FY2019 Project for Ministry of the Environment Japan

FY2019
City-to-City Collaboration Programme for Low-Carbon Society

Low carbonization in smart city development project in Yangon Region

Report

February 2020

NTT Data Institute of Management Consulting, Inc.

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Chapter 1 Business Overview and Background

1.1 Overview

(1) Objective

All countries participated in the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) held in Paris, France in December 2015, and the conference adopted the Paris Agreement, a legal framework for a fair and effective measures to combat climate change after 2020. The Paris Agreement promotes efforts aimed at decarbonization, calling for nations to keep global temperature rise well below 2 degrees centigrade compared to pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees centigrade. At COP21, it was decided to recognize the actions of non-state actors, including municipalities, welcome the efforts of all non-governmental actors (municipalities and other local public bodies), and invite them to scale up their efforts.

COP22 was then held in Marrakesh, Morocco in November 2016. This session adopted the Marrakesh Declaration of Action for Climate and Sustainable Development, which reemphasized the urgent need to address global warming of an unprecedented scale and recognized that the global actions by states as well as local governments and the economic transformation will become the active opportunity to achieve further prosperity and sustainable development.

These sessions were followed by COP23 held in Bonn, Germany (host country: Fiji) in 2017; COP24 held in Katowice, Poland in 2018; and COP25 held in Madrid, Spain in December 2019. Japan government has expressed its proactive stance towards decarbonization to all nations at the sessions.

Cities are densely-populated where people engage in activities that support social and economic development. Although cities account for less than 2% of the world's entire area, they are home to roughly 50% of the world's population. This is expected to rise to 70% by 2050. It has been estimated that, as of 2006, more than 70% of global CO2 emissions came from cities, which shows that cities play a major role in mitigating climate change and that steady efforts by cities and surrounding urban areas to combat climate change and reduce greenhouse gas emissions are key to achieving the goals of the Paris Agreement.

Based on the above points, this project conducted a survey activity aimed at forming projects that would lead to JCM credit acquisition in smart cities, that is, a large-scale smart city development project “Eco Green Smart City Project” (hereinafter referred to as EGSC project) promoted by the Housing Bureau of the Ministry of Construction, which will serve as a bridgehead for building a decarbonized society in the Republic of the Union of Myanmar, with the support of Kitakyushu-City, which has experience and know-how on the formation of a decarbonized society.

Specifically, this project focused on finding candidate projects that can specifically realize decarbonization by not only grasping the EGSC plan to be developed over 16 years, but also

formulating a plan to promote decarbonization in line with the plan. In addition, utilizing the network of the Alliance Stars Group of Companies (hereinafter referred to as “Alliance”), which is the main body of the EGSC, this project have identified potential decarbonization projects in Yangon, etc., and conducted project formation activities to lead to JCM credit acquisition.

(2) Description of business

As mentioned above, this study conducted an excavation activity (Activity 2) for decarbonization candidate projects located in Yangon city and other places by focusing on the EGSC project, a large-scale smart city development project planned in the suburbs of the Yangon Region of the Republic of the Union of Myanmar, (hereinafter referred to as “Activity 1”) , together with the support centered on Kitakyushu-City's know-how on decarbonization, and utilizing the network of the Alliance, which is the EGSC promotion entity,.

- Activity 1: Making use of Kitakyushu-City's know-how on decarbonization planning to formulate decarbonization plans for the EGSC project
- Activity 2: Excavation of decarbonization projects utilizing Alliance's network

(3) Business execution methodology

(3)-1. Activity 1: Formulation of decarbonization plan for EGSC project

	Activity items	Activities
①	Grasping the outline of the EGSC project and checking its progress	As the EGSC project is a large-scale development project, it is highly likely that the original plan will be changed depending on the investor's investment situation. Therefore, the original plan of the EGSC project will be organized and the progress status including investment status will be confirmed.
②	Formulation of draft plan for decarbonization	Based on the above survey results, a decarbonization plan will be formulated so that future investments and developments will incorporate reductions in greenhouse gas emissions. As a first step, a draft plan will be created.
③	Consultation and consensus building with stakeholders	Based on the above draft, this project will consult with the Alliance, seek consensus building, and revise the draft as necessary.

(3) -2. Activity 2: Excavation of decarbonization projects

	Activity items	Activities
①	Promotion of the Alliance's understanding of JCM	This project will hold direct consultations with companies with needs identified in previous surveys, grasp detailed plans and share consideration policies for decarbonization.
②	JCM project discovery activities utilizing Alliance's network	Based on discussions with candidate companies etc. for project implementation, this project will examine the basic study of the technology to be introduced, the economics of the investment amount, the payback period, the internal rate of return, and the CO2 emission reduction effect of the introduction of equipment.

(3) Performance period

July 23, 2019 to March 1, 2020

(4) Survey implementation system

As shown in Table 1, this survey was conducted in cooperation with Kitakyushu-City and NTT Data Institute of Management Consulting, Inc.

Table 1 Implementation Organization Diagram1

business person	role
Kitakyushu-City	・ Consultation with Alliance ・ Support for decarbonization planning formulation utilizing Kitakyushu-City's know-how
NTT Data Institute of Management Consulting, Inc.	・ Consultation with Alliance ・ Support for decarbonization plan formulation ・ Technological and economical examination of specific candidate projects ・ Summary of this project work

(5) Survey schedule

The three-year business plan assumed in this project is shown in Figure 1. For Activity 1, it is assumed that a draft plan for decarbonization will be formulated during this study, and that necessary reviews will be conducted according to the status of investment in EGSC. Regarding Activity 2, a survey will be conducted this year with the aim of applying for JCM equipment

subsidy projects and deploying similar projects in the next year and beyond.

