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Promotion of Smart Community Strategy in Vietnam's Binh Duong Province

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Additional information is available at the end of the chapter

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Abstract

Vietnam's Binh Duong Province is located in southeastern Vietnam, immediately to the north of Ho Chi Minh City (HCMC). The province constitutes the southern economic zone of Vietnam, and many Japanese companies—mainly manufacturing enterprises, including small and medium enterprises—are investing there. Becamex IDC Corp (a Vietnamese state-owned developer) and Tokyu Corporation (a Japanese company) established Becamex Tokyu, a joint venture company, in March 2012. As a smart community strategy, Becamex Tokyu is promoting Tokyu Binh Duong Garden City, which is a development plan integrating new urban development. The Becamex Tokyu Bus, which is a wholly owned subsidiary of Becamex Tokyu, operates the new transportation system KAZE Shuttle. In addition, Binh Duong Province has developed a smart community strategy centered on energy establishment in urban development, information and communications technology infrastructure development and utilization, the elimination of physical waste in infrastructure construction, and smart traffic. In this chapter, by using his field work as a basis, the author examines the current status of, and issues faced by, development of the smart community strategy in Binh Duong Province in Vietnam.

Keywords: digital transformation society, new city, regional development, smart community, Vietnam

1. Introduction

A smart community is a social system that introduces information and communication technology (ICT) such as the promotion of energy conservation, the diversification of energy sources, the reduction of CO₂ (carbon dioxide) emissions and the use of electric vehicles, and combines advanced and comprehensive cutting-edge technologies.

A smart community actively utilizes new technologies such as renewable energy and energy management systems (EMSs) to achieve more efficient use of energy. A smart community implements new urban development, investigates urban environmental problems, introduces local transportation systems, optimizes residents' lifestyles, and conducts regional development in the form of housing, buildings, factories, and new urban areas [10].

In recent years, the emerging country of the Socialist Republic of Vietnam has concentrated its efforts on regional and urban development, based on the concept of smart communities, in various parts of the country [6].

There have been a very few studies of smart communities (including Smart Cities) in Asia (including Vietnam), although this is a valuable research area. This type of development is also a reference case for other efforts such as regional development and urban development in other Asian countries.

Therefore, in this chapter¹, the author considers the current status of new urban development in Vietnam's Binh Duong Province from the perspective of smart communities.

2. Outline of Binh Duong Province and urban development

2.1. Outline of Binh Duong Province

Vietnam's Binh Duong Province is located 17 km north of Ho Chi Minh City (HCMC) in southeastern Vietnam and consists of one city, four towns, and four prefectures (**Figure 1**) [2].

The provincial capital of Binh Duong Province is the city of Thu Dau Mot, with an area of 2694 km². In 2015, the population of the province was about 2 million (of which 60% work) and the gross domestic product growth rate is 14.5% [2].

As of December 31, 2016, in Binh Duong Province, there were a total of 3050 approvals for foreign direct investment (FDI)² (composition ratio 13.5%), with a cumulative total investment of 26,600 million USD (composition ratio 9.1%) [12, 13].

The current (2017) monthly minimum wage³ of workers in Binh Duong Province is 7.15 million VND (about 17,300 yen) in the same area as HCMC and Hanoi. This figure was 3.5 million VND (about 16,100 yen) in the previous year and has thus increased by about 50% in a year. Binh Duong Province, along with Dong Nai Province (mainly HCMC) and Ba Ria-Vung Tau Province, constitutes the Southern Focal Economic Zone of Vietnam.

In Binh Duong province, a number of Japanese companies (large enterprises and small and medium enterprises) are entering the market, mainly in the manufacturing industry (**Table 1**). In March 2012, Tokyu Corporation (a Japanese company) and the Investment and Industrial

¹This chapter has been drawn up and modified from a large part of the author's paper, A Study of the Smart Community in Vietnam: Case of Binh Duong Province in the Southern Regional City; "Information Management · 73rd National Conferences Proceedings" [Autumn Edition] [11].

²Foreign Direct Investment (FDI) means the acquisition of permanent interests (predominantly through management) in foreign companies.

³The minimum wage system in Vietnam was adopted in 1997. A minimum wage was formulated for each region (1–4); since October 2011, the wages of domestic companies and foreign-funded enterprises have been unified [4].

