Technology (Shenzhen) Co., Ltd.
	●	Shenzhen	AAF (Shenzhen) Co.,Ltd.
	●	Zhuhai	Zhuhai Gree Daikin Device Co., Ltd.
	●	Zhuhai	Zhuhai Gree Daikin Precision Mold Co., Ltd.
	●	Huizhou	Daikin Air-Conditioning (Shanghai) Co.,Ltd.
Taiwan	●	Taipei	Formosa Daikin Advanced Chemicals Co.,Ltd.
	●	Miao Li Hsien	AAF Taiwan Co.,Ltd.
Thailand	●	Chonburi	Daikin Airconditioning (Thailand) Ltd.
	●	Chonburi	Daikin Industries (Thailand) Ltd.
	●	Rayong	Daikin Compressor Industries Ltd.
Malasia	●	Selangor	OYL Manufacturing Company Sdn Bhd
	●	Selangor	OYL Technology Sdn Bhd
	●	Selangor	American Air Filter Manufacturing Sdn Bhd
	●	Selangor	J&E Hall Refrigeration Sdn Bhd
Singapore	●	Singapore	Daikin Airconditioning (Singapore) Pte. Ltd.
Indonesia	●	Java Barat / Bekasi	PT OYL Sentra Manufacturing
India	●	Neemrana	Daikin Airconditioning India Private Limited
	●	Bangalore	AAF India Private Limited
	●	Noida	AAF India Private Limited
Australia	●	Sidney	Daikin Australia Pty. Ltd.
Saudi Arabia	●	Riyadh	AAF Saudi Arabia Limited (Saudi Arabia)
UAE	●	Dubai	AAF-International Air-filtration Systems L.L.C. (United Arab Emirates-Dubai)
Turkey	●	Sakarya	Hendec Factory of Daikin Turkey
Bergium	●	Ostend	Daikin Europe N.V.
Czech Republic	●	Pilzen	Daikin Industries Czech Republic s.r.o
	●	Burno	Daikin Device Czech Republic s.r.o.
Slovakia	●	Nove Mesto	AAF International s.r.o. (Slovakia)
France	●	Lyon	Daikin Chemical France S.A.S
	●	Gasny	AAF-SAS(France)
	●	Louviers	AAF-SAS(France)
Netherland	●	Oss	Daikin Chemical Netherlands B.V.
	●	Emmen	AAF-International B.V.(The Netherland)
United Kingdom	●	Cramligton	Daikin Applied (UK) Limited (United Kingdom)
	●	Dartford, Kent	J&E Hall Limited (United Kingdom)
	●	Cramligton	AAF-Limited (United Kingdom)
Italy	●	Cecchina, Rome	Daikin Applied Europe S.p.A. (Italy)
	●	Milan	Daikin Applied Europe S.p.A. (Italy)
Germany	●	Guglingen	Rotex Heating Systems GmbH
	●	Frankfurt am Main	Daikin Refrigerants Europe GmbH
Spain	●	Vitoria	AAF,S.A. (Spain)
U.S.A.	●	Faribault, Minnesota	Daikin Applied Americas Inc.
	●	Owatonna, Minnesota	Daikin Applied Americas Inc.
	●	Auburn, New York	Daikin Applied Americas Inc.
	●	Staunton, Virginia	Daikin Applied Americas Inc.
	●	Phoenix, Arizona	Daikin Applied Americas Inc.
	●	Louisville, Kentucky	American Air Filter Company, Inc.
	●	Columbia, Missouri	American Air Filter Company, Inc.
	●	Elizabethtown, Pennsylvania	American Air Filter Company, Inc.
	●	Atlanta, Georgia	American Air Filter Company, Inc.
	●	Ontario, California	American Air Filter Company, Inc.
	●	Fayettville, Arkansas	American Air Filter Company, Inc.
	●	Houston, Texas	Goodman Manufacturing Company, L.P.
	●	Houston, Texas	Goodman Manufacturing Company, L.P.
	●	Dayton, Tennessee	Goodman Manufacturing Company, L.P.
	●	Fayetteville, Tennessee	Goodman Manufacturing Company, L.P.
	●	Decatur, Alabama	Daikin America,Inc.
	●	Hanover, Massachusetts	Cri-Tech Inc
Mexico	●	San Luis Potosi	Daikin Manufacturing Mexico, S.de.R.L.de.C.V.
Brazil	●	Manaus	Daikin Ar Condicionado Amazonas Ltda.
	●	Mogi das Cruzes	Daikin McQuay ArCondicionado Brasil Ltda

● Airconditioning,Refrigirators and Heating Systems
● Fluorochemicals
● Filter and others