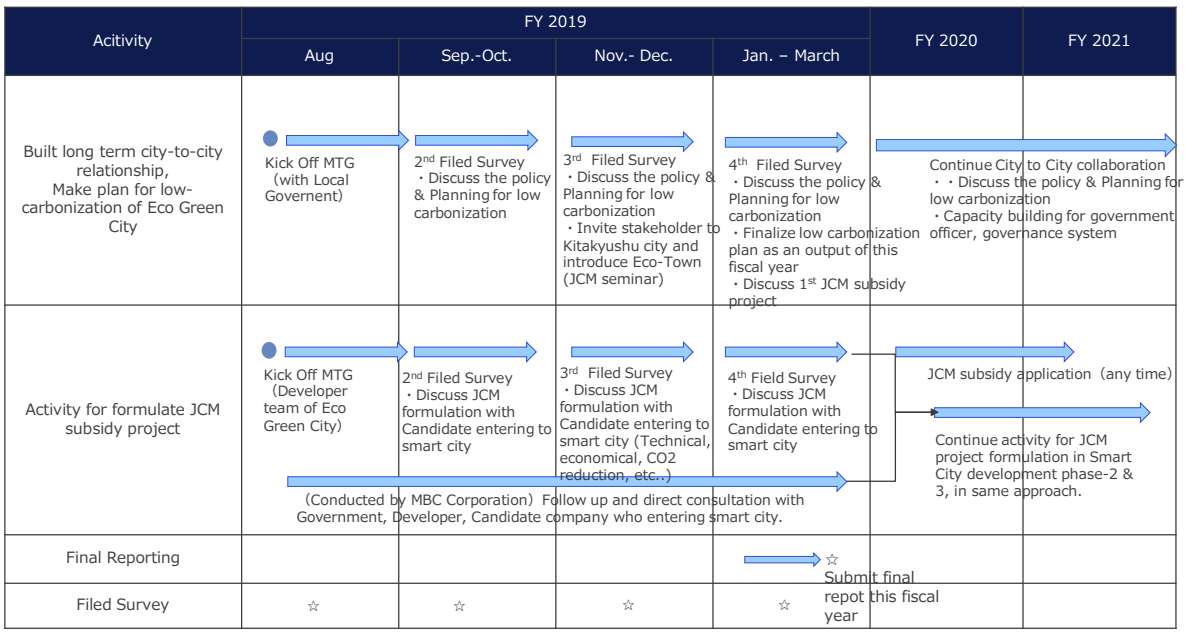

Figure 1 Expected Survey Schedule1

1.2 Business Background

1.2.1 Overview of target jurisdictions

The Yangon Region is located in the southern part of Yangon, the former capital and largest city of Myanmar, and has 7.36 million people (2014), equivalent to about 14% of the nation's total population. Yangon, the center of the city, is rapidly growing in population and urbanizing as the center of economic development in Myanmar due to the rapid democratization, the inflow of foreign capital, and private development in recent years. However, it is found out that the supply system of social infrastructure which supports urban life against the population increase is not sufficient, and that it has become a bottleneck for economic activity. Among the basic economic policies announced by the Myanmar government in July 2016, “priority development of basic infrastructure” and “city construction from the viewpoint of long-term environmental protection” are mentioned, Urban development from the viewpoint of both economic development and environmental protection is required.

According to the National Spatial Development Framework Plan announced by the Myanmar government, the development concept is centered on the Yangon Region, the Mandalay Region, and the Special Economic Zone (SEZ). JICA and KOICA have prepared the 2040 Master Plan for the Yangon Region, which is a subordinate plan. The Myanmar government is trying to revise its urban plans and legal systems with reference to the master plans prepared by such plans.

The Yangon master plan prepared by JICA, based on the Yangon implementation survey, aims to expand the urban area around Yangon city and the suburbs of Yangon to form a new

Yangon metropolitan area. The main themes are CBD development (Central Business District), suburban area development, and public transport oriented urban development.
As shown in the figure below, "Yangon 2040 The Peaceful and Beloved Yangon – A City of Green and Gold" as its slogan, the vision of Yangon Metropolitan Area Development for 2040 has set four pillars of "realization of an international hub city", "realization of a comfortable city", "realization of an infrastructure-rich city", and "realization of a good governance city".

出所：ミャンマー国ヤンゴン都市圏開発プログラム形成準備調査ファイナルレポート 平成25年4月

The future urban structure plan of the master plan is shown in the figure below. In addition to the development of the southern CBD where the current urban functions such as administration, finance and commerce are concentrated, the sub-center (New Town in the legend in the figure) will be developed in the future with the CBD as the center. A detailed plan is prepared for the area as the direction of the urbanization, given that the development of urban development in the "Northeast Suburbs" is expected in the short term, driven by the construction plan of a new international airport in the northeastern part of Yangon. It is to build efficient urban infrastructure by forming an "outer ring growth city axis" along the outer ring road in Yangon City, not only avoiding excessive urban development, but also studying the environment by preserving green spaces and agricultural land.

1.2.2 Position of EGSC

The development site of the Eco Green Smart City (EGSC), which is the target of this project survey, is located in Hlegu Township in the northeast suburbs. The area is served by a highway that runs from central Yangon to the northern region of Myanmar, and serves as the gateway to Yangon. In addition, it is an area with high potential, from the viewpoint of transportation nodes and natural environment, as there are excellent agricultural lands on the outer ring road plan in the metropolitan area which are rich in nature and equipped with irrigation systems.

The Urban and Housing Development Department of the Ministry of Construction in Myanmar is planning large-scale urban development in four locations in the country. The Eco Green City Project is one of them, and is a project in line with the future vision described in the Yangon Metropolitan Master Plan created by JICA. In addition, it is drawing attention as the first urban development project involving the Yangon Region government.

The following figure shows the development image of the EGSC project. The project will be implemented in a public-private partnership between the Myanmar Ministry of Construction and Urban Housing Development Bureau and the local private company Alliance. The development area is about 1,453 acres, and the original plan is to develop in three phases during 16 years from 2019 to 2035. This survey was conducted in collaboration with Myanmar Business Central Corporation (MBC), a business partner of the Alliance, which has no capital relationship but has a rich track record of collaboration. MBC has an abundant local corporate network. By cooperating with MBC, as consultation is facilitated, it is possible to establish a

JCM application business in line with the Eco Green City Development Plan and to establish a business with companies that may enter the city. In addition, this project conducted the study on the belief that proposing advanced Japanese technologies to developers through MBC would increase the possibility of finding decarbonization project for companies which Alliance has network with.