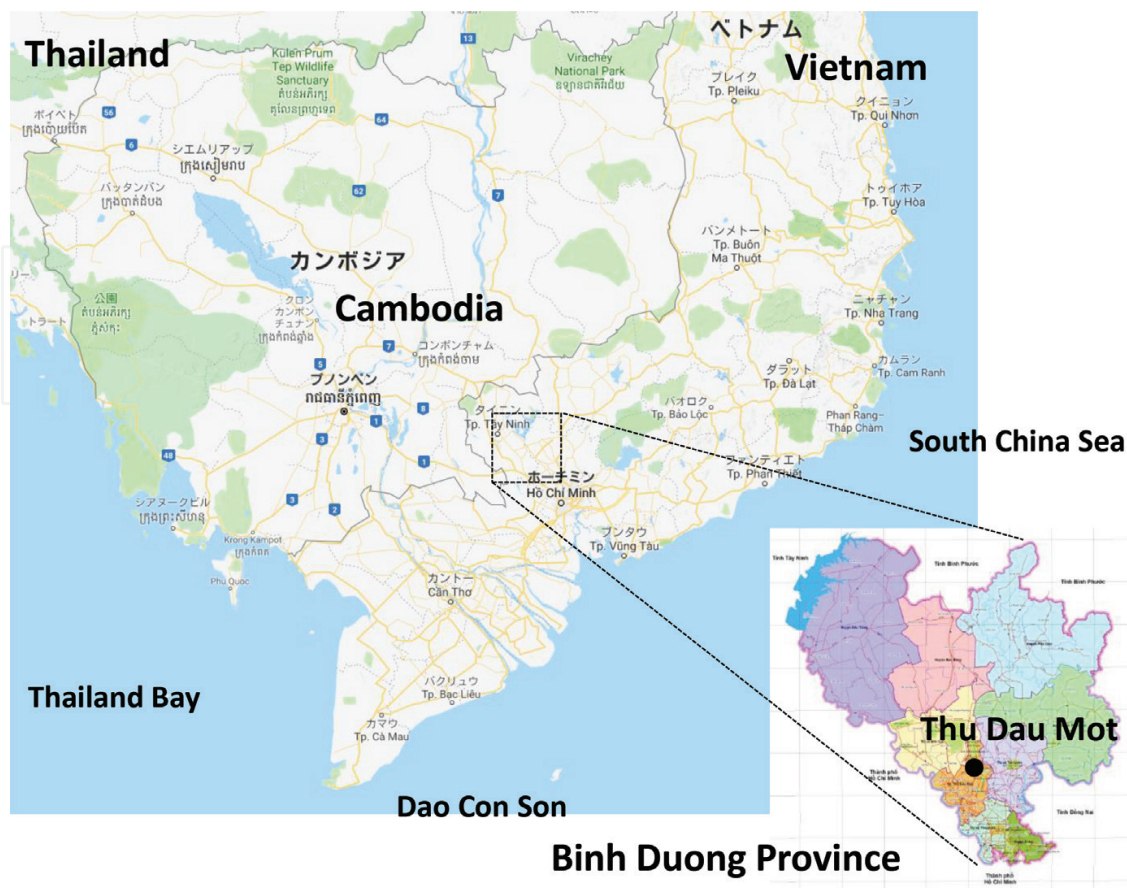


Figure 1. Location of Binh Duong Province. Source. Created from the HP material of Binh Duong Province.

Development Corporation (abbreviated Becamex IDC Corp)⁴ (a Vietnamese state-owned developer) established Becamex Tokyu Co., Ltd.

2.2. Binh Duong Province and urban development

With a capital of 8600 billion VND (about 32.7 billion yen), Becamex Tokyu is promoting a unified development plan for new city development and new region development⁵ in Binh Duong Province. The core facility for the development is Tokyu Binh Duong Garden City in Binh Duong New City.⁶

The development plan for Binh Duong New City includes a huge project to set up SORA gardens, which include low-, middle-, and high-rise condominiums and will cover about 71 ha of a 110-ha site owned by Becamex Tokyu. In addition, SORA gardens will have a commercial building with a Hikari shopping precinct along with residential buildings and business and commercial facilities.

⁴Established in 1976, Becamex IDC Corp, as a developer, is investing in, developing and managing 100% Vietnamese government capital in industrial parks, residential areas, urban areas, and development of traffic infrastructures [17].

⁵Tokyu Group utilizes the railway line development know-how that the company has accumulated over many years to conduct overseas town development projects such as the New City in Binh Duong Province, Vietnam, a rental housing business for Sriracha Japanese in Thailand, and residential land development in the Yanchep District of Western Australia [16].

⁶Binh Duong New City is located in the Binh Dun Industrial, Urban, and Service Multiple District and is scheduled to be upgraded to a central government shipping city in 2020.

	Company name	Industry	Business contents	Industrial park
1	Sakata Inx Vietnam Co., Ltd. Head office	Other products	Production of printing ink	Vietnam Singapore Industrial Park 2
2	Asti Electronics Corporation	Electronic products	Two-wheel wire harness, four-wheel wire harness, electric control board for home appliances	Dong An St., Tan Dong Hiep Ward, Di An Town, Binh Duong Province
3	Vietnam LSI Cooler Co., Ltd.	Electric machine	Production of heat sink	Vietnam Singapore Industrial Park 2
4	Astee Horie VN Co., Ltd.	Service industry	Plastics painting/vapor deposition/printing/ASSY	Dong An Industrial Park
5	Iwai Plant Tech Vietnam Co., Ltd.	Machinery products	Designing, manufacturing, selling and repairing food manufacturing machines, pharmaceutical manufacturing machines and chemical manufacturing machines Manufacture, procurement, construction, sale, service of general equipment mainly comprising machinery for food manufacturing, pharmaceutical manufacturing machinery, and chemical manufacturing machinery	My Phuoc 3 Industrial Park
6	Inter Art Saigon Co., Ltd.	Construction industry	Interior design, construction	Viet Hung 1 Industrial Park
7	Uchihashi Vietnam Co., Ltd.	Electronic products	Manufacture of electronic equipment	Vietnam Singapore Industrial Park 1
8	MHI Engine System Vietnam Co., Ltd.	Machinery products	Manufacture and sale of general purpose machines and special vehicles	Vietnam Singapore Industrial Park 1
9	Ohmori Vietnam Co., Ltd.	Electric appliances	Parts processing for semiconductor devices, part machining for machine tools	Vietnam Singapore Industrial Park 2
10	Oda Vietnam Co., Ltd.	Other products	Production and sales of ready-made curtains, product exports by Vietnamese fabric	Dong An Industrial Park
11	Kubota Vietnam Co., Ltd.	Machinery products	Manufacture and sale of tractor/combine and its implementation	My Phuoc 3 Industrial Park
12	Saigon Stec Co., Ltd.	Packaging	COF assembling/inspection for camera module/liquid crystal driver	Vietnam Singapore Industrial Park 2
13	Sakai Chemical (Vietnam) Co., Ltd.	Plastic products	Production of scientific materials for plastic products	My Phuoc 3 Industrial Park
14	Taisei Bijutsu Printing Vietnam Co., Ltd.	Pulp and paper	Print services to Japanese companies operating in Vietnam	My Phuoc 3 Industrial Park

