7. Kitakyushu City, Japan

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7.1 INTRODUCTION

The City of Kitakyushu in Fukuoka Prefecture is the 13th largest city in Japan. Located on Kyushu island just south of the Japanese main island, it is regarded as a gateway to Asian economies.

The city was developed by the steel industry in the modern era (1900s), and grew to become one of the largest industrial zones in Japan. However, by the 1950s and 1960s, its rapid development had led to air and water pollution (Photo 7.2). The Dokai Bay area was contaminated by factory emissions and industrial and domestic wastewater, and came to be dubbed the 'sea of death'.[322]

The local administration was forced to act, and the city dramatically recovered from the environmental degradation. Kitakyushu set out to become the World Capital of Sustainable Development; and it became known for its sustainability initiatives, many of which involved partnerships with residents, enterprises, research institutes and government administrations.

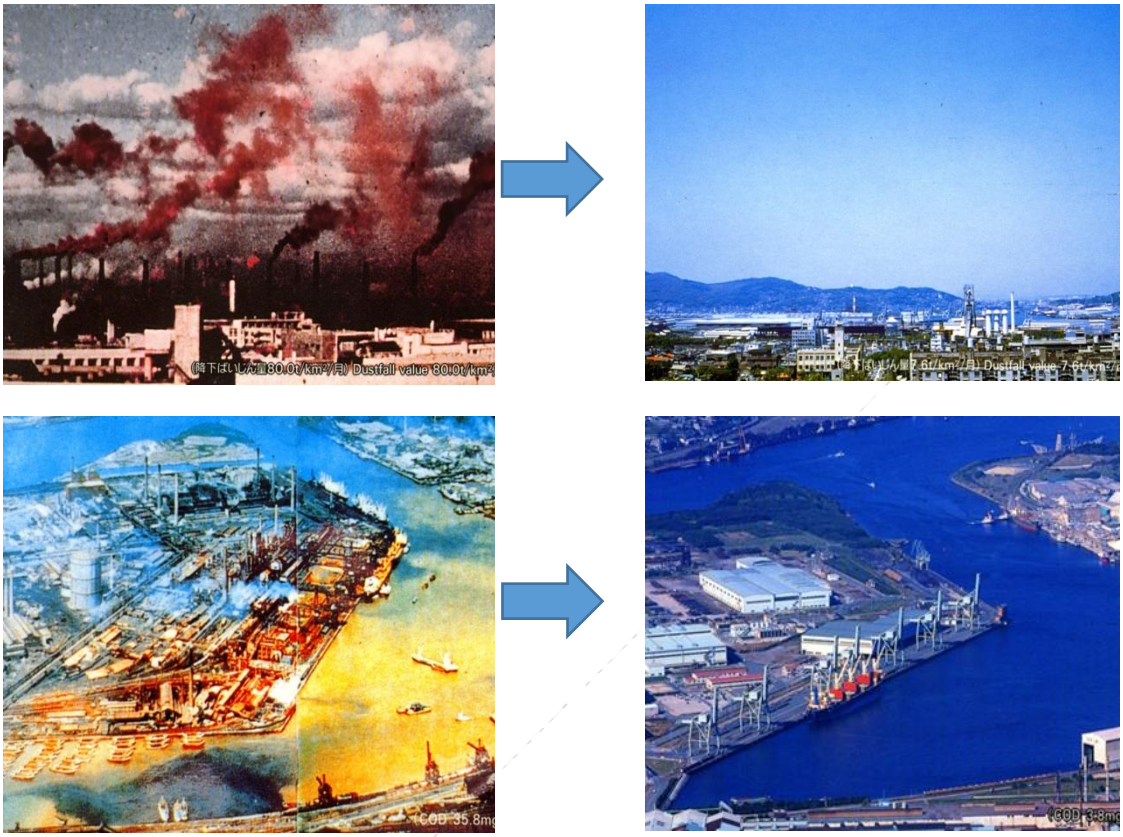
This chapter illustrates Kitakyushu's concept of urban management, exemplified by the Energetic Kitakyushu Plan.[323] Secondary data sourced from the City of Kitakyushu and academic articles were drawn upon for this case study.

Photo 7.1 City of Kitakyushu

Source: City of Kitakyushu

Photo 7.2 Overcoming Severe Environmental Pollution, City of Kitakyushu

In the 1950s & 1960s **Present**



Credit: City of Kitakyushu.