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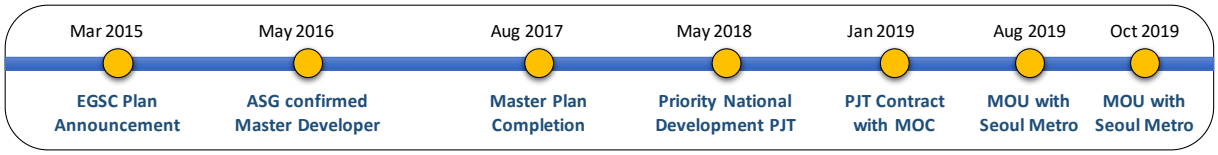
Chapter 2 Formulation of EGSC Decarbonization Plan

2.1 Overview of EGSC project and confirmation of progress

(1) Outline and current status of EGSC project

As mentioned above, the EGSC project is a large-scale development project promoted by the Federal Republic of Myanmar, Ministry of Construction, Urban Housing Development Bureau, and the original plan is that development will be promoted in three phases over the 16 years from 2019 to 2035. The history from the announcement of this project to the present is shown in the figure below. That is, the plan was announced in 2015, and the Alliance was selected as its master developer. Acquisition of land started in 2016, and FS, master plan formulation, etc. were approved for priority national projects.



- ❍ Mar 2015 Eco Green Smart City Plan Announcement (MOA → MOF → MOC)
- ❍ Mar 2015 Confirmed Alliance Stars Group of Companies as the Master Developer
- ❍ May 2016 Initial MOU followed by the process of Relocation and Resettlement
- ❍ 2017-2018 Feasibility Study
- ❍ Aug 2017 Master Plan Completion by Nikken Sekkei Civil Engineering LTD
- ❍ May 2018 Approval of Priority National Development Project
- ❍ Jan 2019 Project Contract with MOC
- ❍ Apr 2019 Project Phase 1 A, B Construction on going
- ❍ Aug 2019 MOU with Seoul Metro (Korea Government Co.) for Logistic Hub
- ❍ Oct 2019 MOU with Posco E&C (Korea Major EPC Co.) for Water Infrastructure

(MOA: Ministry of Agriculture, MOF: Ministry of Finance, MOC: Ministry of Construction)

At present, low-cost housing for low-income earners is being developed as a first phase development. Eventually, about 4,000 low-income housing will be provided.

Low cost housing

Greening of housing

The low-income housing is expected to be invested by the Alliance and transferred to the state (Ministry of Construction's Housing Bureau) when housing development is completed. The renovation and transfer of housing rights will establish Alliance's EGSC master developer rights. The basic policy for the construction of various facilities and buildings after the development of low-income housing is to promote development by the investors who invest in collaboration with the Alliance or who invest solely by acquiring rights from the Alliance after Alliance's finding such investors

The Alliance has been working to find investors from Japan, China and Korea, as well as Western countries. As Korean companies are showing interest in the EGSC because new industrial parks near the EGSC are being developed by Korean capital, Korean investors have become a good candidate for investing in housing for low-income earners. In fact, in August 2019, Seoul Metro (a Korean government company) signed a Memorandum of Understanding (MoU) on the development of a logistics hub, and in October 2019, Posco E & C, a leading Korean EPC company, has signed a memorandum of understanding on the development of water supply infrastructure.

However, due to the effects of the Rohingya problem and other factors, foreign investors' willingness to invest in Myanmar is not always high, and it is expected that the investment in various facilities and buildings after housing development for low-income earners is delayed compared to the original plan.

As described above, as the scheme for the development after housing development for low-income groups is that the Alliance will find another investor, facilities and buildings to be developed may be changed based on the intentions of the investor, even though it is based on the original plan

The following summarizes the original plans to constitute the basic concept of investment even though there is a possibility to be changed by the investor. In addition, the study was proceeded with attention taken into account the note that the decarbonization plan to be formulated shall be applicable, such as thorough energy saving in buildings and maximum use of renewable energy, even if facilities and buildings are changed due to changes to the original plan.

(2) EGSC project plan

(Site location / features)

The EGSC project site (hereinafter referred to as the EGSC site) is located about 15 miles from the center of Yangon and about 7 miles north of Yangon International Airport, and is expected to become the central base north of the Greater Yangon Metropolitan Area.

The EGSC site will develop agricultural land on a large scale, and the EGSC is expected to be a core hub for human traffic and logistics, as a Yangon-Mandalay expressway will run through the center of the EGSC site and an interchange will be developed.

In addition, an industrial park (Nyaung Nabin Industrial Zone) is scheduled to be established in the northwest of the site, and the EGSC is expected to play a role in supporting the industrial park in terms of housing.

In addition, the surrounding agricultural area is widespread, and the EGSC is expected to contribute to the promotion of agriculture.

(EGSC vision)

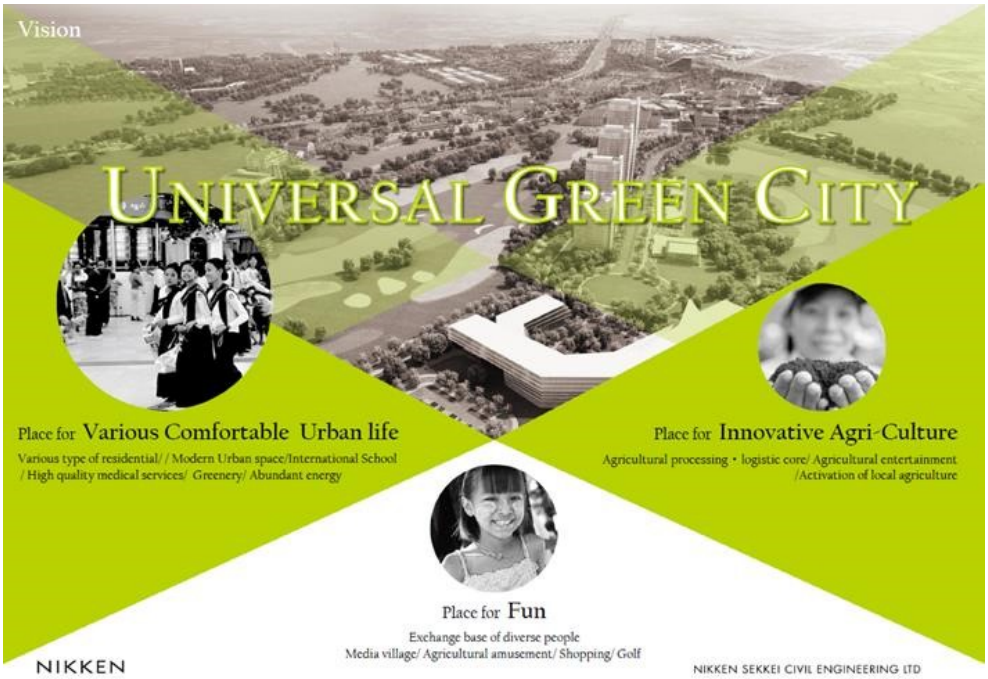
The EGSC aims to be a town symbolized by the following three keywords.