	Company name	Industry	Business contents	Industrial park
15	Daido Vietnam Co., Ltd.	Clothing industry	Button production	145/46 Tan Hoa Blk, Dong Hoa Ward, Di An Township, Binh Duong Province
16	GF Vietnam Co., Ltd.	Clothing production	Clothing production	Song Than 2 Industrial Park
17	Hayabusa (Vietnam) Co., Ltd.	Other products	Manufacture of fishing tackle	My Phuoc 2 Industrial Park
18	Vina Kraft Paper Co., Ltd.	Pulp and paper	Manufacture and sale of cardboard	My Phuoc 3 Industrial Park
19	V-Eikou Co., Ltd.	Electronic products	Manufacture of parts and finished products such as mobile phone parts, desktop holder, PDA charger, and so on.	My Phuoc 2 Industrial Park
20	Fujiya Manufacturing Vietnam Co., Ltd.	Metal products	Manufacture of pliers, nippers	My Phuoc 3 Industrial Park
21	Vietnam Success Co., Ltd.	Machine parts production	Manufacture of mechanical parts	Dong An Industrial Park
22	Honda Logicom (Vietnam) Co., LTD.	Warehouse/transport related business	Warehouse and commodity storage service, transportation agency service	Vietnam Singapore Industrial Park 2
23	Yamaken Apparel Vietnam Ltd.	Clothing production	Clothing production	Dong An Industrial Park
24	Yamaken Concrete Vietnam Co., Ltd.	Other products	Production of concrete	Song Than 3 Industrial Park
25	Makita Vietnam Co., Ltd.	Electric appliances	Sales of electric tools, air tools, engine tools and parts and after-sales service	Vietnam Singapore Industrial Park 1
26	Maruichi Sun Steel Corp	Steel	Manufacture and sale of steel pipes	DT743Rd., Dong Tac Quarter, Tan Dong Hiep Ward, Di An County, Binh Duong Province
27	NSK Precision Co., Ltd.	Precision mechanical equipment	Manufacture of rotating equipment for dental use	Vietnam Singapore Industrial Park 2
28	Yamaichi Special Steel Vietnam Co., Ltd.	Metal products	Sales, processing, heat treatment of special steel	Dong An 2 Industrial Park
29	Eon Mall Vietnam Co., Ltd.	Service industry	Retail, sales	No. 01 Dai Lo, Khu Pho Binh Giao, Thuan Giao Ward, Thuan An District, Binh Duong Province

	Company name	Industry	Business contents	Industrial park
30	Becamex Tokyu Co., Ltd.	Urban development	Real estate development/real estate sales/real estate leasing	Lot C18, Hung Vuong Boulevard, Hoa Phu ward, Thu Dau Mot city, Binh Duong Province

Table 1. Major Japanese companies expanding into Binh Duong Province. Source. Created from materials such as [18–48].

The total cost of this project (the whole development project) is about 100 billion yen. Development is proceeding in three steps, namely SORA gardens I (Gate City, which covers 15 ha), SORA gardens II (Core City, covering about 15 ha), and SORA gardens III (Garden City, of about 40 ha). In March 2015, SORA gardens I, which is a high-rise apartment building and is the first project, was completed, and in January 2015, a commercial *Hikari* containing food courts and family marts began operating.

SORA gardens I has a total land area of 9082 m², a total floor area of 31,287 m², 24 floors, 406 houses, and a total of about 1500 apartments. The permanent facilities and facilities of SORA gardens include lounges, gyms, rooftop pools, rooftop gardens, parking lots, and motorbike storage. The final development will have business parks, financial centers, international conference halls, commercial facilities, and universities on the premises. By about 2020, the complex will house 120,000 people and, including the surrounding industrial park, there will be about 400,000 people as part of the plan to develop a new city.

In December 2014, Becamex Tokyu Bus Co., Ltd., a wholly owned subsidiary of Becamex Tokyu, began operating the KAZE shuttle as a route connecting the provincial capital city of Thu Dau Mot and Binh Duong New City. In the KAZE shuttle, we have brought Japanese bus operation know-how to Vietnam. As part of this novel transportation system, we provide thoroughly safe operation, scheduled operations based on timetables posted at bus stops, polite customer service, clean bus interiors, comprehensive safety and accident prevention, a user-friendly riding method⁷, and detailed user guidance.