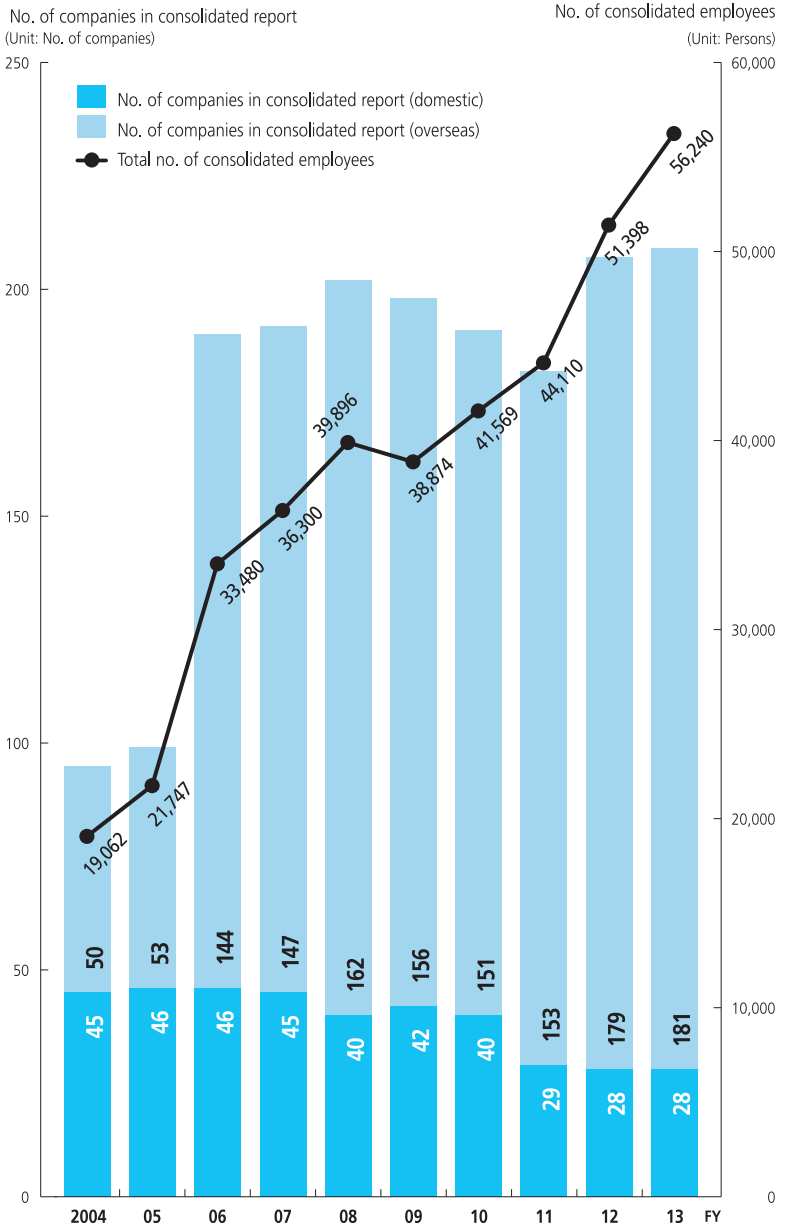
Trends in Sales and Net Income



Business/Finance Consolidated Sales Trends in Ordinary Profit



Trends in No. of Companies and Employees in Consolidated Report



Chronology

1924 Akira Yamada founds Osaka Kinzoku Kogyosho Limited Partnership in Osaka; company begins production of aircraft radiator tubes and other products.

1929 Company begins production of “Rational Lubricator(s)”.

1933 Begins research related to fluorine refrigerants.

1934 Osaka Kinzoku Kogyo Co., Ltd., established, with following corporate symbol:

Corporate Symbol

Trial manufacture of methyl chloride type refrigerator succeeds; called “Mifujirator” and production begins.

1935 Daikin succeeds in fluorocarbon synthesis; begins mass production in 1942.

1936 Daikin delivers “Mifujirator” refrigerator to Nankai Railways for trial use as Japan's first air conditioner for trains.

Production of oil hydraulic parts for aircraft begins.

1937 Sakai Plant established in Sakai, Osaka.

1941 Yodogawa Plant established in Mishima (today’s Settsu), Osaka.

1951 Production begins of packaged air conditioners.

1952 Subzero cryogenic unit developed.

1953 “Daiflon” fluorocarbon polymer (polychlorotrifluoro-ethylene) developed.

1955 “Polyflon” fluorocarbon polymer (polytetrafluoro-ethylene) developed.

1956 Heat exchange device installed on Soya, Antarctic research vessel, as cabin heating system.

1958 Residential-use air conditioners equipped with Japan's first rotary compressor marketed.

Heat-pump type packaged air conditioner developed.

1960 Pumps, valves, and other oil hydraulic equipment marketed.

1962 Production of turbo refrigerators begins.

General Technical Research Center established.

1963 Development of Neoflon fluorocarbon polymer (copolymer of tetrafluoroethylene and hexafluoropropylene) begins; product successfully marketed in 1974.

Osaka Kinzoku Kogyo Co., Ltd., renamed Daikin Kogyo Co., Ltd. (renamed Daikin Industries, Ltd., in 1982)

1969 Daikin develops multi-room air conditioning system with single outdoor unit.

Daikin utilizes refrigerant heater in air conditioner combining heating and cooling functions.

Clark Daikin, joint venture air conditioning sales company, established in Australia. (Name changed to Daikin Australia Pty., Ltd., in 1980)

1970 DAI-EL fluoroelastomer developed.

Shiga Plant established in Kusatsu, Shiga; full-scale production of residential room air conditioners begins there.

1972 Daikin Europe N.V. established in Ostend, Belgium. Knockdown production of air conditioners begins in 1973.

Mass production of carbon fluoride begins.

1975 DACS organic exhaust gas recovery and treatment equipment developed.

Home air purifier marketed.

1976 Daifree? fluorocarbon mold releasing agent developed.

Ulala FF kerosene warm-air heater marketed.

1978 Rinkai Factory established in Sakai Plant as compressor manufacturing factory.

Daikin successfully produces Japan's first Neoflon Film fluorocarbon polymer.

1980 A.C.E. Daikin (Singapore) Pte., Ltd., established as air conditioning system manufacturing and sales company.

1981 World's thinnest marine container refrigeration unit developed.

1982 Japan's first “VRV” system developed.

Comtec computer graphics system marketed.

Siam Daikin Sales Co., Ltd., established in Bangkok, Thailand, as air conditioning manufacturing and sales company.

Daikin Airconditioning Belgium N.V. established in suburban Brussels as air conditioning sales company.

1983 Kashima Factory established in Kashima, Ibaraki, to produce fluorocarbons and fluorocarbon polymers.

1984 Daikin becomes first in world to produce cumulative total of 1 million packaged air conditioners.

Daikin Airconditioning (Hong Kong) Ltd. established as air conditioning system sales company.

1985 Triosystem developed as industry's first heat-pump air conditioning and hot water supply multisystem.

Compact cryogenic helium refrigerator capable of achieving temperature of -269˚C (4K) developed

1987 "VRV" system enabling individual control for each floor installed in Umeda Center Building.

Daikin Headquarters moved to Umeda Center Building.

Daikin Airconditioning (Thailand) Ltd. established in Chonburi, Thailand, as air conditioning manufacturing and sales company.

1988 First "Daikin Orchid" Ladies Golf Tournament held.

1989 Comtec series three-dimensional graphics workstations marketed under OEM agreement with Silicon Graphics Corp., U.S.

Industry's first ice thermal storage type multi-room air conditioning systems (EXG Series) developed.

1990 Daikin Industries (Thailand) Ltd. established in Thailand; begins production of air conditioners in 1991.

MEC Laboratory established in Tsukuba, Ibaraki.

1991 Daikin America, Inc., and MDA Manufacturing, Inc., established in U.S. as fluorocarbon polymer production and sales companies; factory begins operation in 1994.

HFC-134a production plant established inside Kashima Factory and begins production.

Low-noise, high-safety multilevel parking system marketed.

1992 "Lezanova" fluorine-impregnated natural leather marketed.

Daikin Chemical Europe established in Dusseldorf, Germany, as fluorochemicals sales company.

1993 Charter on Global Environmental Preservation established.

Air Conditioning Network Service System, industry's first 24-hour online monitoring system for business air conditioners, developed.

Daikin Sunrise Settsu, Ltd., joint venture formed with Osaka Prefecture and Settsu City, established to employ people with disabilities; operations begin in 1994.

Daikin Airconditioning France S.A. established in Paris, France, as air conditioning sales company.

1995 Industry's first compact room air conditioner to use swing compressor to save energy marketed.

Daikin America's Decatur Plant establishes facility to produce fluorocarbon polymers for LAN wire coating.

Shanghai Daikin Yah Chong Airconditioning Co., Ltd., established in Shanghai, China, as joint venture; begins production of commercial-use air conditioners in 1996.

1996 Industry's first ice thermal storage type multi-room air conditioning system utilizing economical nighttime electricity marketed.

Daikin Foundation for Contemporary Arts established.

Xi'an Daikin Qing'an Compressor Co., Ltd., established in Xi'an, China, as joint venture.