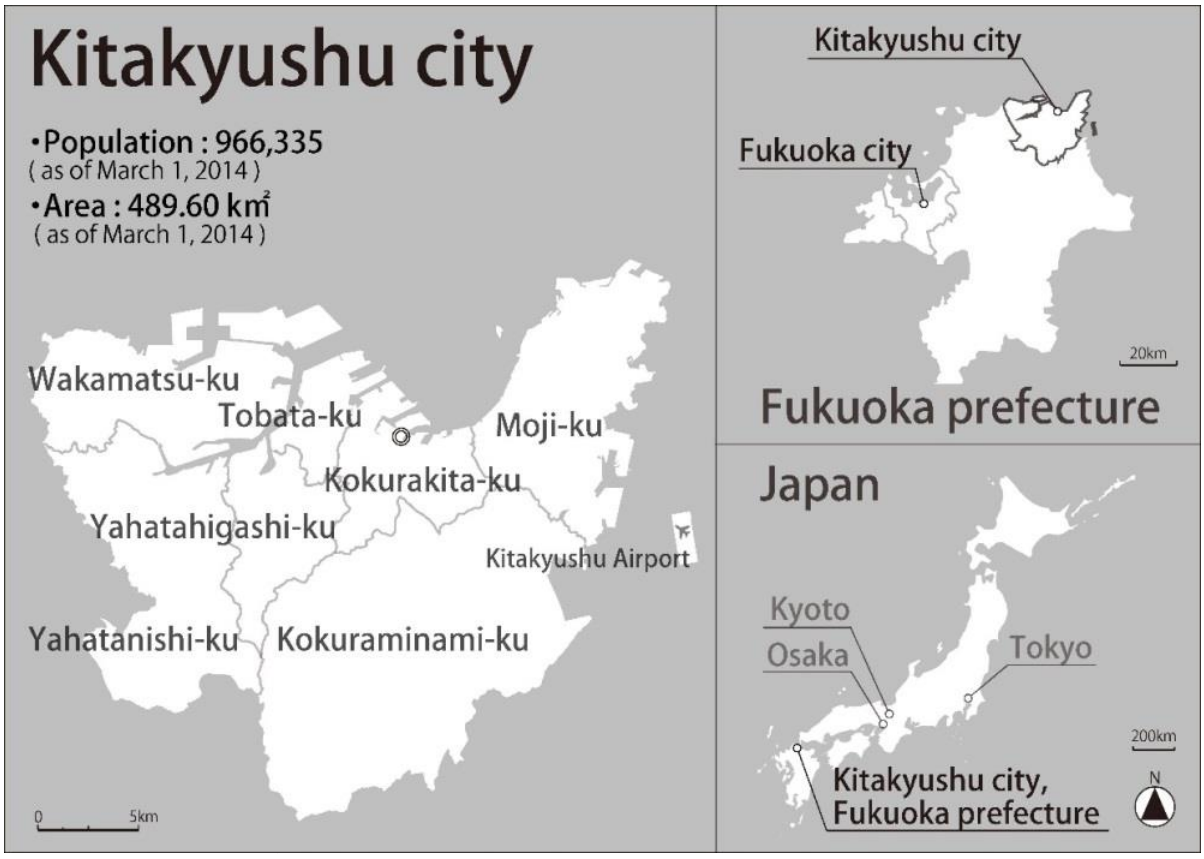
The chapter discusses some of the measures implemented by Kitakyushu City in moving from a 'grey city' to a green and a sustainable city. First, Kitakyushu's economic dynamics, its infrastructure, and its social, environmental and governance systems are described in detail. Then, the collaborative efforts to push forward the Kitakyushu Model, which was designed to establish Kitakyushu as a global leader in sustainable city development, will be examined. The study will then conclude with key messages and lessons from the case study of Kitakyushu that could be replicated and adapted for other cities in the APEC region.

7.1.1 Development of the City of Kitakyushu

Kitakyushu has a population of approximately 1 million (around 423,000 households) within an area of 489.6 square kilometres, making it the second largest city in the Kyushu region after Fukuoka City. Kitakyushu is divided into seven wards (Moji, Kokurakita, Kokuraminami, Wakamatsu, Yahatahigashi, Yahatanishi and Tobata), each with differing geographical conditions. The southern part of the city – designated as the Kitakyushu Quasi-National Park – is mountainous and has a relatively compact urban form. Kitakyushu enjoys a mild climate, which contributes to a comfortable lifestyle.

As the gateway city of Kyushu, and by taking advantage of its location facing a number of Asian economies, Kitakyushu has developed into a port city. The city also serves as a major hub for both road and railway transportation networks.

Figure 7.1 Map of City of Kitakyushu



Source: Authors.

7.2 ECONOMIC DYNAMICS

Kitakyushu has approximately 443,700 people in employment (as of 2012), and is home to almost 48,000 businesses. The key industry is manufacturing, and major export sectors are steel and machinery. Fukuoka City, the capital of Fukuoka Prefecture, differs considerably in industrial profile and focus, which strengthens the competitiveness of the prefecture.

The expansion of Kitakyushu's economic base was driven by the materials industries (steel, chemical, metal and ceramic) during the early twentieth century. Imperial Steel Works, Japan, founded in 1901, was the largest steelworks in Asia at the time – a modern factory that played a lead role in Japan's industrial revolution and economic growth. The Chikuho coalfield, the largest of its kind in Japan at the time, brought prosperity to the city.

However, an industrial restructuring was required after the Second World War; and since then, three types of port (seaport, airport and e-port) have been constructed, and new industries, including the automobile, semiconductor and environment-related industries began to be promoted.[324] Current figures suggest that Kitakyushu's unemployment rate is above the average for Japan and is continuing to rise, despite the shrinking working-age population.[325]

7.2.1 Key Industry Growth Sectors

Kitakyushu's current industry growth sectors are automobile, semiconductor manufacturing and robotics. The logistics and distribution base centred in Kitakyushu Airport, Tachinoura Container Terminal and Hibikinada Container Terminal supports the growth of these industries. Major automobile manufacturers and auto parts makers are located throughout the city, contributing to the development of the sector's advanced technology.

Research facilities for environmental and information technologies are based at the Kitakyushu Science and Research Park. Research institutes, laboratories, enterprises and affiliated departments of universities gather in this research park for educational purposes. The goal of Kitakyushu Science and Research Park is to become a pre-eminent intellectual base for cutting-edge science and technology in Asia, as well as a core academic research centre.[326] It also aims to facilitate collaborative research by enterprises and universities, promoting integrated learning.