On March 5, 2016, Becamex Tokyu Bus opened five bus routes connecting the major parts of the region and the surrounding areas from the center of Binh Duong New City. Along with this expansion of bus lines, we have newly established a bus terminal in front of *Hikari*, a commercial facility in Binh Duong New City. With the bus terminal as a transport hub, we have connected major sites in the provincial capital Thu Dau Moy and Binh Duong New City via a bus route to improve the convenience of travelers in the area.⁸

The bus business in Binh Duong Province is a new form of public transport that is easy for local residents to use and is an indispensable function of advanced town planning. The bus route has become indispensable as a means of travel for the administrative staff of Binh Duong

⁷In Binh Duong New City, (1) check the time of the bus in the timetable; (2) when the bus arrives, enter via the front door (the rear door is exclusively for alighting); (3) after getting on the bus, pay the fare at the fare box; and (4) when you reach your stop, press the nearby buzzer to inform the driver.

⁸Becamex Tokyu Bus aims to create new value in Binh Duong New City.



Figure 2. Facilities of Binh Duong Province. Source. Created from the HP material of Binh Duong Province.

new government center and administrative center, visiting officials at the administrative center, and commuting local residents.

2.3. Urban development in Binh Duong New City and the surrounding area

In the vicinity of Binh Duong New City, Korea's Lotte Vietnam Shopping Center (Lotte Mart) opened its fifth Vietnam shop on November 23, 2013 (**Figure 2**) [2]. Lotte Mart plans to increase the number of its domestic stores in Vietnam to 60 by 2020.

On November 1, 2014, AEON Vietnam Co., Ltd., a Vietnamese corporation of the Japanese company AEON Group, implemented its dominant store strategy⁹ in Binh Duong Province. Following the opening of AEON Mall Tan Phu Celadon on January 11, 2014, the corporation opened a suburban-type AEON Mall Binh Duong Canary, its second Vietnamese store [7].

AEON Mall Binh Duong Canary has shopping facilities, amusement facilities, and a Japan Zone area, providing a style of shopping mall that encourages customers to stay and emphasizes Japanese quality and enhanced services.

In addition, Vietnam Singapore Industrial Park 1 (VSIP 1) was founded in 1996 in the vicinity of the Binh Duong new city. VSIP 1 is an industrial cluster of the largest Japanese companies in southern Vietnam; it also includes small and medium Japanese enterprises.

⁹"Dominant store" opening is the strategy of intensively opening stores in areas where retailers are located.

3. Binh Duong Province and smart community

3.1. What is a smart community?

The Japan Smart Community Alliance (JSCA)¹⁰ defines a smart community as “a community where various next-generation technologies and advanced social systems are effectively integrated and utilized, including the efficient use of energy, utilization of heat and unused energy sources, improvement of local transportation systems, and transformation of the everyday lives of citizens” [5].

The Agency for Natural Resources and Energy¹¹ and the Ministry of Public Management, Home Affairs, Posts and Telecommunications define the smart community as “an energy-efficient system that utilizes IT technologies such as energy management systems and storage batteries, as well as electricity and heat and traffic” [14].

In Vietnam’s Binh Duong Province, “a community that realizes integrated management and optimal control of all infrastructure, including electricity, water, transportation/logistics, medical care, information, etc.,” is regarded as “a community of the next generation” [18].

At the moment, the definition of a smart community has a variety of interpretations by industry, academia, and government, and an academic definition has not been established.

Promoting energy conservation by improving the efficiency of energy use¹², diversifying energy sources by introducing renewable energy, reducing CO₂ emissions, and introducing electric vehicles) by using an energy management system (EMS), which is a social system that combines energy in a comprehensive and comprehensive manner throughout the region.

EMS¹³ utilizes ICT. This type of management system includes, for example, visualization of electricity consumption, equipment control for energy saving and CO₂ emissions reduction, and control of renewable energy and electric storage (**Figure 3**) [9]. EMS encompasses fields such as HEMS (housing), BEMS (building), FEMS (factories), and CEMS (communities), depending on the objects to be managed (**Table 2**) [1].

In the residential field, as part of the home energy management system (HEMS), household electrical products are connected to a home area network (HAN) to manage energy in the home. The HEMS may include the concepts of the net zero energy house (ZEH) and mansion energy management system (MEMS), depending on the home management target.

In the building field, a building energy management system (BEMS) includes responses to the monitoring of electricity demand. The energy management system of the entire building

¹⁰The Smart Community Alliance (JSCA), established in April 2010, is the secretariat of the New Energy and Industrial Technology Development Organization (NEDO).

¹¹The Agency for Natural Resources and Energy, an external agency of the Ministry of Economy, Trade, and Industry established in 1973, is an administrative agency of the national government as stipulated by the National Administrative Organization Act and the Ministry of Economy, Trade and Industry Establishment Law.

¹²Energy is classified into electrical energy, atomic nuclear energy, thermal energy, light energy, stationary energy, sound energy, dark energy, and so on according to its forms of movement and preservation.

¹³The author considers the energy management system (EMS) in his 2017 paper, A Study of the Smart Community in Vietnam: A Case of Smart City Community Strategy in Da Nang City, “Kokushikan Business Review” [8, 11].