A.C.E. Daikin (Malaysia) Sdn. Bhd. established in suburban Kuala Lumpur, Malaysia, as air conditioning sales company.

1997 Licensing agreements for new refrigerants (R410A, 407C, 404A) concluded with DuPont in U.S.

All Daikin factories in Japan (Sakai, Yodogawa, Shiga, and Kashima) acquire ISO 14001 certification for environmental management.

Huizhou Daikin Suns Airconditioning Co., Ltd., established in Huizhou, China, as joint venture and begins production of water chilling units.

"VRV" system employing new R407C refrigerant developed that does not damage ozone layer.

Daikin Trading (Thailand) Ltd. established in Bangkok, Thailand, as air conditioner parts trading company.

Daikin Asia Servicing Pte., Ltd., established in Singapore to supply service parts to Asian region.

Daikin Fluoro Coatings (Shanghai) Co., Ltd., established; begins production of fluoro coatings in China.

1998 Room air conditioners employing new R410A refrigerant marketed.

	Major overseas production subsidiaries acquire ISO 14001 certification for environmental management.
	Daikin-Alen Airconditioning Inc. established in Quezon, Philippines, as joint venture.
	Daikin Airconditioning South Africa Pty., Ltd., established in Cape Town, South Africa, as air conditioning systems sales company.
	"Super Inverter 60" packaged air conditioner, using 60% less electricity, marketed.
	Building equipment maintenance business begins.
	Environmental Report 1998 published.
	Daikin Airconditioning Germany GmbH established in Munich, Germany, as air conditioning sales company.
1999	Daikin Airconditioning Central Europe GmbH established in Austria as air conditioning systems sales company.
	"Ururu Sarara" marketed as world's first room air conditioner capable of regulating humidity with humidifying system having no water supply.
	Daikin becomes industry's first company to reach production of 5 million packaged air conditioners.
	Daikin concludes comprehensive global partnership with Matsushita Electric Industrial Co., Ltd., in air conditioning operations.
2000	"EcoRich" hybrid oil hydraulic pumps marketed.
	Matsushita-Daikin Air Conditioning Development Center established.
	Research department split into three companies: Daikin Air Conditioning R&D Laboratory, Ltd., Daikin Systems & Solutions Laboratory, Ltd., and Daikin Environmental Laboratory, Ltd.
	Daikin-Shriram Airconditioning, Ltd., established in New Delhi, India.
	Daikin Airconditioning Spain S.A. established in Madrid, Spain.
	24-hour, 365-day after sales service system for air conditioning and refrigeration established.
	DAI-ACT research and development company established in Daikin America.
	Operation of "Antsense"is transferred and ME Division abolished.

	Super Inverter "ZEAS", which substantially reduces burden on environment and overcomes three environmental issues of new refrigerant, energy saving, and recycling, marketed.
2001	Daikin Airconditioning Argentina S.A. established in Buenos Aires, Argentina, as air conditioning sales company.
	Daikin Compressor Industries, Ltd., established in Bancock, Thailand, as swing compressor manufacturing and sales company.
	Daikin Airconditioning Poland sp. z.o.o. established in Warsaw, Poland, as air conditioning sales company.
	Age limit for re-employing Daikin retirees extended to 65.
	Daikin Fluorochemicals (China) Co., Ltd., established in Changshu, China.
	Daikin Contact Center opens as comprehensive customer service desk related to air conditioning (in Tokyo and Osaka).
	Photo resistant fluorocarbon polymer developed for manufacture of next-generation semiconductors developed.
	Daikin Chemicals France S.A.S. established in suburban Lyons, France, as fluoroelastomer manufacturing company.
	Taiwan Daikin Advanced Chemicals Inc. established in Taipei, Taiwan, as fluorochemicals sales company.
	Daikin (China) Investment Co., Ltd., established in Beijing, China, to control all production and sales bases for air conditioning and chemical businesses.
	Daikin and Sauer-Danfoss Inc. of U.S. agree to establish joint venture in oil hydraulics business.
	Technical tie-up formed with US company Omnova Solutions Inc. to develop fluorine chemical products.
	Daikin and US company Sauer-Danfoss Inc. establish Daikin Sauer-Danfoss Manufacturing, Ltd., as manufacturing joint venture company and Sauer-Danfoss-Daikin, Ltd., as sales joint venture in mobile oil hydraulic business.
	Daikin and US company Trane agree to establish global strategic tie-up in air conditioning business.
	All mechanical departments achieve zero waste when mechanical department of Yodogawa Plant achieves it.

2002

Achieved zero waste of resources in all mechanical departments.

"EcoCute", natural refrigerant (CO_2) heat pump type water heater, marketed.

Nationwide development of fluorocarbon recovery and destruction business begins.

Nikkan Kogyo Shimbun's 11th Annual Grand Prize for Global Environment awarded to Daikin.

Headquarters of Daikin Airconditioning Italy S.r.l. established in Milan and branch office established in Rome.

"Conveni-Pack ZEAS-AC", industry's first integrated system for refrigerators, freezers and air conditioning, developed.

Daikin Group Philosophy established.

2003

Daikin Air-Conditioning Technology Co., Ltd., starts business in Beijing, Shanghai, and Guangzhou as industry's first wholly foreign-owned service company in China.

Daikin Industries Czech Republic s.r.o. established in Pilsen, Czech Republic, as production base for air conditioning equipment.

Corporate Ethics Committee and Corporate Ethics Department established.

Daikin Airconditioning U.K., Ltd.,established in U.K.

Ve-up Q Series, "VRV" for replacement needs, marketed.

Daikin Air-conditioning (Shanghai) Co., Ltd., and Daikin Central Airconditioning (Shanghai) Co., Ltd., established in Shanghai, China, as production bases for air conditioning equipment.

Daikin achieves top market share of residential air conditioners throughout fiscal 2003.

Shiga Plant achieves production total of 15 million room air conditioners.

Titanium apatite photocatalyst filter developed and commercialized for first time in world.

Tsinghua University in China and Daikin form tie-up to develop air conditioning technology and establish Tsinghua-Daikin R&D Center in Tsinghua University as R&D base.

Daikin Device (Suzhou) Co., Ltd., established in Suzhou, China, as production base for air conditioner compressors.

Technology for egg antibody bio filter, which captures influenza virus in air, developed.

2004

"Conveni-Pack ZEAS-AC" wins Minister of Economy, Trade a nd Industry Award; top honor among Energy Conservation Grand Awards.

Nationwide development of fluorocarbon recovery and destruction business begins.

UX Series, wall-mounted inverter type air conditioner with slim and compact design, marketed.

Super Unit oil hydraulic equipment wins Japan Machinery Federation's Chairman Award for excellent energy conservation performance.

Group companies in Japan acquire integrated ISO 14001 certification for environment.

Daikin introduces executive officer system.

Daikin Applied Systems Co, Ltd., established to manufacture and sell central air conditioning equipment and provide design, installation, sales, and service of air conditioning and refrigerant systems.