- A place to realize various comfortable urban life

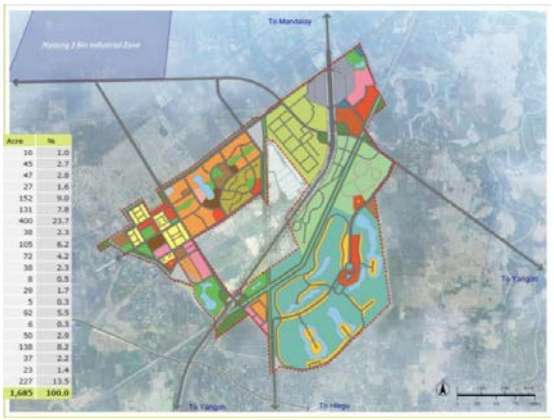
- Various types of dwellings
- Modern urban space
- Place of international learning (international school)
- High quality medical services
- Green area
- Abundant energy

➢ A place to realize innovative agriculture
- Agricultural products and logistics
- Simultaneous recreation and agriculture at community farms
- Activation of local agriculture

➢ A place for fun
- Diversity exchange base
- Media experience
- Agriculture experience
- Shopping
- Golf

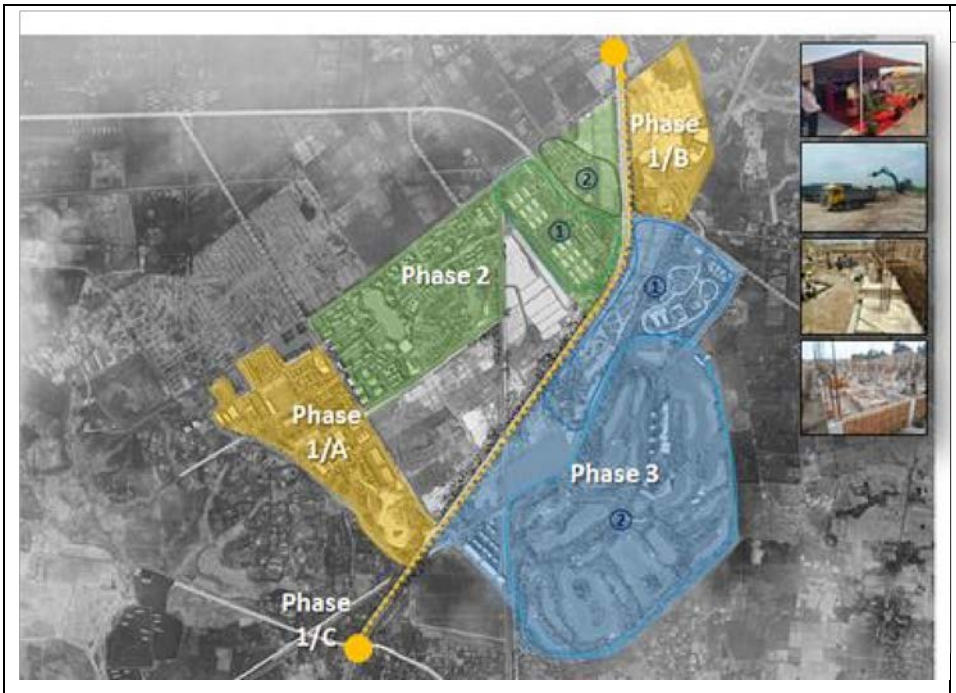


As shown in the figure below, the planned development plan divides the site into 21 zones, including commercial facilities, hotels, video media facilities, agricultural parks, golf courses, low-income housing, agricultural-related housing, and middle and high-income people. It plans to develop housing, hospitals, schools, pagoda, logistics bases, canals, public service facilities, roads, infrastructure, etc.



	Landuse	Acre	%
	Public service zone	16	1.0
	Commercial zone	45	2.7
	Mixuse zone	47	2.8
	Hotel zone	27	1.6
	Media village	152	9.0
	Agro-park	131	7.8
	Golf resort	400	23.7
	Low cost housing zone	38	2.3
	Mid-High density housing zone	105	6.2
	Exclusive housing zone	72	4.2
	Farm residential zone	38	2.3
	Hospital zone	8	0.5
	School zone	29	1.7
	Pagoda	5	0.3
	Park and lake	92	5.5
	Traffic zone	6	0.3
	Rest camp	50	2.9
	Green	138	8.2
	Canal	37	2.2
	Infrastructure	23	1.4
	Road	227	13.5
	Total*	**1,685**	**100.0**

The above development is planned to be carried out in three phases as described above, and although there is a possibility of change, the development plan as of November 2019 is as follows. Phase 1 is planned to be divided into three phases: Phase 1/A, 1/B and 1/C. According to the Myanmar government, the total investment is expected to be around US $ 2.0 billion.



Phase 1 (2019-2025)

① A: Low-cost Housing (On going)
② B: Logistic Hub (On going)
③ C: Moving the Toll gate
④ Infrastructure
⑤ Highway Rest Camp
⑥ Bus terminal, Mall, Wholesale etc.