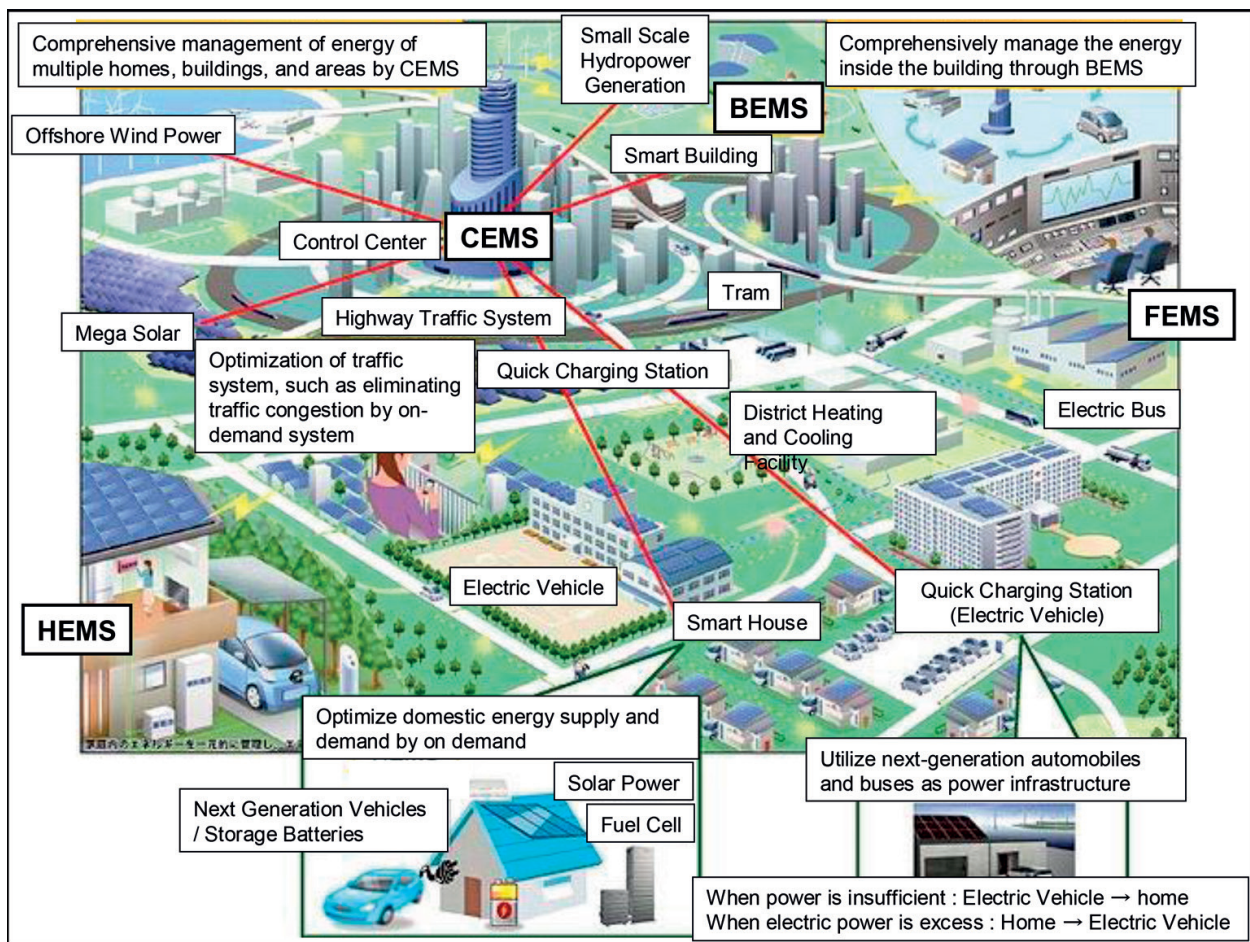


Figure 3. Smart community overview. Source. Ministry of Economy, Trade and Industry, "Smart Grid/Smart Community."

monitors and controls the amount of power used by building distribution equipment, air-conditioning equipment, lighting equipment, ventilation equipment, and office automation (OA) equipment. The BEMS may include the concept of the zero energy building (ZEB), depending on the building management target.

In the factory field, the factory energy management system (FEMS) includes the response to the monitoring of electricity demand. FEMS is an energy management system for the entire factory and controls the amount of power used by, for example, power distribution and distribution facilities in the factory, air-conditioning and sanitation equipment, lighting equipment, utilities, and manufacturing and production facilities. The FEMS may also include a manufacturing management system (MMS), depending on the plant management target.

The regional community energy management system (CEMS) involves the mechanism of the smart grid, which is a power grid with added communication and control functions. The CEMS is used to manage the energy of an entire region and monitors and controls the power supply to the area, including the power managed by the HEMS, BEMS, and FEMS. CEMS may also include a regional energy management system (REMS), depending on the regional management target.