Daikin Motor (Suzhou) Co., Ltd., established in Suzhou, China, as joint venture with Matsushita Electrical Industrial Co., Ltd., to produce and sell compressor motors for air conditioners.

Commemorative project for 80th anniversary of Daikin's foundation launched.

New Daikin corporate symbol established for common use among Daikin Group companies worldwide.

Corporate symbol

Daikin shares sales unit reduced to 100 shares.

Daikin Device Czech Republic s.r.o. established in Brno, Czech Republic, as production base of compressors for air conditioners.

Daikin Airconditioning Portugal S.A. established in Lisbon, Portugal, as air conditioning sales company.

2005

"Ururu Sarara" F Series featuring temperature control for comfortable sleep marketed.

Solutions Plaza Shanghai opens in Shanghai, China, as China's first large-scale specialized showroom for air conditioners.

Collaboration agreement concluded with US Dow Corning Corporation in exploration of new areas of fluorosilicone chemistry.

Daikin opens Moscow Office.

Business tie-up agreement concluded with Aisin Seiki Co., Ltd., in field of gas heat pump type air-conditioning (GHP).

Daikin Environmental Laboratory, Ltd., and Daikin Air Conditioning R&D Laboratory Ltd. are integrated to establish Daikin Air-Conditioning and Environmental Laboratory, Ltd.

CSR Committee and CSR Department established to promote CSR activities of entire Daikin Group.

Holding company Daikin Holdings (USA), Inc., and air conditioning sales company Daikin AC (Americas), Inc., established in U.S.

2006 Environment Readiness Section established in Daikin Europe N.V. to assume environmental leadership in Europe.

Daikin formulates Fusion 10, mid- to long-term strategic management plan, aiming to maximize corporate value and become truly global excellent company.

Oil hydraulic multi-level parking system business transferred.

OYL Industries (Malaysia), major global air-conditioning manufacturer, acquired as Daikin aims to become No.1 air-conditioning manufacturer.

Daikin Airconditioning Greece S.A. established in Athens, Greece.

First publication of CSR Report to introduce Daikin Group's unique CSR activities.

Daikin Air-conditioning Systems (Shanghai) Co., Ltd., certified as vocational training site for physically challenged persons in Shanghai, first for foreign-affiliated manufacturer in China.

Four production bases in China, including Shanghai Daikin Air-conditioning, Daikin Air-conditioning Systems (Shanghai), Daikin Central Air-conditioning (Shanghai), and Daikin Central Air-conditioning (Huizhou) integrated to establish Daikin Air-conditioning (Shanghai) Co., Ltd.

Refrigeration Business Department established aiming for global development of refrigeration (cooling and freezing) business.

Daikin Rexxam Electronics, Co. Ltd., established as joint venture to develop, produce, and sell electronic devices related to air conditioning.

2007 Turkey Office established in Istanbul, Republic of Turkey.

Daikin Airconditioning Netherlands B.V. established in Schiedam, Kingdom of the Netherlands.

Clear Force air purifier marketed with industry's first full-fledged humidifying and dehumidifying features.

Water-based fluoropolymer coating material with superior anti-stain and weather resistance properties jointly developed between Daikin and LANXESS Deutschland GmbH.

DESICA, industry's first air treatment unit for controlling humidity without water piping, marketed.

Company for production and sale of hydrofluoric acid established with China Centralfluoro Industries Group Co., Ltd.

Joint venture established in China with French company Arkema Incorporated to market new refrigerant for air conditioners.

Daikin Refrigeration (Suzhou) Co., Ltd., established in China for producing marine container refrigeration units.

Ladies professional golfer Shinobu Moromizato signs endorsement contract with Daikin

2008 Commemorative campaign conducted to celebrate 50th anniversary of Daikin room air conditioner.

Air Conditioning Network Service System II, remote monitoring system for air conditioners, begins.

Daikin Airconditioning Korea Co., Ltd., established.

German heating manufacturer Rotex Heating Systems GmbH acquired.

Daikin MR Engineering Co., Ltd., starts operation.

Daikin becomes first in air conditioning industry to be endorsed as Eco First Company.

Remote energy-saving tuning service wins Ministry of Economy, Trade, and Industry Award among Eco Product Awards.

Daikin and Gree Electric Appliances agree to establish joint venture.

Daikin Human Support Co., Ltd., merged.

2009 Hexagon Module Chiller for buildings and factories marketed.

Commemorative "Pichonkun" campaign-car goes on Eco Road Trip" conducted to celebrate 10th anniversary of "Pichonkun".

Development and testing facility established at Daikin McQuay Applied Development Center in U.S.

Established Daikin McQuay Solutions Plaza in New York metropolitan area.

New factory established at Daikin Sunrise Settsu Co., Ltd.

Residential heat pump hot water heater marketed for Chinese market.

Daikin acquires Nippon Muki Co., Ltd., major Japanese air filter company.

"Zeffle" Infrared Reflective Coating, coating using 4-fluoro type fluoropolymer coatings, wins energy award in Lloyd's List Global Awards 2009.

Water-cooled "VRV" units delivered to 2010 FIFA World Cup™ Stadiums in South Africa.

"Ururu Sarara" (R Series) air conditioner featuring world's first 4-directional airflow (up, down, left, and right) marketed.

"ZEAS" Refrigeration Condensing Unit for deep freezing applications marketed.

Flash Streamer Antibacterial Unit for buses developed as first application of Flash Streamer technology.

2010 "Eco-ZEAS 80" energy-saving inverter type air conditioner marketed.

Daikin/Arkema joint venture starts production of new refrigerant in China.

Daikin McQuay Solutions Plaza established in New York to exhibit cutting-edge, large-scale air conditioning equipment

Tree local sales subsidiaries of oil hydraulic machineries integrated into "Daikin Hydraulic Engineering Co., Ltd."

Daikin Europe begins cross-border academic-industry cooperation project to construct Net Zero Energy Office, which has net zero energy use, in Germany.

"Daikin Altherma" for apartment buildings and collective housing, air-to-water heat pump system for heating, cooling, and domestic hot water, marketed in European market.

Commercial-use air purifier equipped with flash streamer marketed.

Daikin and Nippon Valqua form capital alliance for fluoropolymer business in China

Achieving Global No. 1 Position in Air Conditioning

2011 Air conditioning sales subsidiaries in Japan reorganized to establish subsidiary specializing in sales for mass retailers.

Daikin Air Survey Team, which verifies simple customer concerns, formed.

Miharimo power saver controller and Soine sleep time controller marketed.

DESICA, commercial-use air treatment unit for controlling humidity, wins Minister of Economy, Trade and Industry Invention Award at National Convention for Invention

Daikin acquires Turkish heating and air conditioning manufacturer Airfel.

Agreement concluded with Shiretoko Nature Foundation and towns of Daikin opens new solutions plaza "Fuha Tokyo".

Daikin becomes first Japanese company awarded "Best Employers for Workers Over 50 Award" by AARP (former American Association of Retired Persons).