Kitakyushu Science and Research Park also provides various opportunities to robotics venture enterprises. Led by the Robotics Technology Center of Kitakyushu Foundation for the Advancement of Industry, Science and Technology (FAIS), the Kitakyushu Robot Forum was established in 2006. Robot-related technological research, development and application are the main purposes of this forum. The products include, but are not limited to, the Upper Limb Medical Rehabilitation Support Robot, the Pipework Inspection Robot, the Carrier Support Robot and the Infrastructure Investigation Robot for tunnels.

7.2.2 Trade and Investment

Kitakyushu's exports bring in around JPY 1 trillion (USD 9.8 billion) per annum. Major exports include: steel materials, machinery, shipping containers, electrical equipment and rubber products such as tires and tubes.[327] Main imports include: natural gas, coal and electrical equipment. The city's main trade partners for exports (as of 2011) are China (25.7%), Korea (14.0%) and ASEAN economies (17.4%). Main trade partners for imports (as of 2011) are China (27.2%), Korea (7.2%) and ASEAN economies (24.5%). The amount of trade (both export and import) continues to increase, generating JPY 2 trillion (USD 16 billion) in 2011; almost twice the revenue generated in 2002.[328] The figures suggest a strong relationship between Kitakyushu and its neighbouring Asian economies.

Kitakyushu's active export relationship with its neighbouring Asian economies has supported its economic growth. Its main partner economies in Asia are China, Korea, Chinese Taipei and Thailand. The United States is also a major trading partner.[329] Recently, in line with the moves toward a greener economy, export of steel products with

a high environmental performance has been the main focus of Kitakyushu's manufacturing sector.

7.2.3 Regional Economic Competitiveness

The economic competitiveness of the region can be illustrated by the uniqueness and innovativeness of Kitakyushu-based companies. An example is the Yaskawa Electric Cooperation.[330] The company developed 'MOTOMAN', an industrial robot, using its own motion control technology, and released it as the first Japanese all-electric industrial robot in 1977. Since then, the company has shipped more than 300,000 products, establishing itself as the world's leading manufacturer of industrial robots.

Zenrin Co. Ltd., also headquartered in Kitakyushu, is Japan's largest map maker. Not only does it produce printed and electronic maps, the company also provides geographic information system (GIS) data to Google Maps and global positioning system (GPS) makers.[331]

Another example is TOTO Ltd., which is ranked fourth in the world in the sanitary ware manufacturing sector (as of 2014). The company has bases in the United States and Europe, as well as China and a number of economies throughout the Asia-Pacific, producing products that fit the culture and lifestyles of each region. Its headquarters is in the Kokurakita ward of Kitakyushu; where it is able to advantage of its favourable location to import and export products to China and other East Asian economies.[332]

The geographical advantage of Kitakyushu, combined with its logistics and transport infrastructure, has enabled it to attract investments in the above key industry sectors. From the perspective of economic competitiveness, Kitakyushu complements Fukuoka City. While Kitakyushu is strong in manufacturing, robotics and environmental management, Fukuoka City leads in the tertiary industry. Its wholesale and retail industries employ around 190,000 people,[333] making this a core industry, followed by the service industry, comprising medicine, information services and civil engineering. The Gross City Product for Fukuoka was about JPY 51.9 trillion (USD 428 billion) in financial year 2012.[334] Fukuoka City also has a port and an international airport. Together, these two cities are driving the competitiveness of the prefecture.

7.2.4 Local Economic Development

Kitakyushu aims to develop further the materials and machines industry by taking advantage of its location and resources.[335] It aims to foster a knowledge-based manufacturing and assembly business hub that focuses on creating high-value products using innovative technologies and experienced human resources.

The city supports small businesses that lead in technologies and services by providing them with accreditation. Kitakyushu also offers financial assistance to businesses at risk of bankruptcy as well as those starting creative projects. It also provides support through technological development funding, courses and seminars. Collaboration with local universities and businesses are promoted to assist local economic development.

7.2.5 Innovation, Creativity and Business Entrepreneurship

Kitakyushu's most notable innovation is the integration of environmental and economic policies. The Green Frontier Plan aims to address the issues of greenhouse gas emissions and the coordination of environmental and industrial policies.[336]

The city also promotes medical welfare businesses that address the issues of an ageing society.[337] Ageing and the shrinking working-age population are pressing issues for Japan, and demand for businesses that address these concerns continues to increase. Success in developing the medical welfare sector will strengthen Kitakyushu's competitiveness. Beyond being an industrial city, it will also be a city with the capacity to respond to society's new needs by developing innovative products and services that draw on the latest advances in robotics and information and communications technology. These advanced technologies could also be tapped to develop solutions that respond to the decrease in available human resources.

7.2.6 Economic Development Partnerships

Sister cities of Kitakyushu (as of August 2014) include: Tacoma (Washington, the United States), Norfolk (Virginia, the United States), Dalian (China), Incheon (Korea) and Haiphong (Viet Nam).

In 1991, 10 major East Asian cities (Kitakyushu, Shimonoseki and Fukuoka in Japan; Tianjin, Dalian, Qingdao and Yantai in China; Incheon, Busan and Ulsan in Korea) organized a conference to discuss the economic development of the region. In 2004, this network of 10 cities was named The Organization for East Asia Economic Development and established a platform for economic activities.[338]

Kitakyushu has a number of ongoing initiatives – not only with Asian economies and the United States, but also with European nations. In 2015, Kitakyushu was selected to be part of the Regional Industry Tie-Up Program (RIT Program) led by the Japan External Trade Organization. Under the RIT Program, Kitakyushu aims to create a new business model with European partners, starting with Germany.