In an information society, the EMS is a mechanism for building new energy infrastructure utilizing ICT. Essentially, the EMS combines various elements such as people, machinery,

Field	System name	Overview
House	Home Energy Management System (HEMS)	Connect various home electric appliances and household OA equipment existing in the household to the network and control energy used in the home in conjunction with HAN.
	Net Zero Energy House (ZEH)	It is a house that generates energy such as photovoltaic power generation and consumption of fuel energy such as petroleum and coal used at home is almost zero (net zero) annually
	Mansion Energy Management System (MEMS)	Measure and accumulate the electricity consumption of the condominium, make it visible, control the connected equipment such as air conditioning and lighting equipment, and suppress and control the demand peak.
Building	Building Energy Management System (BEMS)	Monitor and control the amount of electricity used in buildings such as power distribution equipment, air conditioning equipment, lighting equipment, ventilation equipment, OA equipment, and so on, and control the amount of energy in the entire building.
	Zero Energy Building (ZEB)	Reduce energy consumption at building operation stage through energy conservation and use of renewable energy and limit energy to zero as much as possible.
Factory	Factory Energy Management System (FEMS)	Monitor and control the amount of power usage such as power distribution and distribution facilities in the factory, air conditioning/sanitation equipment, lighting equipment, and so on, and control the energy used in the whole factory.
	Manufacturing Management System (MMS)	Respond to the monitoring and control of production facilities in various fields within the factory, realize improvement in production efficiency in the factory, and control the reduction of energy consumption.
Region	Community Energy Management System (CEMS)	Monitor and control the amount of power supply at power plants including renewable energy within the region, and control the energy used throughout the region.
	Regional Energy Management System (REMS)	Optimize and improve energy use of target area, control energy consumption and CO ₂ emissions, and control energy cost reduction.

Table 2. Classification of energy management system (EMS). Source. Created by the author.

facilities, organizations, and functions in a modern information society, and it manages the coordination of energy among these elements. Through the cooperation of these various elements, the EMS can be used to achieve excellent overall functionality, effects, and reactions in homes, buildings, factories, and regions.

EMS supports a wide variety of forms of power, such as hydroelectric power generation, wind power generation, solar power generation, geothermal power generation, thermal power generation, nuclear power generation, wave power generation, and pumped storage power generation.

EMS utilizes ICT to combine all elements (generation, conversion, accumulation, transmission, consumption) organically, from power generation to power transmission, electric power conversion, and distribution, and ultimately to electric power consumers. Through collaboration with a variety of various organizations, it realizes effective and efficient use of energy.

3.2. Binh Duong Province and power energy

Ahead of other cities in Vietnam, Binh Duong Province is promoting a smart community strategy that is an innovative approach to energy, local transportation, industrial waste, and water treatment.

Electricity demand has continued to increase in Vietnam, despite the 2008 global economic crisis. In Binh Duong Province, priority is being placed on the installation of power transmission lines and distribution lines from newly constructed power plants in order to cope with the electric power demand within the area. As a consequence, there has been no progress in the expansion of the existing electric power system, which integrates power generation, electric power conversion, power transmission, and power distribution to customers. In other words, because of this situation, the load factor of transmission and transformation/distribution equipment is rising in Vietnam.

Binh Duong Province therefore has the same problems with electrical energy as in other regions of Vietnam. To address these problems, the province is making a number of efforts. The system average interruption duration index (SAIDI) for individuals and organizations is about 70 h a year. In addition, the system average interruption frequency index (SAIFI) is as high as 17 times a year. As described earlier, power supply reliability has been poor for a long time because of frequent occurrence of power failures.

About 90% of Binh Duong's electric power SAIDI and SAIFI have human impacts due to accidental blackouts and repair blackouts. SAIDI and SAIFI are used to evaluate the reliability of supply of Binh Duong's electric power; efforts are being made to improve the reliability of the electricity supply by decreasing the numerical values of these indexes.

In Binh Duong Province, in buildings in which importance is placed on the reliability of power supply (such as factories, hospitals, provincial government buildings, government offices, and schools) measures such as the installation of in-house power generation facilities are being taken. In the province, there are many foreign companies entering industrial clusters such as industrial parks, and the demand for electricity is remarkable.

For this reason, Binh Duong Province is taking measures to ensure that the infrastructures, such as the new establishment, expansion, or renewal of transmission lines, substations, and substations, are adequate.

In addition, Binh Duong Province is working on energy conservation measures based on the "Law on Economical and Efficient Use of Energy and Measures for its Implementation,"¹⁴ which came into force in 2011. For example, a reduction target of 2% of electricity consumption compared with the previous year has been set, and each month, the Ministry of Commerce and Industry of Binh Duong Province announces the degree of achievement of the target. In

¹⁴Government Ordinance No. 21 gives the details and enforcement method of the Energy Conservation Law of Vietnam (21/2011 / ND-CP), as applied to energy-intensive facilities, factories, agriculture, and transportation agencies (over 1000 petroleum-equivalent tons). Large-scale customers with energy consumption corresponding to that of offices (500 oil-equivalent tons or more) are required to announce energy-saving targets, formulate and report plans, and so on [3].

addition, Binh Duong Province has implemented measures to support the companies that promote energy conservation.

The following support is provided as part of the Binh Duong Province company support policy:

1. Provide subsidies to small- or medium-sized enterprises that conduct energy audits (the upper limit is 50 million VND.)
2. Provide subsidies for introducing energy-saving equipment [30% of the renewal cost in the case of renewal of the facility (the upper limit is 70 million VND) and up to 100 million VND for new installation)].
3. Support companies that implement energy conservation and projects.