ZESTIA marine container refrigeration unit marketed.

Daikin opens a new solutions plaza "Fuha Tokyo".

Daikin's largest air conditioning production base established in Suzhou, China.

2012 "ZEAS" series featuring world's first all aluminum constructed "microchannel heat exchanger" marketed.

Daikin markets RakuAir, first residential air conditioner in Japan to use design psychology in development.

Daikin adopted by METI as Manager to Promote Introduction of Energy Management System (BEMS aggregator).

PT. Daikin Airconditioning Indonesia established.

Major American residential use air conditioner company Goodman acquired to build solid base for positioning Daikin as leading company in global air conditioner market.

"Urusara 7" ("Ururu Sarara" R series), featuring world's first adoption of next-generation refrigerant HFC32 in residential air conditioner, marketed.

Daikin-Sauer-Danfoss Manufacturing Ltd., which performs all

activities of product development, manufacturing, and sales of oil hydraulic equipment used in construction machinery, established.

DESICA HOME AIR, residential use control unit for humidity and ventilation of entire building, marketed.

2013 Residential air conditioner “Urusara 7” receives various awards including "Prime Minister's Award" of 5th Monozukuri Nippon Grand Awards for excellent engineering, "Minister Prize of Economic, Trade and Industry," Energy Conservation Grand Prize for excellent energy conservation equipment, and Red Dot Design Award.

Daikin opens new solutions plaza “Fuha Osaka”.

Agreement with Kyoto University for comprehensive partnership concluded with aim of creating new social value by integration of arts and sciences.

TSP, leading distributor of commercial HVAC equipment in Indonesia, acquired.

Clear Force Z, air purifier using Streamer technology and having humidifying and dehumidifying functions that automatically control room humidity, marketed.

“FIVE STAR ZEAS”, air conditioner for stores and offices that is first commercial air conditioner to use new refrigerant HFC32, marketed.

Daikin Europe celebrates 40th founding anniversary.

Daikin Asahikawa Laboratory established with aim of expanding heater and hot water supply system business.

Daikin Air Conditioning Saudi Arabia established

Index

24-hour, 365-day service system 187, 242, 267
40th anniversary 45
70th anniversary 167
80th anniversary 235, 297
90th founding anniversary 377

A

ACE, Pte. Ltd. 102
"Acson" 335, 337
Adams, Clifford 157, 158
agricultural chemicals 36, 37
agricultural machinery 45-47, 68
air cleaners 285, 364,365,369
Air Conditioning Business School 186
air conditioning equipment exhibition 68, 95
Air Conditioning Network Service System ("AirNet") 187, 242, 357
aircraft assembly plant 26, 74
aircraft parts/components 6, 7, 16, 19, 23, 25, 26, 28, 74
air handling unit 239, 323, 330, 332
air purifier business 178
"AIRSHOP" 321, 322
Airfel Co. 330-332, 338
all-weather structure 85, 93, 118, 119
Altherma: see "Daikin Altherma"
American Air Filter (AAF) 308, 335, 345, 347, 369-371
anhydrous hydrofluoric acid 28, 62, 63, 361
antidumping charges 153
Anti-pollution movement 48, 107, 164
"Antsense" 215, 216
Arkema 208, 361
Asahi Glass Co., Ltd. 63, 80, 112, 208
Asahikawa Lab 368

B

BASF 151
Behavioral Guidelines for Protecting Environment 119-121, 165
Best Practice, Our Way 232
business ties 13, 39, 183, 199, 201, 203, 207, 239, 240, 265, 266, 269, 273, 306, 309, 318, 346, 365, 378, 379

C

Cab Cooler 54
Carrier Corporation 92, 103, 105, 175, 201, 204, 206, 265, 274, 307, 308, 317, 318, 323, 333, 348, 349

cartridge cases 3, 4, 8, 9, 12, 16
cell production method 192, 250, 252
centrifugal chillers 56
CFC regulations 142, 149
Changshu Plant 275, 276
chlorofluorocarbon (CFC) 61-65, 68, 97, 98, 118, 124, 141, 142, 147, 149-153, 165, 207
Chrysler 51, 52, 89
chiller 54, 56, 61, 103, 204, 239, 255, 270, 323, 329, 331, 339
Clark Daikin Co. 69
COCOM 118, 142-147
composite cylinder 286, 287
compliance 147, 149, 177, 228, 289, 290, 372, 379
compressors 35, 52, 53, 59, 60, 90, 97, 98, 100, 110, 130, 131, 136, 139, 152, 183, 189, 198-200, 203, 246, 255, 263, 264, 270, 284, 315, 319, 321, 328, 330, 333, 334, 369
construction material 45-47, 294
"Convini-Pack ZEAS" 255
corporate culture 50, 156, 160, 167, 204, 227, 229, 232, 350
Corporate Ethics 120, 177, 228, 229, 288-290, 379
corporate governance 224, 225, 229
corporate principles 157, 159, 175, 177, 229
corporate social responsibility (CSR) 218, 230, 289, 371-373
cross-licensing 212, 213, 214
cryogenic equipment (cryopump) 54, 89-91
current aggregate value 175, 226, 299,
customer-first policy 228, 231
customer satisfaction 241, 371
Customer Support Center 364

D

Dai-el 362
"Daiflon" 27, 62, 63, 65, 68, 115
Daikin (China) Investment Co., Ltd. (DCI) 268, 269, 321, 368
Daikin Advanced Fluorochemicals (Chagshu) 361
Daikin Air Conditioning Co. 69, 102
Daikin Air Conditioning Federation 185
Daikin Airconditioning (DAC) 69, 70, 102
Daikin Airconditioning America (DAA) 105, 343
Daikin Airconditioning America (DACA) 346
Daikin Air-conditioning (Shanghai) Co. 321, 376