7.3 STRATEGIC INFRASTRUCTURE AND ASSETS

Kitakyushu, as the front runner in the modernization and industrialization of Japan, founded a number of factories for the chemical, ceramics, cement and electricity industries; including the Imperial Steel Works, Japan. With its favourable geographic location, it was able to support these industries by enhancing two core infrastructure assets: the port and the railway. These improvements were the catalyst for the city's growth to become one of the top four industrial areas of Japan.

Today the region's infrastructure network remains one of its main strengths. Not many non-capital cities in Japan are equipped with an infrastructure network as comprehensive as Kitakyushu's. There are flexible options for logistics and transportation; and Kitakyushu is one of the few cities able to meet the greater demand for faster transportation and lower costs. Kitakyushu's infrastructural base is being further

strengthened by progress on its airport and expressways. The following is an overview of the city's infrastructure:

***Air transportation*:** Kitakyushu Airport opened in 2006 and operates 24 hours per day.[339] The airport provides services between major cities in Japan and cities in Asia. International charter flights as well as midnight cargo flights are also offered.[340] Kitakyushu Airport is approximately 30 minutes' drive from the city centre.

***Marine transportation*:** The Port of Kitakyushu, one of the main ports in western Japan, is an international distribution base serving Asia and the rest of the world.[341] It is 230km from Busan, Korea; and Chinese ports such as Shanghai, Qingdao and Dalian are within a radius of 1,000km. There are seven to eight feeder services per week between the ports of Kobe and Kitakyushu. Regular ferry services are available to the Osaka and Tokyo regions. Internationally, the Port of Kitakyushu has sister-port relationships with Tacoma (the United States) and Laem Chabang (Thailand); and a friendly-port relationship with Dalian (China). It also has logistics partner ports: Incheon (Korea); and Tianjin, Yantai and Qingdao (China). The Kitakyushu port has around 197 international services per month.

***Land transportation*:** Kitakyushu's JR Kokura Station is linked to the main island of Japan by Japan Railways (JR). The bullet train (*shinkansen*) and other express trains stop at this hub station. With a monorail and expressway network, the area offers accessibility to the port areas as well as the airport. The Kanmon Expressway, Kyushu Expressway, East Kyushu Expressway and Kitakyushu Urban Expressway have interchanges in the city. Furthermore, the undersea Wakato Tunnel through Dokai Bay opened in 2013, allowing for easier and faster access between Hibikinada and the Tobata-Kokura area.

7.3.1 Logistics and Information Systems

The Port of Kitakyushu's Tachinoura Container Terminal serves as a hub for international physical distribution in western Japan. Using a sophisticated IT system, it offers accurate and efficient services to 180 container vessels per month. The No. 1 Container Terminal wharf is 620m long and its container depot capacity is 6,424 TEU.[342]

The Hibiki Container Terminal started operating in April 2005; since then, the port has further enhanced its level of services. The terminal's berth has 15m of water depth, with the overall length being 700m. The terminal is designed to meet multi-purpose logistic needs. Table 7.1 summarizes the main trading destinations of container cargo in 2014.

Table 7.1 Main Trading Destinations of Container Cargo at Hibiki Container Terminal, 2014

Port	TEU	Tons
Busan	113,955	1,697,519
Shanghai	85,456	1,187,183
Kaohsiung	42,094	852,572
Hong Kong, China	33,345	624,530
Qingdao	18,538	235,610

Source: Kitakyushu Seaport and Airport Bureau.

The Kitakyushu Freight Terminal has a dedicated platform for marine containers. Utilizing its proximity to the sea and neighbouring Asian economies, the terminal has a sea–rail system that can minimize environmental burdens. It is possible to unload the train at its platform, minimizing unloading time.

In September 2015, the Tachinoura Container Terminal, the main terminal of Kitakyushu port, conducted a pilot trial of an electronic toll collection (ETC) system at the terminal gate. The system is designed to enhance the accuracy and speed of the gate and shipping. It is expected that the implementation of the system will further strengthen the competitiveness of the Port of Kitakyushu as a regional hub. The system will automatically recognize vehicles and containers at the entry and exit gates as trailers pass through. There will be no need for the drivers to get out of the vehicles. Trailers can be moved and unloaded with the guidance of electric signboards, considerably reducing the time at a gate. Kitakyushu aims to implement this system in early January 2016, and to apply the system to all gates by April 2017.[343]

7.3.2 Assessment of Physical Infrastructure and Assets

As described above, Kitakyushu has well-networked and advanced physical infrastructure that supports its industries and logistics. It is apparent that Kitakyushu's locational values have made it a hub of marine, road and air transportation. The short distance from close Asian hub cities has enhanced its competitiveness in trading and logistics. The city has continued investing in assets to provide high-quality services, such as the Hibiki Container Terminal. Kitakyushu's strategy of utilizing its location and building on that advantage has been successful thus far. Its infrastructure network has also benefited other areas in Kyushu.

Infrastructure is essential in a region prone to natural disasters such as floods, typhoons and earthquakes. It may be perceived that the Kitakyushu region is overly committed to enhancing its infrastructure network. However, when disaster strikes, it is imperative to secure these types of networks. When portions of roads and ports are damaged, the networks provide alternative ways to dispatch rescue teams and send relief goods throughout Kyushu.

The city aims to provide more efficient services by solidifying the air, marine and land logistics networks. This would also support the city's objective of promoting new, creative businesses in the environment and energy sectors. Kitakyushu is expected to attract business leaders and entrepreneurs with this new strategy.