Regional issues such as electrical energy requirements, local transportation, industrial waste, or water treatment do not require individual solutions. We need the concept of a smart community to deal with regional problems by tackling them in a complex and comprehensive way. In response to the smart community concept, we need to improve the reliability of power supply in buildings such as buildings, factories, hospitals, provincial government buildings, government offices, and schools and in neighboring areas.

For example, as part of the promotion of a smart community in Binh Duong Province, the Bus Rapid Transit (BRT)¹⁵ project is being developed. Other examples in Binh Duong New City are the establishment of high-quality electricity in urban development, the development and utilization of ICT infrastructure, the elimination of physical waste in constructing infrastructure, and the development of a smart community strategy by introducing smart traffic.

3.3. Smartization in Binh Duong New City

Tokyu Corporation has used an abundance of know-how in its urban development at Tama Denen on the Tokyu Denen Toshi Line. Tokyu Corporation takes advantage of its own know-how, exploring its strategies for building towns and new cities' and making its town planning packages smart [15].

In smartization by using the Tokyu Corporation city development package, we aim to contribute to town development by forming convenient infrastructure and comfortable communities.

We are exploring the following applied packages [7]:

1. City development that coexists with nature is surrounded by nature. In our urban development, we provide a rich urban space surrounded by water and greenery, and an environment that can interact with nature.
2. In city planning centered on public transportation, the station (or bus terminal) is the center. In this type of urban development, we concentrate urban functions, create comfortable environments, and introduce low-carbon type traffic.

¹⁵Bus Rapid Transit (BRT) is a high-speed bus transportation system that paves the orbit of a railroad, creates a bus exclusive road, and enables fast operation on a regular basis.

3. As part of resource recycling in town development, water and wastes are recycled. In this type of city planning, we provide safety and security, towns that are resistant to flooding and rising waters, and cities that are strong against disasters and have little crime.
4. Utilization of state-of-the-art technology in energy-saving town planning. In town development, we explore the relevant technologies based on the concept of regional traditions and climate, utilization of renewable energy, and optimum use of energy.

To establish energy and high-quality electricity supply and to improve the reliability of supply in Binh Duong Province, we need to explore state-of-the-art technology.

To establish a reliable energy supply, it is necessary to establish a company that provides an EMS service, construct a system with less power failure, construct a power distribution system with less power loss, improve energy efficiency, implement energy-saving measures for the entire region, and use renewable energy.

As part of the core technology of a smart community, on-site combination of EMS, smart meters,¹⁶ power storage devices, and renewable energy generation (such as solar, wind power, hydropower, geothermal, solar heating, atmospheric heating, natural heating, and biomass¹⁷ power generation) is needed. Both power supply and demand must be controlled.

In the development and utilization of ICT infrastructure in Binh Duong New City, smartization has been applied to the information network by using a new Wi-Fi system.¹⁸ In addition, there is a need to build a Wi-Fi system that can disseminate the Internet and improve the processing speed of computers. It must also be able to handle the huge and complicated big data¹⁹ generated by an information society.

Smartization can also be applied by using artificial intelligence (AI)²⁰ functions. In addition, by improving the efficiency of data collection and introducing surveillance cameras, a system can be constructed that eliminates waste by using personal identification functions.

There is a need to eliminate waste in the physical (real world) as well as in cyberspace.²¹ For example, we need to avoid wasting fuel and time by preventing traffic congestion on the roads, install wide roads that will not need to be expanded in the future, and improve infrastructure by eliminating future waste from a variety of perspectives.

3.4. Smartization target of Binh Duong New City

Completion of the smart community in Binh Duong New City is planned for 2022 and sets the following objectives:

¹⁶Unlike the conventional analog inductive watt-hour meter, the smart meter visualizes electricity by digital measurement. The smart meter is a next-generation watt-hour meter managed by a communications function in the meter.

¹⁷Biomass is a concept representing the amount of biological resources; it is a renewable organic resource that excludes fossil resources.

¹⁸Wi-Fi is a network based on the standard of the industry group Wi-Fi Alliance in the USA.

¹⁹"Big data" refers to large capacity digital data generated as the Internet spreads and computer processing speeds improve.

²⁰Artificial Intelligence (AI) is a technology that allows computers to perform intellectual behaviors such as understanding and reasoning of languages or problem-solving on behalf of human beings.

²¹Cyberspace is a virtual data space that can be used by many people such as computer software and computer networks.

1. Introduction of supervisory control and data acquisition (SCADA)/distribution management systems (DMSs) to distribution companies in Binh Duong New City, and installation of smart meters (with automatic meter reading) to all major customers.

With smart meters, electricity customers can digitally measure their power consumption at 30-min intervals and can thus understand their electricity usage.

2. Achievement of a 10% reduction in SAIFI in Binh Duong New City.

By understanding the SAIFI of Binh Duong New City, we can respond by comparing, analyzing, and evaluating the figures for Vietnam as a whole.

3. Achievement of a 20% reduction over 5 years in SAIDI in Binh Duong New City.

By understanding the SAIDI of Binh Duong New City, we can respond by comparing, analyzing, and evaluating the numerical values for Vietnam as a whole.

4. Reduction in the number of workers at substations in Binh Duong New City.

The minimum wage in Binh Duong Province is classified as the “first type²²” (highest) among domestic workers. By creating a smart electric power service, we can reduce the labor costs of electric power workers at the domestic wage level in Vietnam.