Daikin Air-conditioning (Suzhou) Co. 321, 322
Daikin Airconditioning (India) Pvt. Ltd. (DAIPL) 338, 339
Daikin Airconditioning (Indonesia) 340
Daikin Airconditioning (Malaysia) 337
Daikin Airconditioning (Thailand) Ltd. (DAT) 139
Daikin Airconditioning America Co., Ltd. (DAA) 105, 343, 346
Daikin Airconditioning Central Europe (DACE) 205
Daikin Airconditioning Germany GmbH (DAG) 205, 259
Daikin Airconditioning Italy (DACI) 259
Daikin Airconditioning Poland (DAPO) 259
Daikin Airconditioning Spain S.A. (DACS) 205, 259
Daikin Airconditioning Technology Research Center 248
Daikin Airconditioning U.K. (DAUK) 259, 260
Daikin Airconditioning Systems (Shanghai) Co., Ltd. (DASS) 270
Daikin Air Techno Co. 367
Daikin Ales Aoya 374
"Daikin Altherma" 307, 310, 324-326, 329
Daikin America Inc. 156, 159, 220, 277, 344, 362
Daikin Applied Americas Inc. (DAAI) 345, 346, 348
Daikin Applied Solutions Indonesia 340
Daikin Applied Systems Co., Ltd. 241
Daikin Arkema Refrigerants Asia Ltd. 361
Daikin Asia Servicing Pte Ltd. (DAP) 198
Daikin Business School 235
Daikin Central Airconditioning (Shanghai) Co., Ltd. (DCAS) 270, 273
Daikin Chemical America (DCA) 156
Daikin Chemical Europe (DCE) 210, 211
Daikin Chemical France (DCF) 211, 278, 279
Daikin Chemical Netherlands B.V. 211, 278
Daikin Chemicals (Hong Kong) Co., Ltd. (DCHK) 209
Daikin CNCCC Chemical Trading (Shanghai) Co., Ltd. 210
Daikin Consumer Marketing (DCM) 366
Daikin Contact Centers 292
Daikin Device (Suzhou) Co., Ltd. (DDS) 270, 271
Daikin Device Czech Republic (DDCZ) 264, 328
"Daikin Eau de Ciel Tateshina" 164, 377
Daikin Electronics College 87
Daikin Electronics Technology Center 87
Daikin Europe N.V. (DENV) 71, 103, 135, 220, 257, 273, 323, 326, 372
Daikin Fluorochemicals (China) Co., Ltd. 275, 361, 362
Daikin Fluoro Coatings (Shanghai) Co., Ltd. 209, 210, 361
Daikin Foundation for the Promotion of Modern Art 222, 297

Daikin Group CSR Report 372, 373
Daikin Industries (Thailand) Ltd. (DIT) 136, 137, 139, 220, 257, 321, 376
Daikin Industries Czech Republic (DICZ) 263, 264, 328-330, 333, 334
Daikin Institute of Advanced Chemical Technology 277
Daikin Institute of Air Conditioning Engineering 186
Daikin Investment Co. 268, 269, 321
Daikin Kogyo Co., Ltd. (DKC) 45, 57
Daikin McQuay Ar Condicionado Brasi Ltda 342
Daikin McQuay Mideast (Dubai) 327
Daikin McQuay Applied Development Center (ADC) 344, 345
Daikin McQuay Applied Solutions Plaza 345
Daikin Modine Inc. (DMI) 206, 344
Daikin Motor (Suzhou) Co., Ltd. (DMS) 270
"Daikin Orchid" Ladies Golf Tournament 162, 163, 297
Daikin Production System (see PDS) 85, 110, 140, 190, 239, 337
Daikin Sauer-Danfoss Manufacturing Ltd. 283
Daikin Shriram Airconditioning Co., Ltd. (DSL) 202
Daikin Sunrise Settsu, Ltd. 165, 166, 296, 375, 376
Daikin Technical Skill Olympics 253
Daikin Technology Statement 231, 245, 246, 254, 279, 352
Daikin Telecommunications (Ningbo) 361
Daikin Trading (Thailand) Ltd. (DTL) 198
Daikin Turkey A.S. (DTAS) 327-329, 331, 332
Daikin Way 175, 178, 225, 226, 234
Daikin's 70-year history 168
Daikin-Alen Airconditioning Co., Ltd. (DAAL) 202
Decatur Plant 156, 158, 159, 207, 212, 344
Delta Motors 69
Declaration of a Safety Emergency Situation 280, 281
Desica Home Air 357
diesel engines 25, 36, 68
differentiated products 202, 353, 355, 367, 368
distributors 70, 103, 140, 141, 181, 204, 205, 259, 340, 367
diversification of employees 371, 374
Dow Chemical 151
Dream Teams 186
Duct-type air conditioners 198, 206, 266, 267, 320, 341, 342
dumping charges 142, 153
DuPont 19, 27, 34, 63, 64, 80, 112, 153, 208, 209, 213, 214, 277, 278

E

Earthquake, Great Kanto 7
Earthquake, Hanshin Awaji 218
Earthquake, Great Eastern Japan 304, 310, 311, 329, 347, 355, 357,

358
"EcoCute" 256, 358, 365, 366
"EcoRich" 283-286
EFEP 277, 278
electric appliance stores 183, 184, 192, 193, 196, 245
electric refrigerators 29, 35, 43, 58
electronic equipment business (division) 88, 287
Electronics Manufacturing Service (EMS) 335, 357
Electronics Technical Center 97, 98
Employee retirement age 81-83, 296, 374
employment of disabled persons (workers) 165-167, 296, 297, 375-377
Energy conservation 97, 188, 189, 195, 242, 254, 255, 275, 285, 290, 319, 320, 348, 355, 356, 368, 369
Environmental action plan 290, 291, 371, 372
environmental pollution 47, 49, 107, 319
Environmental Report 165, 220, 290-292, 372
Environment Research Center 248
Environmental Research Lab 86
ETFE 112, 158, 208, 211, 362
European Development Center (EDC) 328
"Evanet" 215, 216

F

Facility Control System 187
factory automation 130, 131, 287
fan coil unit 239, 270, 332
fast and flat management 174, 179, 181, 224, 229, 232, 263
FEP 112, 115, 153, 158, 208, 211, 277, 279, 361, 362
filter unit 208, 278, 308, 369, 370, 371
fire extinguisher 10, 16, 143
fluorite 62, 361
fluorocarbon 19, 20-26, 28-35, 38, 40, 48, 61-65, 68, 97, 98, 101, 118, 124, 141, 142, 147, 149, 150, 152-154, 207, 213, 214, 219, 282, 291, 362, 371, 372
fluoroelastomer 112, 207, 211, 278, 362
fluororesins 34, 37, 43, 62, 64, 65, 80, 85, 112, 113, 118, 124, 141, 151, 153-155, 173, 175, 207, 209, 212, 276, 277, 282, 361
Formosa Daikin Advanced Chemicals Co., Ltd. 279
flexible working hours 161, 249
Fred Clark Ltd. 69
"Freon" 23, 27, 33, 34

Fiber reinforced plastic (FRP) 218, 286
diesel engines 25, 36, 68
"Fuha Osaka" 368
"Fuha Tokyo" 368
"Furatol" 37
Fusion 05 223, 227, 229, 230, 283, 295
Fusion 10 305-307, 333
Fusion 15 311, 312, 315, 336, 341, 373
Fusion 21 173, 174, 176, 179, 197-199, 204, 206, 225, 228, 229
Fusion 21D 176, 221, 225

G

gas heater 58
General Motors (GM) 19, 22, 27
general shareholders meetings 226
global environment 148, 164, 165, 202, 219, 247, 248, 292, 294, 351, 371
Global Mini-Split (GMS) 188, 193, 196, 202, 336, 351
governors 26
Gree 274, 309, 318-321, 323, 328, 331, 336, 353, 378
Gree Electric Appliances 309
Green Procurement 220, 291
Group Environment Conference 220, 290
Group Management Meeting 233-235
Group Philosophy 231-234, 254