Phase 2 (2026-2030)

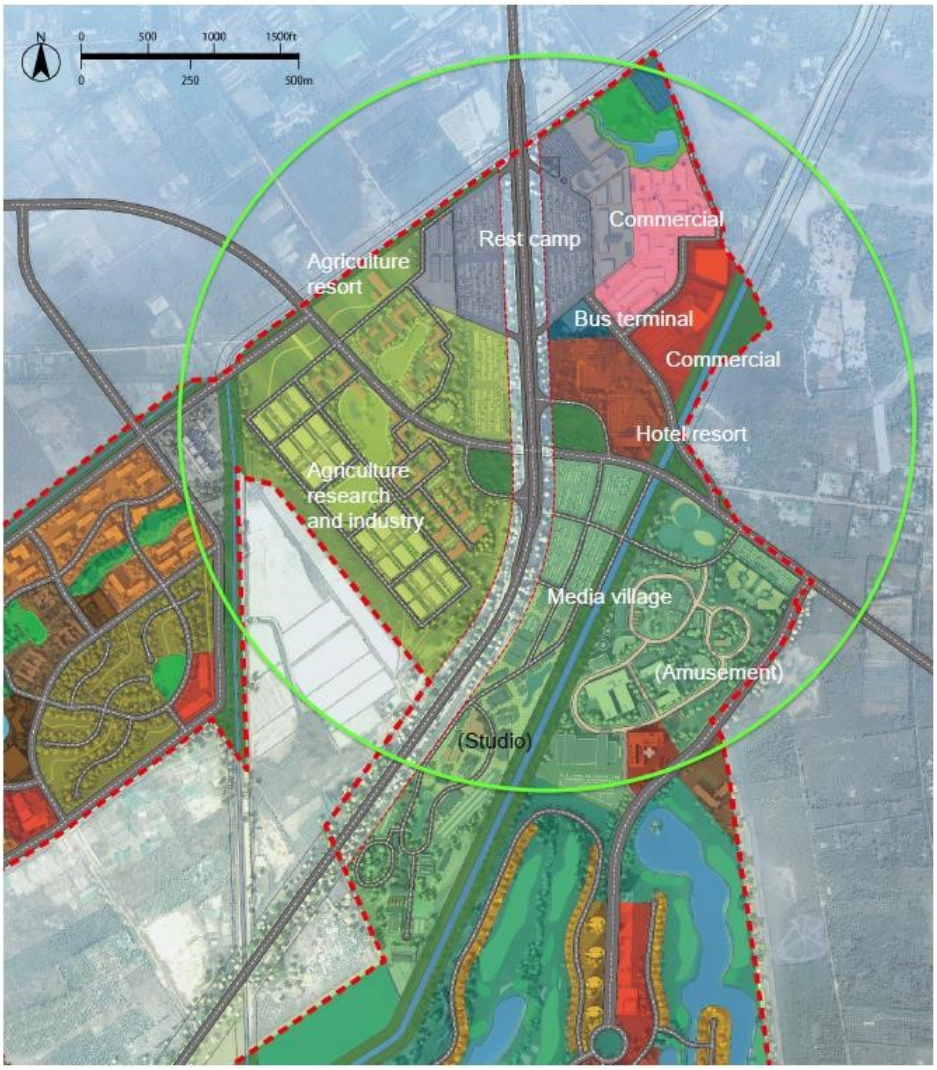
① Agricultural research park
② Agricultural Resort
③ Mid-cost Housing
④ Water Entertainment
⑤ Hospital, Mall, etc.

Phase 3 (2031-2035)

① Media Village
② Golf resort
③ High-rise Office Building
④ High-cost Housing
⑤ Luxury Hotel
⑥ International School, High class Hospital, etc.

* The Content and the order above is subject to change

Of the development zone, the urban core area, which is a collection of urban facilities, is located in a highly convenient location near the expressway that runs through the center of the site, and is located in hotel resorts, video media facilities, agricultural resorts, and agriculture. R & D and related industrial facilities will be developed.



The infrastructure supporting the site will include water supply facilities, power supply facilities, telecommunications facilities, waste consolidation bases, and wastewater treatment facilities. The water source is planned to be procured from a dam located about 15 miles north of the site. As the communication infrastructure, in addition to the optical fiber cable, a high-speed wireless infrastructure and a surveillance camera for ensuring security will be provided. In order to use renewable energy as much as possible, it is planned to install about 30 MW of solar power generation facilities at the site (or nearby area). carbon-free electricity from solar power plans to supply electricity not only to the EGSC but also to a nearby Korean industrial park.

2.2 Decarbonization plan

(1) Kitakyushu-City model

Based on the experience of overcoming pollution, fostering environmental industries, and achieving sustainable development, Kitakyushu-City has complied the steps to formulate a master plan for creating a vision, analyzing the background (problems and effects, etc.), setting goals and numerical targets, and formulating a strategy (planning), in order for cities in emerging countries to be able to achieve sustainable development without experiencing pollution. This is called the Kitakyushu Model.

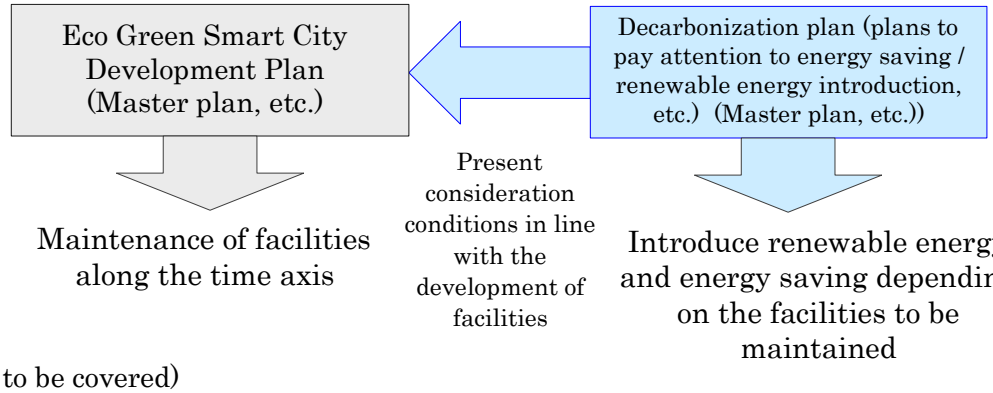
The EGSC is a new urban development, and a decarbonization plan that plans to incorporate the concept of decarbonization in a series of development processes will need to be aligned with urban planning. Therefore, among the Kitakyushu Model, the decarbonization plan was examined with reference to the sustainability framework.