However, some foreseeable challenges should also be noted. Physical infrastructure requires regular maintenance and updates to maximize its potential. With the Japanese economy experiencing a prolonged period of stagnation and an ageing population, it will be a significant challenge to maintain the physical infrastructure and assets, and to meet expected needs in the future. The skills and knowledge of workers in these facilities are arguably world-class. The city could invite trainers from partner economies or cities and disseminate knowledge in logistics and infrastructure maintenance and design.

7.3.3 Public Infrastructure Reinvestment Plans and Infrastructure Partnerships

Kitakyushu is home to many heritage structures. These include but are not limited to the Kanmon Tunnel, Mitsubishi warehouse, Kawachi Reservoir and the facilities of the Imperial Steel Works, Japan. These sites have the potential to create new business activities if maintained and refurbished. They will attract tourists, students of engineering history and architecture, and social entrepreneurs, among others.

Some of these sites were nominated by UNESCO as world heritage sites, as part of the *Sites of Japan's Meiji Industrial Revolution: Iron and Steel, Shipbuilding and Coal Mining* initiative, in July 2015. Kitakyushu is investing in these facilities by collaborating with other local government administrations that are also taking part in the initiative. Partnering administrations are as follows: prefectural (Fukuoka, Saga, Nagasaki, Kumamoto, Kagoshima, Yamaguchi, Iwate and Shizuoka), municipal (Omuta, Nakama, Saga, Nagasaki, Arao, Uki, Kagoshima, Hagi, Kamaishi and Izunokuni). Kitakyushu have invested in the initiative.

7.4 SOCIAL AND ENVIRONMENTAL SYSTEMS AND SUSTAINABILITY

Dependence on the steel industry caused serious air and water pollution for Kitakyushu during the economic boom between the 1950s and 1970s. The city implemented a series of environmental policies such as pollution control administration and an anti-pollution ordinance in partnership with its local citizens. As a result of these policies, health-threatening levels of pollution were reduced; and compliance with almost all domestic standards was achieved.

Key initiatives for reducing the environmental impact of its heavy manufacturing industries include converting the city's largely coal-based energy supply to oil and natural gas; moving toward cleaner production, including improving industrial energy efficiency; and introducing end-of-pipe technologies.

The environmental approaches introduced by Kitakyushu have been highly praised both at home and abroad; and the city was selected as a Future City and a Green Asia International Strategic Comprehensive Zone in 2011. Kitakyushu was also the only Asian

city to be selected as one of four Green Growth Cities by the OECD Green Cities Program alongside Paris, Chicago and Stockholm. [344]

Prior to this, in 2004, the city had formulated a Grand Design (to work 'Towards the Creation of a "World Capital of Sustainable Development"') based on grassroots-level environmental approach (see also Section 7.4.2). The Grand Design ascribes standards for all actions, with the aim of creating a city of abundance, wealth and prosperity that could be passed down to future generations. In 2007, Kitakyushu developed a Basic Environmental Plan that embodies the Grand Design. Kitakyushu also aims to triumph with its Green Industrial Town, by satisfying both environmental and economic targets while revitalizing the local economy with the aid of the Plan of Comprehensive Special Zone for International Competitiveness Development. Kitakyushu is regarded as a leader among cities in Asia in terms of its approach to social and environmental sustainability (See case study in Box 7.1).

Box 7.1 The Hustle and Bustle of Central Kokura and its Environmental Activities

Flowing through the heart of central Kokura, the Murasakigawa River is a symbol of Kitakyushu. In the past, the river had been prized as a production area for high-quality *ao-nori* (a type of edible seaweed). It is said that the river had numerous *ayu* (sweet fish); and cormorant fishing was common. However, in the 1960s, industrial effluent and residential wastewater caused serious pollution; and the area suffered from poor water quality and unpleasant odours.

In 1963, the year Kitakyushu was founded, the city began to engage in water purification, beginning with a comprehensive study of the water quality of the river. The city also embarked on a programme of sewage system construction. In the latter half of the 1960s, acting on pleas by the Junior Chamber International Kitakyushu for the waters of the Murasakigawa River to return to its former pristine state, efforts to clean up the river were expanded into a citywide movement. Thanks to the combined efforts of citizens and the local government, the river has since shown steady improvement.

1960s

Present

Murasakigawa River

Toward the latter half of the 1980s, the ground-breaking urban development project, 'My Town My River', was introduced. This project involved the unified implementation of river development projects as well as the creation of parks, roads and urban zones. The river was widened and bridges replaced. Buildings that had previously faced away from the river were reconstructed so that they looked out onto the purified river. To create a waterfront with a harmonious natural environment, natural rockery was added to the river dikes and waterfalls, and Suhama Plaza was built.

Various environmentally friendly initiatives were also introduced, such as the Environmental Museum of Water, which allows visitors to observe conditions under the water surface. A commercial facility was later constructed featuring an air conditioning system that utilizes water from the river.

Source: City of Kitakyushu

7.4.1 Labour Markets, Education and Training

Kitakyushu's labour market has been shifting its focus over the years, from manufacturing to tertiary industry (Table 7.2). A major concern is population decline, mainly driven by net migration rate. Kitakyushu's population peaked in 1979 at 1,086,415. It has since declined by 10.5 percent, to 972,719 in October 2011.[345] Meanwhile, the elderly dependency rate continues to increase. Kitakyushu has the highest percentage of those age 65+ among all 'designated cities' selected by the Japanese government for special programmes. It is also notable that younger people are leaving the city for education and other opportunities,[346] making it a challenge for Kitakyushu to attract students and qualified workers.