H

Halon 2402 143, 144, 148
hand dryer 58
HCFC 149, 151-153, 207, 211
heat pumps 51, 88, 89, 97, 101, 105, 106, 256, 307, 324-326, 331, 354, 358, 359
heating and cooling units 16, 18, 19, 54
heating equipment 18, 51, 57, 58, 287
Hesselman engines 25, 36
HFC 151-153, 207, 213, 261, 291, 292, 294, 295, 315, 354-356, 361, 369
Higgs, R.C. 69, 70
high-cycle production method 187, 191, 193, 237, 239, 249
Hirata, Masato 21
Hirohata Works of Fuji Steel 66
Hitachi Ltd. 16, 52, 311
Huizhou Daikin Suns Airconditioning Co., Ltd. 200
Huizhou Daikin Co., Ltd. 267, 269

Hyuga, Hosai 75

I

icemaker 35, 90
ICI Co. 66, 112, 208
Imamiya Plant 9, 10, 23-25
Inoue, Noriyuki 48, 75, 144, 150, 171-173, 175, 178, 180, 181, 199, 203, 204, 221, 224, 227, 229, 230, 234, 240, 245, 246, 271, 274, 297, 306, 309, 310, 313-315
Inoue Yoshikuni 75, 81
Inoue Yoshiyuki 36, 37, 150
Imora Makmur, PT 340
intelligent delivery center 133
Intergovernmental Panel on Climate Change (IPCC) 371
internal permanent motors (IPM) 284
inverter-type air conditioners 87, 100, 101, 260, 267, 309, 318-320, 337, 341, 359, 372
iodine migrating polymerization method 113
ISO 14000 certification 167, 177, 220, 291
ISO 9000 certification 134, 135
Iwaki, Toru 21

J

Japan Fluororesin Industry Association 64
J&E Hall 335, 347
Jiangxi Datang Chemicals Co., Ltd. 361

K

Kanaoka Factory 56, 57, 60, 86, 109, 110, 123, 129, 130, 135, 353
Kansai Association of Corporate Executives (KACE) 47, 75
Kansai Economic Council 168
Kanzakigawa Plant 26, 27, 30, 32
Kashima Plant 106 114, 115, 123, 148, 151, 157, 213, 281, 293
Kasuga, Hiromu 42
Kawasaki Aircraft Industries 25, 67
kerosene engines 36, 68, 102
Kitai, Hiroyuki 229, 230, 236, 289
Komatsu Ltd. 40
Kometani, Yuzuru 154, 156
Korean War 38, 39

L

Labor Management Council 44, 47

labor relations 32, 33, 42, 44, 46, 47, 48, 76, 120, 161, 226
labor regulations 48
labor union 31, 32, 44, 47, 48, 77
layoffs 33, 46, 77, 78, 82
Lehman Crisis 302, 303, 305, 309-311, 315, 323, 334, 337, 342, 345-347, 358, 360, 362-364
"Lezanova" 208
logistics system 201, 204, 237
lubricating devices 19, 66

M

management by ratio 226, 227, 229, 299
management without layoffs 77, 78, 82
marine container 91, 92
Masuda, Sadaji 30, 31
Matsui, Tsunesaburo 4, 5, 7
Matsushita Electric Industrial Co., Ltd. (MEI) 58, 198, 202, 203, 244, 270, 273, 333
McQuay Applied Develop Center (ADC) 344, 345
McQuay Applied Solutions Plaza 345
McQuay ArCondicionado Brasil 342
McQuay International Corp. 266, 274, 307-309, 316, 331, 335, 339, 340, 342-345, 349
McQuay China 315, 316, 318, 329
McQuay Italy 329
McQuay U.S. 345, 347
MDA Manufacturing, Inc. 156, 362
MEC Laboratory 122, 124, 125
medical equipment (ME) business 92, 215, 218, 287
Medium-Term Business Plan 206
Megatherm 141, 204, 259
Meister system 253
Miami Incident 105, 106, 137
Micro-channel heat exchanger 354
Midea 274, 318, 319
"Mifujirator" 22, 23, 50
Ministry of International Trade and Industry (MITI) 63, 64, 86, 88, 97, 143-147, 357
Ministry of Economy, Trade and Industry 375
Minnesota Mining and Manufacturing (3M) 155, 156, 158, 208, 362
Mitsubishi Aircraft Corporation 16
Mitsubishi Electric 52, 333, 335, 337
Mitsubishi Heavy Industries 24, 52, 74, 331
Mitsui Chemical 34
Mitsui Fluorochemicals 65, 80

Mitsui-DuPont 213
Montreal Protocol 141, 148, 214
Moriyama, Masayuki 316
Moscow Office 260, 327
multi-type air conditioner 94, 99, 104, 260, 323

N

Nakajima Aircraft 5, 6
Nakayama, Sohei 162
National Museum of Art, Osaka 168, 222
National Refrigerators Inc. 207
Neoflon 115, 153, 158, 208
Neurofine 208
New York Office 154, 155, 343
Nihon Suisan Kaisha, Ltd. 35, 54
Nihon Kokan (JFE Steel Corporation) 67
Nippon Oil & Fats Co., Ltd. (NOF) 41
Nippon Muki Co. 370, 371
Nippon Telegraph & Telephone Public Corporation (NTTPC) 51-53
Ningbo Dongfang Daikin Scientific and Technical Communications Co. 276
Ningbo Toho Daikin 361
Nitto Chemical Industries 63, 65
non-inverter type sir conditioners 136, 266, 321, 334, 339, 353,

O

O.Y.L. Industries Bhd. 266, 305, 307-310, 315-318, 335, 344, 346, 347, 350, 352, 369, 372, 378
OYL Manufacturing 323, 328, 329, 335-339
Oil Crisis 49, 73, 76, 78, 79, 81-83, 93-97, 101, 102, 108, 111, 112, 114, 161
Oil hydraulic equipment (business) 25, 45, 66, 67, 69, 76, 126, 149, 166, 174, 176, 178, 216, 217, 226, 255, 270, 282-284
Okamura, Kazuo 17, 20, 21
Okano, Yukiyoshi 230, 236, 314
Okinawa Business Leaders' Forum 163
Optool 360
Osaka Artillery Arsenal 2, 17
Osaka Kinzoku Kogyo Co., Ltd. (OKKC) 15, 16, 45, 47, 50
Osaka Kinzoku Kogyosho (OKK) 6, 16, 50
Ostend Plant 70, 140, 261, 262, 329

P

packaged air conditioners 50-52, 54, 61, 69, 71, 85, 94, 95, 97-99, 105, 109, 128, 132-134, 170, 171, 180-182, 188-190, 198, 201-203, 254, 267, 270, 273, 284
Pansonic see Matsushita Electric Industry 244, 333
PDS (the Production of Daikin System) 85, 110, 140, 190, 239, 249, 337
Pennwalt Corporation 157
people-centered 178, 227, 229, 232, 237, 312, 313, 378
PFA 112
"Pichonkun" 196, 245
plenum cable 115, 153
Pollution Countermeasures Fundamental Low 107
"Polyflon" 64-66, 115, 153, 154
polytetrafluoroethylene (PTFE) 63, 112, 115, 153, 154, 156, 158, 208, 211, 275, 276, 361, 369, 370
Power Motion Control Business 255, 285
President's Award 98
"PROSHOP" 321, 322
project for planting trees 377
qualification system 47, 82, 129