(2) Decarbonization plan

(Positioning of decarbonization plan)

In the decarbonization plan, when various facilities and infrastructure are developed in the EGSC in accordance with the urban development plan, the introduction and disposal of equipment that contributes to the reduction of greenhouse gas emissions mainly from the environmental and energy perspectives

Items to be considered have been compiled so that reuse and recycling of goods can be promoted.



(Themes to be covered)

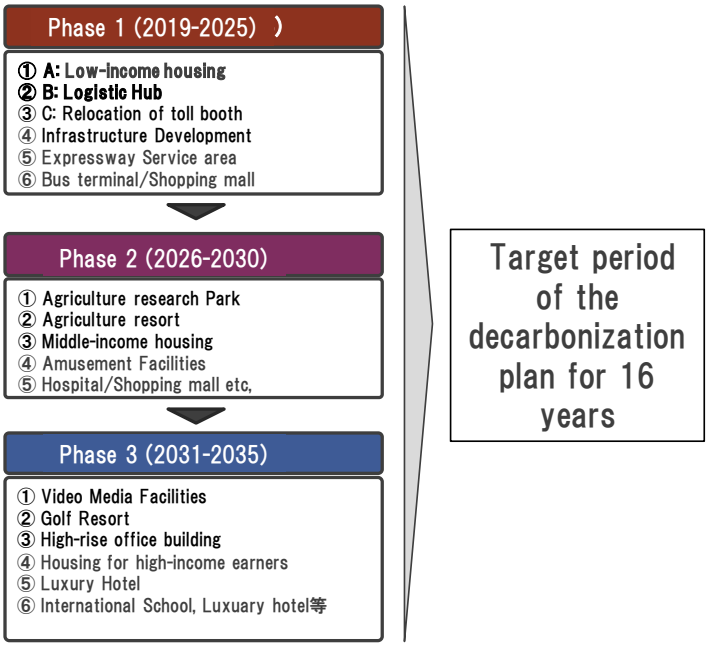
Among the Kitakyushu Models, the Sustainability Framework exemplifies four major themes as specific themes of sustainability: energy, water, waste management, and stakeholder involvement.

The EGSC plans to develop various facilities such as hotels, hospitals, schools, commercial facilities, agricultural parks and agricultural processing facilities, as well as infrastructure such as electricity, water and sewage, communications, waste management, and expressways. Based on the infrastructure and facilities to be developed, after discussions with the Alliance, it is decided that the areas to be taken up as themes should be energy, water and waste management, as well as transportation and environmental protection for the entire EGSC.

Featured themes	Energy	Water	Waste management	Traffic	Environmental protection

(Target period)

It is realistic to set the target period of the decarbonization plan to be the same as the EGSC development period of 16 years. As mentioned above, EGSC plans to divide 16 years of development into three phases, so the period of the decarbonization plan is also set to be 16 years.



(Goals for decarbonization, pilot projects, etc.)

The following table shows the goals, KPIs, pilot projects, etc., which were set as themes on energy, water, waste management, transportation, and environmental conservation respectively through discussions with the Alliance.

Since the EGSC may change the facilities that will be developed after the investor decides, the content of decarbonization targets and pilot projects will be possibly changed according to the changes.

Theme	Goal	Numerical goal	KPI	Pilot project
Energy	・Improve the efficiency of energy use. ・Expand the use of decarbonized energy such as renewable energy.	・ Aim to reduce CO2 emissions in building management (relative to 2010 building standards). ・ Increase the use of renewable energy	・ 2010 architecture Criteria (Building Regulations Part L 2010). 15% reduction in traffic	・ Energy saving projects for buildings in the EGSC, shopping malls, hospitals, schools, etc. ・ Project to introduce renewable energy equipment into EGSC (solar power, biomass, etc.)

Water	・ Securing water resources is a top priority. ・ Streamline water and sewage management and reduce water source pollutants ・ Promote reuse of treated water.	・Reduce the ratio of own water source to about 40%. ・Reduce costs by 20% by improving energy use efficiency. ・Recycled water use ratio to 30%.	・Ratio of own water source to procured water source ・Energy efficiency of water and sewage management ・Recycled water usage ratio	・ Efficient maintenance and operation of water and sewage systems ・ Advanced sewage treatment to enable reuse of treated water
Waste management	・Reuse (including energy recovery) waste generated from the town as much as possible to reduce the amount of landfill waste.	・Do not landfill 85% of waste.	・Amount or ratio of waste not to be landfilled	・Optimization of waste disposal
Traffic	・ Alleviate traffic jams ・Realization of compact city	・Reduce traffic jam extension by 5% compared to the average in Yangon	・Frequency and magnitude of traffic congestion ・Usage rate of public transportation	・Implementation of power transmission projects using digital such as automated driving ・Implement a project to introduce a traffic congestion mitigation system using AI

Environmental protection	・Monitoring of air, water quality, soil, etc.	・Establish environmental standards for air, water, soil, etc.	・Environmental standards for air, water and soil are set.	・Monitoring of air, water and soil

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Chapter 3 Excavation of Decarbonization Projects

3.1 Overview of activities

As described in Chapter 2, the EGSC project is a long-lived urban development project, and is currently actively pursuing investor discovery. For this reason, it is highly likely that a certain amount of time will be required to find specific projects to be subsidized by JCM equipment financing programme.

Therefore, in order to identify projects to be subsidized by JCM equipment financing programme in a relatively short period of time, excavation activities for specific CO2 emission reduction projects were conducted by utilizing the Alliance's network, visiting related companies to introduce JCM equipment financing programme. The main activities are as shown in the table below.

Table 3-1 Major project excavation activities

Implementation date.	Company name	Industry	Visit location information
2019/8/14	Alliance Company	Major Zaibatsu (Developer)	Myanmar / Yangon
	Company A (affiliated company of Alliance)	Energy service companies	Myanmar / Yangon
2019/8/15	Company B (local)	Cement production	Myanmar / Naypyidaw
2019/8/16	Company C (Japanese)	Service company	Myanmar / Yangon
2019/9/30	Alliance Company	Major Conglomerate (Developer)	Myanmar / Yangon
	Company D (Japanese)	Hotel management	Myanmar / Yangon
2019/10/1	Company E (local)	Beverage manufacturing	Myanmar / Yangon
2019/10/2	Company F (local)	Battery manufacturing	Myanmar / Yangon
2019/10/3	Company G (affiliated company of local company F)	Metal recycling	Myanmar / Yangon
2020/1/29	Company F (local)	Battery	Myanmar / Yangon

		manufacturing	
	Alliance Company	Major Conglomerate (Developer)	Myanmar / Yangon
	Company H (local)	Hospital management	Myanmar / Yangon

In addition, since the EGSC project is positioned as one of the four major projects promoted by the Housing Bureau of the Ministry of Construction in Myanmar, we conducted, by visiting ministries and agencies, including the Ministry of Construction, Bureau of Ministry of Construction, the explanation of the outline of the project and requested cooperation for JCM promotion. The main activities are as shown in the table below.