Table 7.2 Employment Trends in Kitakyushu, by Sector, percent

	Manufacturing	Construction	Electricity, gas, water	Wholesale/retail	Finance/ insurance	Real estate	Logistics/ communication	Service	Government service	Others
1996	23.7	7.6	3.8	11.9	6.8	7.9	10.1	18.7	6.9	2.7
1997	23.7	7.1	3.5	11.4	6.5	7.8	11.3	18.7	7.1	2.6
1998	21.4	7.5	3.6	11.1	6.3	8.8	11.9	19.4	7.2	2.7
1999	20.8	7.6	3.6	11.1	6.4	9.0	11.6	19.8	7.5	2.6
2000	20.6	7.7	3.6	10.7	6.0	9.2	11.2	21.0	7.4	2.5
2001	20.4	6.8	3.6	10.4	6.4	9.2	11.7	21.3	7.6	2.6
2002	18.5	7.0	3.7	10.7	6.6	9.5	12.1	21.6	7.8	2.7
2003	19.6	5.6	3.6	10.7	6.3	9.7	12.4	21.7	7.8	2.5
2004	19.2	5.6	3.8	10.6	5.8	9.8	12.9	22.0	7.8	2.5
2005	19.7	6.0	3.9	10.3	6.4	9.6	12.6	21.8	7.2	2.4

Source: City of Kitakyushu, Cabinet Office National Accounts Estimates

Creating employment is one of Kitakyushu's biggest challenges. Kitakyushu relied on two types of strategies between the years 2008 and 2011: one aimed at promoting growth in industry, enterprises and regional manufacturing; and the other focused on expanding business or trade and services. These strategies failed to achieve the target of 8,000 new jobs (Table 7.3). Japan's stagnant economy during this period may have affected the outcome, which reinforces the need for new ways of dealing with the situation. The city also needs to provide more opportunities, to assure the younger generation that they could

achieve a better life and raise their families in a quality environment if they choose to stay.

Table 7.3 Employment Creation in Kitakyushu, 2008–2011

		2008	2009	2010	2011	Total
Strategy one	1. Promoting growth of industry (target: 800 new jobs)	107	330	188	107	732
	2. Attracting enterprises (target: 3,200 new jobs)	964	609	1,001	411	2,985
	3. Strengthening regional manufacturing (target: 800 new jobs)	306	316	326	242	1,190
Strategy two	4. Promoting business/trade (target: 1,600 new jobs)	189	359	74	454	1,076
	5. Creating services (target: 1,600 new jobs)	65	423	422	428	1,338
Total (target no. for 4 years: 8,000)		1,631	2,030	2,011	1,642	7,321

Source: City of Kitakyushu. *New Growth Strategy* (in Japanese, 2013)

7.4.2 Environmental Management and Sustainability: Policies and Measures

Kitakyushu overcame serious environmental pollution (coal dust and sulphur dioxide concentration in air and water) in the 1960s. By 1990, the major urban environmental issues were living-environment related, such as noise, vibrations, odour, ozone depletion and nitrogen dioxide.[347]

Kitakyushu was selected as an Eco-Model City by the central government in 2008. In 2009, the city issued the Kitakyushu Environmental Model City Basic Plan based on the Grand Design scheme.[348] The core principle of the Grand Design is 'true wealth and prosperity' sustained by the three pillars of living and creating together; economic advancement in a healthy environment; and enhancement of sustainability.

Along with the Grand Design, the people of Kitakyushu, noting 'the importance of the creation of a sustainable society', embraced 10 principles of environmental action 'by all sectors of society and in all aspects of living, learning, working and playing in Kitakyushu':[349]

Ten Principles of Environmental Action of the People of Kitakyushu

- Boosting the environmental capacity of the city through the strength of the people
- Advocating for the advancement of exceptional human resources in the field of environment
- Valuing the significance of visible local ties
- Encouraging the symbiotic relationship with all living things through a deeper understanding of nature
- Protecting our valuable urban assets in the quest for beauty
- Reducing the 'urban load' on the environment
- Stimulating the market, driven by innovative environmental technology, with the participation of local actors
- Advocating the use of recycled resources in socioeconomic activities
- Sharing environmental information for further actions
- Channelling the concept of a model environmental city to all people of the world.

The 2009 Kitakyushu Environmental Model City Basic Plan, regarded as the administrative plan of the Grand Design, has the following objectives: (i) to enhance the capacity of environmental sustainability; (ii) to promote a low-carbon society and its internationalization; (iii) to promote a recycling-oriented society; and (iv) to promote conservation of biodiversity and facilitate a better quality of life.[350] The outcomes of the Plan are monitored by applying a cycle of Plan, Do, Check and Action. The plan is evaluated using three performance indicators – achievement; ripple effect and efficiency – measured against the four aforementioned objectives. For the results of an evaluation published in 2014, see Table 7.4.

To achieve its objectives, and in line with the aim to transform the former steel town into an eco-town, Kitakyushu has actively promoted environment-related businesses. First, Kitakyushu invited recycling businesses. The success of this strategy can be seen in the fact that Kitakyushu now has the largest scale of production for this type of business in Japan. An integrated environmental complex with a zero-emissions policy was developed in the Wakamatsu ward. The area has been used for recycling PET bottles and office equipment. It area also supports small venture businesses. Its precinct consists of a 'frontier zone' that gathers together cutting-edge technologies, and an 'automobile recycling zone' where automobile dismantlers are located. Also, a research centre has been to set up to foster collaborative efforts among industry, government and universities (including Fukuoka University) to improve technologies in waste management and recycling. The research centre aims to address global environmental issues. In June 2001, Kitakyushu Eco-Town opened its doors to encourage participation of the citizens and to promote better understanding of environmental issues.