Q

qualification system 47, 129

R

radiator tubes 5-7, 11, 16, 18
"Rational Lubricator(s)" 8, 9, 12, 16, 24, 29, 66
reduction in working hours 160, 161
refrigerants, new 151, 152, 160, 175, 213, 276, 282, 290, 292
refrigerants, recovery of 292, 295
refrigerants, substitute 152, 213
refrigerator 20-22, 29, 32, 35, 43, 58, 61, 68, 76, 89-91, 147, 207, 239, 255, 371, 372
reefer containers 55, 91
re-employment 296
reluctance DC technology 189, 254, 255
remote monitoring system 187
Renesas Electronics Corporation 355
Reorganization Plan 32, 33, 37
Research Laboratory 89, 112
residential air conditioner 102, 105, 106, 130, 221, 347, 348, 363
Rinkai Factory 106, 108, 110, 114, 123, 130, 131, 133, 135

robot business (robotics) 86, 126, 131, 178, 179, 214-216, 250
rotary compressor 59, 62, 97, 139, 199
ROTEX Heating Systems GmbH 326, 328

S

Sakai Plant 23-31, 34, 36, 41, 51, 57, 60, 76, 86, 107-109, 111, 129, 130, 220, 294
sales affiliates 177, 186, 187, 190, 204, 205, 330
sales agencies 53, 59, 70, 78
sales agent 36, 95, 102, 138, 338, 343
Sauer-Danfoss 67, 283, 284
Sauer-Danfoss-Daikin Ltd. 283
scroll compressors 130, 200, 203
service engineers 128, 129, 243, 288
Service Engineering College 129
Shanghai Daikin Airconditioning Co., Ltd. 199, 267, 269
Shanghai Daikin Yah Chong Airconditioning Co., Ltd. 199, 200
Shanghai Valqua Fluorocarbon Products Co., Ltd. 362
Shiga Plant 59, 60, 87, 94, 111, 123, 128-132, 135, 193, 198, 250, 251, 294
Shingu, Haruo 65
shock absorbers 25
Siam Daikin Sales Co. 103
"SkyAir" 97, 106, 130, 131, 140, 184, 188, 189, 198, 199, 202, 204, 267, 323, 329, 333, 338, 340, 342, 343, 369
social contribution activities 160, 165, 167, 168, 274, 289, 371
sole distributors 103, 204, 205, 259, 340
solar batteries 357, 362
solid ring type bobbins 11
solution business 202, 241, 247, 248, 345, 347
Solution Plaza 274, 369
special procurements 31, 40, 42, 47
split-type air conditioner 69, 105, 140
strategic alliances 176, 202, 203, 212, 213
strategic business units (SBU) 174, 287
submarines 19, 22, 23
Sub-zero 54
Sumitomo Bank 38, 53
Sumitomo Chemical 46, 55, 75
Sumitomo Copper and Steel Piping 16
Sumitomo Corporation 153
Sumitomo Light Metal Industries 354

Sumitomo Metal Industries, Ltd. (Sumitomo Copper Works) 16, 17, 18, 39, 40, 43, 45, 66, 75, 114

Sumitomo Steel Works 17
Sundstrand Corporation 67, 68
"Super Inverter 60" ("SkyAir") 184, 188-190, 254
Superheated steam method 66
Super Green Heart Factory 376
Superior Skills Succession Committee 253
Supply chain management (SCM) 237-239, 284, 333, 348, 366
synergetic effect 307, 315, 324, 326, 336, 348-350, 369

T

Task Force 175, 190, 225, 265, 283, 289
technical agreement 69, 90
technical ties 56, 57, 63, 90, 283
technical training courses 140
Technology Innovation Center (TIC) 358
Technology Statement 231, 245, 246, 254, 279, 351, 352
"Teflon" 63, 65
time card system 47
Togawa, Masanori 236, 314, 315, 379
Tokunaga, Masaaki 36
Toshiba 89, 143, 201, 204
Toyo Cotton Spinning 11
Toyo Yasuri Shindo Co., Ltd. 4, 17
Toyota Motor Corporation 108, 152, 170, 192, 224, 238, 251
Toyota Production System 85, 96, 108, 109, 239
TPM 132
Trade Control Office 145
trade school 25, 36
Trane Company 204, 239-241, 265, 266, 308, 333, 349
Tsuboi, Yasushi 108, 110
Tsuchiya, Yoshio 42, 45, 46, 50, 73

U

U.N. Climate Change Conference (COP 20) 334
U.N. Environment Programme (UNEP) 148
U.K. Office 205
UNESCO World Natural Heritage 372
United Technologies Co. 175
unprofitable businesses 46, 47, 126, 174, 178, 215
cold summer 84, 85, 93, 94, 101, 125, 245
"Ururu Sarara" 187, 188, 189, 195, 196, 219, 244, 351, 355

"Urusara 7" 307, 315, 355, 356, 368, 369

V

Variable Refrigerant Volume ("VRV") 99, 104, 129, 140, 141, 204, 260, 262, 267, 270, 273, 322, 329, 331-334, 338-342, 346, 348
Viet-Kim Co. 334
vinyl chloride pipe 44-46
virtual companies 178, 226, 227
Vision 55 81
Vision 60 83, 84
Vision 65 84

W

warp tying machines 11, 24
water chilling units 70, 200
Whirlpool 60, 90
Window-type air conditioners 59, 60, 69, 101, 104
Worthington Corporation 56

X

Xi'an Daikin Qing'an Compressor Co. 200

Y

Yamada Scholarship Foundation 80
Yamada, Akira 1-10, 12, 13, 16, 17, 20, 30, 40, 45, 47, 50, 73, 77, 80, 87, 168
Yamada, Minoru 33, 37, 40, 47, 73-75, 77, 79, 83, 84, 87, 119-121, 126, 127, 144, 145, 156, 162-164, 168, 171, 172, 178, 181, 222, 227
Yamada, Yasushi 195, 230, 236, 271, 281
Yamatogawa Plant 26-28
Yodogawa Plant 23, 25, 27-31, 36, 38, 42, 48, 62, 76, 86, 111, 114, 135, 144, 148, 151, 165, 166, 211, 280, 281, 293, 358
Yodogawa Science Institute 36
York 206, 307, 317, 318, 333, 335, 337
Yuan, Fang 269

Z

"ZEAS" 255, 354, 355, 368, 369
"Zeffle" 208, 362
zero emissions 293, 294
Zhuhai Gree Daikin Precision Mold Co. 321
Zhuhai Gree Daikin Device Co. 321