5. Improvement of the power supply/demand prediction in Binh Duong New City to realize a 2% peak cut in electric power supply and demand.

To do this, we will create a demand monitoring system and demand control system that uses advanced metering infrastructure (AMI).

By introducing the demand monitoring system, electricity consumption is measured in real time. Power demand is realized and monitored such that it does not exceed a set amount of electricity.

Also, when demand control system is introduced, an attempt will be made to reduce electricity charges by lowering the maximum value of demand electricity in the region.

6. Reduction of transmission and distribution losses in Binh Duong New City.

In electric power transmission and distribution to customers via electric wires, loss of power occurs because of electrical resistance and is accompanied by transmission/distribution loss.

Also, when power is transmitted and distributed to distant places, the voltage drops; power is converted to heat and is lost.

As ways to reduce transmission and distribution losses, the following have been implemented: a method of generating electricity locally, in the vicinity of the area where it was consumed; a method of reducing the electrical resistance by thickening the electric power cables; and a method of high-voltage transmission to reduce the electrical resistance by increasing the electric power.

²²The first type of area includes Hanoi City, Hai Phong City, Ho Chi Minh City, Binh Duong Province, Ba Ria-Vung Tau Province, and Dong Nai Province.

In addition to these goals, it is necessary to utilize a smart grid,²³ to promote the domestic production of smart-grid-related products in Vietnam, and to visualize electricity usage by using smart meters in association with renewable energy systems.

4. Conclusion

In the Binh Duong new city developed by Tokyu Corporation (Japanese Company), we aim to form a smart community that utilizes the know-how that has been realized in regional development in Japan, exporting smartization by city planning package.

Generally, with the promotion of the smart community, development using existing buildings and facilities is difficult. In other words, it is not necessary to consider existing buildings and facilities in developing new urban areas from the ground, so it is possible to promote an optimal and ideal smart community.

Unlike smartization in Da Nang City, which transforms existing old facilities and facilities, the Vietnam's Binh Duong Province smart approach facilitates the development of new cities. Also, unlike HCMC and Hanoi's major cities, in the Binh Duong Province, where population is low, development of new cities is easy to promote.

Furthermore, in the control of energy centered on the EMS by the Binh Duong New City, the neighborhood area is also a great merit to utilize its convenience. Therefore, the Binh Duong Province has attempted new attempts to develop industrial cities and new urban areas including neighboring areas.

The smart community strategy in the Binh Duong province has only just begun. At the present time, it is a situation in which it is impossible to make a judgment on the success or failure of the smart community strategy. Future tasks include strict capital planning accompanying the smart community strategy, and the inability of SORA gardens to sell real estate.

Meanwhile, in real estate in the high-class residential area of PHU MY HUNG in HCMC 7 ward, the sale did not proceed at first.

However, PHU MY HUNG attracted attention after 5 years; there are cases where urban development advanced. Also, in Hoa Lac Hi-Tech Park in Hanoi, there are cases where the urban development advanced more than 10 years ago. For the future development of new urban areas, it is necessary to promote a smart community strategy that cannot be confirmed by immediate earnings and to evaluate future potential.

In Vietnam, dynamic economic activities and corporate actions not seen in industrialized countries have shown that the activities of companies and related organizations showed active movements and showed high economic growth. One of the sources of economic growth in Vietnam is the effort to form a smart community (Smart Community Strategy).

²³The smart grid is a next-generation electric grid that has a mechanism to constantly optimize the demand and supply of electric power by utilizing ICT. In the smart grid, we aim to build a power supply system with high efficiency, quality, and reliability by controlling existing power-generation facilities such as hydropower and thermal power plants and distributed energy sources using new forms of energy such as wind power and solar power generation. Progress is being made in smart grid in each country as one of the countermeasures against global warming.

The smart community strategy in Vietnam's Binh Duong Province is urban development utilizing "know-how" realized in regional development in Japan. In addition, the smart community strategy of Vietnam's Binh Duong Province has just been developed, and it is a situation in which it is impossible to make a judgment of the right or wrong at the present moment.

However, the development of smart community strategy in the future is a very useful reference not only in Vietnam but also in urban development of developed countries and emerging countries, and it can be a useful urban accumulation model. Vietnamese smart community research is a very valuable research content, including not only Vietnamese literature but also English literature from other countries. In addition, smart community research in emerging countries has few approaches so far and is a very valuable field as a research area.

In recent years, the development of large cities of ASEAN countries, emerging countries such as Jakarta (Indonesia), Manila (Philippines), Bangkok (Thailand), Yangon (Myanmar), Kuala Lumpur (Malaysia), and so on is remarkable. The scenery of major cities in emerging countries is comparable to that of Tokyo, Beijing, Shanghai, Seoul, Taipei, and other big cities.

In the large cities of emerging economies, problems of environments and energy due to enormous urban areas are getting worse, and both have similar problems. The promotion of the smart community strategy in Vietnam's Binh Duong province, along with Hanoi and Ho Chi Minh City in Vietnam, is one example of a solution to the big city problem of emerging economies.

Research on smart communities, so far, mainly focuses on technical contents such as energy, environment, and electric vehicle (EV). In this chapter, we examined the smart community of Vietnam's Binh Duong Province from the viewpoint of social science. Studies of smart communities in Asian countries are hardly approached and have great academic contributions.

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