Table 7.4 Evaluation of the Kitakyushu Environmental Model City Basic Plan

Objectives	Achievement	Ripple effect	Efficiency	Total
1. Enhancing the capacity of environmental sustainability	84.4%	92.7%	85.4%	87.2%
2. Promotion of low-carbon society and its internationalization	91.3%	90.0%	88.8%	90.1%
3. Promotion of recycling-oriented society	88.6%	93.2%	97.7%	92.7%
4. Promotion of the conservation of biodiversity and the provision of better quality of life	84.6%	94.2%	84.6%	87.5%
Total	87.1%	92.3%	88.2%	89.0%

Source: City of Kitakyushu, *Report of the Achievement of Kitakyushu Environmental Model City Basic Plan* (2014)

7.5 URBAN GOVERNANCE

7.5.1 Institutional Urban Management Arrangements

Conforming to the customary practices of local governments in Japan, Kitakyushu has a city assembly which currently consists of 61 members from seven wards, each member serving four-year terms. The City Assembly is responsible for budgets and regulations, and also discusses various challenges and issues to offer policy proposals.

7.5.2 Kitakyushu's Vision

'People-friendly and energetic' has been the main theme behind the development of Kitakyushu.[351] The fundamental concept was developed in December 2010 through the Energetic Kitakyushu Plan. The plan outlines six policy aims: to be people-friendly; to promote new growth; to expand the city by attracting citizens and creating jobs; to become the world capital of sustainable development; to guarantee the safety and security of the population; and to administer sustainable and stable finance policies.

Among these aims, the fourth, 'to become the world capital of sustainable development', looks to enhance Kitakyushu's performance as an eco-city by promoting international cooperation. To disseminate the knowledge gained from its experience in overcoming its own pollution problems, Kitakyushu established an international network called the Kitakyushu Initiative Network. A total of 61 cities from 18 economies from the Asia-Pacific region have joined the network (as of January 2006). Kitakyushu is striving toward environmental sustainability by being at the forefront of the Asia-Pacific region.

Photo 7.3 Refurbished Wine Bar in Kitakyushu City's Central Business District (CBD)

Credit: Authors.

Kitakyushu has implemented various schemes to achieve a better quality of life, many of which have attracted nationwide attention. One is 'renovation town planning', where the city renovates underutilized properties in the central business district (CBD) to boost employment and assist its industries. Vacant clothing stores in shopping malls were turned into organic food restaurants and jewellery shops. An old bookshop was refurbished into a wine bar, with the original exterior being retained (Photo 7.3).

7.5.3 Public Finance

Kitakyushu's budget for 2014 was JPY 5.42 billion (USD 45 million), approximately 0.4 percent up from that of the previous year. Investment in leading projects under the new growth strategy was the main focus of the city's spending in 2014: JPY 1.8 billion (USD 15 million), was allocated for the promotion of its regional energy hub; JPY 300 million for the export of urban environmental infrastructure; and JPY 1.8 million (USD 15 million), for a logistics strategy on the new East Kyushu Expressway. Each budget was discussed and adopted at the City Assembly after the Mayor's announcement of the budget proposal and a period of public consultation.[352]

The most critical issue in urban finance would be the cost of maintaining public facilities, roads and bridges.[353] These facilities were mostly constructed after the Second World War, and have aged considerably. An estimated USD 760 million is needed annually for the maintenance of these facilities. This concern will become more serious due to depopulation. It is recommended that the facilities be updated with materials that require minimal maintenance, by applying latest technology wherever possible.

7.5.4 Development Planning

Five municipalities (Kokura, Moji, Tobata, Wakamatsu and Yahata) overcame political differences and merged in 1963 to form the present-day Kitakyushu, which has since steadily revitalized the traditional urban centre and the transport network.[354] The 2013 Kitakyushu Urban Master Plan (and the Individual Area Plans overseen by the respective administrative wards) sets out a clear vision of achieving a compact city with minimal environmental impacts, and stresses the importance of a concept for the city's downtown.[355] This plan is consistent with Kitakyushu's vision of a people-friendly and energetic city. In the 1990s, urban growth increased rapidly, and industries overtook forests and farmland.[356] Therefore it is important for Kitakyushu to control its pace of development to secure its green land for the sake of maintaining its ecosystem.

The master plan focuses on: (i) regeneration of inner town areas; (ii) utilization of stock; (iii) quality assurance; and (iv) collaboration among various stakeholders. These are

intended to address some of the recent trends, such as decrease in population density, decrease in public service efficiency, decline in vitality and vigorousness of the central urban areas; delay in the renewal of urban areas; and inefficiency in the utilization of industrial areas.[357]

Kitakyushu had relatively high population density in some areas because of topographic constraints, but has experienced urban sprawl over the last few decades. This, along with the growing use of private cars, could cause an increase in carbon dioxide emissions. Kitakyushu's urban development aims to develop towns alongside public transport networks (comprising JR lines, the monorail, the Chikuho railway and buses).[358]

As in many other Japanese cities, urban sprawl is a major impediment to sustainability. Compared to other cities, it is still possible for Kitakyushu to achieve a compact urban form for its geographic characteristics. Transit-oriented development is possible if strategic planning is implemented. For instance, successful development of the JR Moji station area was achieved by coupling the land re-adjustment project and the development of residential areas nearby. The project made the Moji area a popular tourist destination, and revived the shopping mall and the town area.