Table 3-2 Major related organizations visited

Implementation date.	Where to visit	Purpose
2019/8/14	Embassy of Japan in Myanmar	・ Introduction of project outline (EGSC project and JCM) ・ Request for support
2019/8/15	Ministry of Construction Housing Bureau	・ Introduction of project outline (EGSC project and JCM) ・ Request for support
	Ministry of Construction (JICA Expert)	・ Introduction of project outline (EGSC project and JCM) ・ Request for support
	Ministry of Natural Resources and Environment	・ Introduction of project outline (EGSC project and JCM) ・ Request for support
2019/9/30	Lecture at Myanmar Japan Chamber of Commerce and Construction	・ Introduction of project outline (EGSC project and JCM)
2019/10/3	JICA	・ Introduction of project outline (EGSC project and JCM) ・ Request for support

3.2 Results of project excavation activities

The results of the project excavation activities described in 3.1 are as follows.

(1) Short-term feasible projects

Company F, established in 1996, is a leading lead-acid battery manufacturer in Myanmar. The company manufactures and sells storage batteries for automobiles and standby batteries for industrial use, as well as batteries for special applications. The company's storage battery brand is a leading brand in Myanmar.

The company has great interest in the structure of the JCM, and is specifically interested in introducing the following two technologies.

(1) Solar power generation system
(2) Regenerating burner

Regarding the solar power generation system, drawings for the roof of the company's factory (Figs. 3-1 and 3-2) were obtained and estimation of an installable area size was conducted (Fig. 3-3).