7.5.5 Governance Reforms and Initiatives

Japan is facing a critical challenge that no other economy has experienced to the same degree. Its rapidly ageing population requires a radical change in the governance of its cities. Japan's public workforce is smaller than other OECD economies; and this needs to be addressed through innovation. There is a need to bring in new skills and new ways of working to enhance the effectiveness and productivity of public services.[359]

Regulatory reform and new forms of partnership with the private sector are other areas for improvement. Public–private partnerships are a common way to boost private investment in infrastructure while reducing the financial burden on the public sector. However, the success of such partnerships is highly dependent on the economic situation. It requires caution, as evidenced by the many examples of failure around the world.

Kitakyushu has been engaged in government reform to cope with the challenges brought by the changes in the societal, economic and environmental situation. The current plan proposes collaboration among residents, non-profit organizations and the private sector. In addition, it aims to achieve efficiency and effectiveness by 'selection and concentration' as the city attempts to respond to the needs of residents and assess the cost-benefit performance of each proposal. To these ends, the city is making efforts to value staff and their skills, reform the organizational structure for more efficiency, and achieve transparency by providing information to its residents.

7.6 PARTNERSHIPS FOR SUSTAINABLE DEVELOPMENT

Kitakyushu has been one of the most engaged Japanese cities in international environmental cooperation.[360] The following are some of its partnerships:

The Yellow Sea Partnership:

The Pan-Yellow Sea Economic Region proposes economic and human resource interactions within the region through The Organization for East Asia Economic Development, described in Section 7.2.6.

The Kitakyushu Asian Centre for a Low Carbon Society (also known as Asia Green Camp):

This partnership aims to promote low-carbon societies in Asian cities. The centre organizes many projects in Asian economies (Cambodia; China; India; Indonesia; Korea; Malaysia; Myanmar; Palau; the Philippines; Singapore; Thailand; and Viet Nam) to promote and support low-carbon projects and businesses to reduce carbon dioxide emissions.[361] It also has partnerships with the United Nations Industrial Development Organization (UNIDO), the Japan Bank for International Cooperation and the Japan International Cooperation Agency (JICA). The Kitakyushu Model Initiative is the main driving force of the centre's activities.

The Kitakyushu Model:

This model was developed to systematically organize a city's administrative knowledge base on urban environments. The Kitakyushu Asian Center for a Low Carbon Society recommends the development of a master plan through applying the Kitakyushu Model, to create sustainability under the 'green city' concept. The centre also measures achievement by applying the Kitakyushu New Low-Carbon Measurement, Reporting and Verification Mechanism (K-MRV). This mechanism aims to promote the export of high, value-added technology by evaluating the reduction of greenhouse gas emissions.[362]

Kitakyushu International Techno-cooperative Association (KITA):

Since 2005, Kitakyushu and Surabaya in Indonesia have cooperated in the waste management sector through KITA. The Takakura Home Composting (THC) method was implemented in Surabaya to solve its serious waste management problem.[363] Surabaya was able to dramatically reduce the waste generated at disposal sites by 30 percent in the matter of four years, allowing the city to win Indonesian and international awards for environmental improvement. A wide range of support from local stakeholders (government and non-government, NGOs and local communities) is essential to build capacity.[364] The success in Surabaya created considerable demand for technical assistance in other Asian cities.[365] For example, in Cebu, Philippines, Kitakyushu funded a community-based wastewater treatment facility in 2009.[366] The THC method was implemented there as well.

Kitakyushu has the highest average number of trainees qualifying per year among the 20 government ordinance-designated cities in Japan that are participating in the International Environmental Cooperation project. The city also has 35 years of experience in international environmental cooperation.[367] In addition to KITA, Kitakyushu also has a JICA centre where it organizes various training programmes.

The training programme for Kitakyushu's resource recycling initiative aims to harness the experience of both government and business to contribute not only to environmental improvement in developing economies but also to the revitalization of Kitakyushu itself.[368] The city holds seminars targeting businesses, conducts surveys, sends business mission teams, participates in exhibitions and acts as a mediator between the business sector and local governments in neighbouring Asian economies.

7.7 CONCLUSIONS

Kitakyushu played an integral part in the economic growth story of not just the Kyushu region, but also Japan, in the twentieth century. That growth came at a price however. The rapid industrialization had resulted in serious environmental problems in the city. This chapter discussed how Kitakyushu survived those problems, and transformed itself into an environmentally friendly city, or an 'eco-city'.

While improving its environmental management, the city invested in economic development by promoting new technology and extending its logistics and transport network. A number of partnerships with other cities throughout the world enabled Kitakyushu to export the knowledge and skills learned from its own environmental crisis. However, knowledge in environmental management would not be sufficient for Kitakyushu to lead Asia in the long run. New growth sectors would be key for Kitakyushu to become more competitive internationally and to establish itself as a technology hub for Asia. Its infrastructure network and its flexibility could well support its way forward.

The challenges facing the development of the city of Kitakyushu are significant. Japanese cities are facing the serious issues of ageing and a decline in working-age population, and Kitakyushu is no exception. Repair and maintenance of its infrastructure will demand significant expenditure, which will put pressure on the city's budget. Cost of pensions and medical care will also continue to increase due to the ageing population.

From an urban planning perspective, a key challenge for Kitakyushu if it intends to keep its position as an environmentally friendly city is to halt urban sprawl and provide close-distance, high-quality transit corridors. It is apparent from international examples that high-density urban settings can provide a high quality of life, even within limited spaces. With its highly-reputed design skills, it should be possible for Kitakyushu to go in that direction. Engaging with the local community and partnering with businesses could result in a consensus on urban design acceptable to all parties, which could in turn reduce costs and attract residents and investors alike.