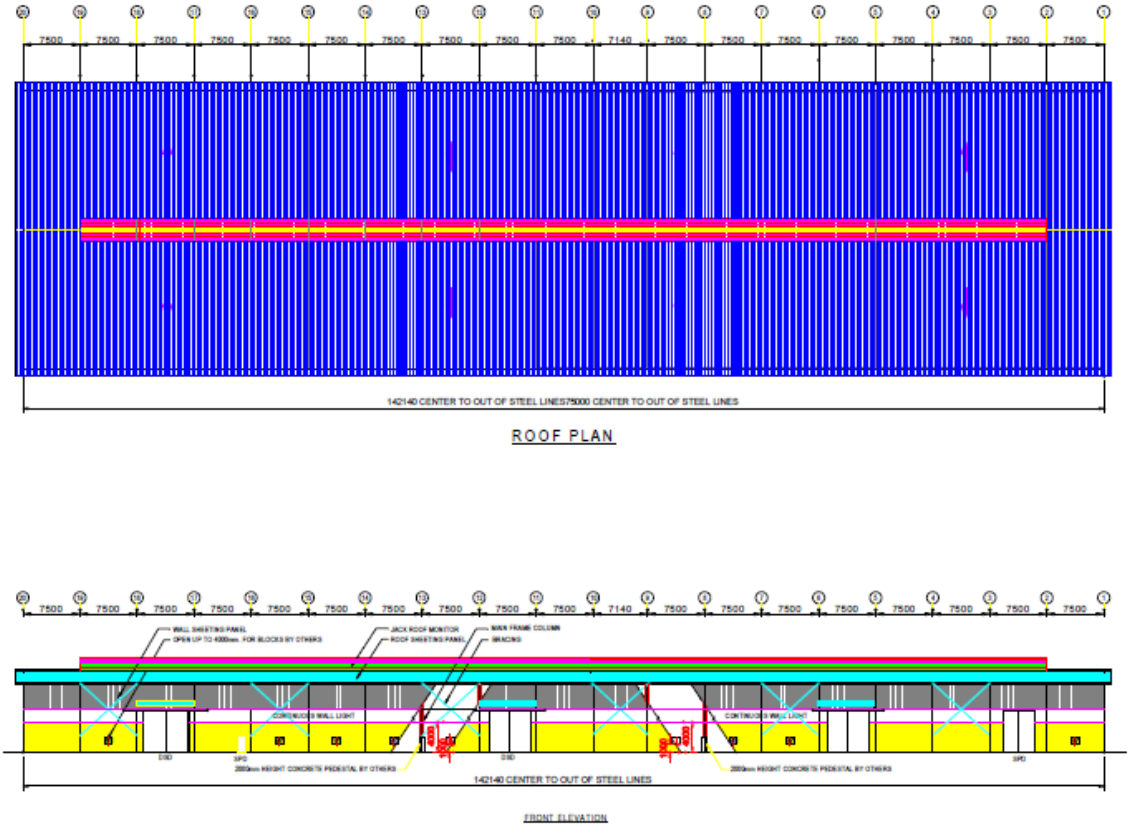


Figure 3-1 Scale of company F roof

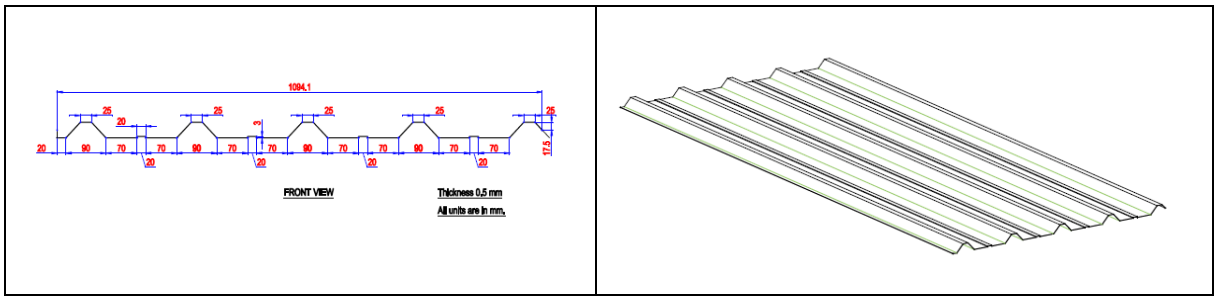


Figure 3-2 Roof shape of Company F

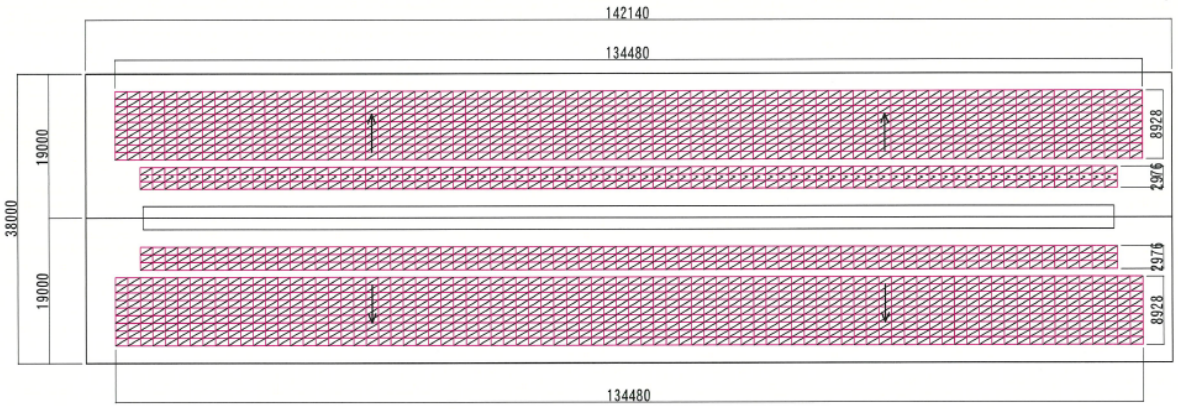


Figure 3-3 Solar power system that can be installed on the roof of Company F

As a result of the estimation, it was assumed that about 0.6 MW of solar power generation system could be installed. By taking into account the solar radiation conditions in Myanmar, the amount of the annual power generation was estimated as about 960 MWh. Based on this figure, assuming the statutory useful life as the factory's nine years, the amount of CO2 emission reduction in life time is estimated to be about 2,800 t-CO2.

In addition to the solar power generation system, the company is considering introducing the regenerative burner described in (1) and promoting the solar power generation system on the roof of factories of affiliated companies. The regenerative burner becomes interested as a waste heat recovery system is not introduced yet in the metal melting furnace in the battery storage plant, which is the company's main plant.

If the scale of the project can be expanded by combining solar power generation system and other technologies in this way, it is possible to consider applying for JCM equipment financing programme.

Currently, coordination is underway with a candidate for Representative Participant in order to construct the scheme shown in Figure 3-4.

Regarding financing, the company basically plans to use its own funds because of its strong business performance. It should be noted, however, that, as Chinese companies have proposed solar power generation systems, the selection of a technology provider is in a

competitive situation.

In addition, if, as Company F is a private company, it becomes a Joint Participant, it should be possible to negotiate a free contract.

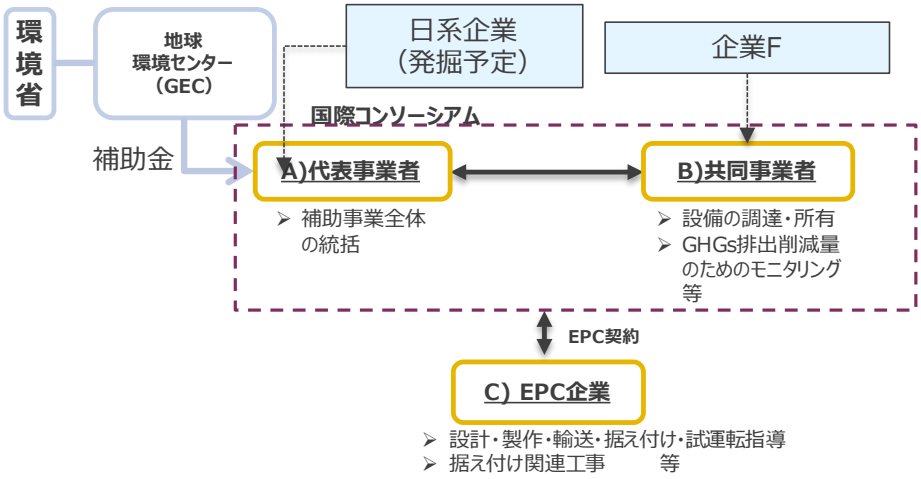


Figure 3-4 International Consortium Scheme

Subsequently, Company H is a conglomerate in Myanmar, founded in 1995, has expanded its businesses from with trade at the start, to with logistics, mine development, agriculture, real estate development, construction and healthcare services. The company is currently working with Japanese medical institutions to develop hospitals that provide advanced medical services to women and children. After outsourcing the basic design to a design company with experience in designing hospitals in Japan, detailed design is almost complete after finalizing the overall concept (see Figures 3-5 and 3-6).

Figure 3-5 Appearance of new hospital (image)

Figure 3-6 Layout of new hospital

The company has great interest in the structure of the JCM, and has plans to install a

generator at the new hospital to provide stable medical services. A decarbonized high-efficiency generator is planned as a promising candidate for the generator, and the company is interested in applying JCM to the introduction of the generator. Currently, as the company is studying details in cooperation with a Japanese design company that was in charge of designing the hospital, the applicability of JCM is increasing.

For investment in hospital construction, a special purpose company (SPC) will be established as a joint investment with a Japanese company, and the SPC will proceed with the construction of the hospital.

(2) Medium and long-term projects

Company A is an affiliate of the Alliance, established in 2013, and is responsible for energy-related operations. The company handles construction and management of generators in various parts of Myanmar, and has a track record of building multiple hydropower plants.

As described in Chapter 2, according to its policy to promote the use of renewable energy as much as possible, the EGSC will eventually install a 30 MW solar power generation system in the EGSC premises (or nearby premises). It is Company A which promotes this huge mega solar project. The company plans to supply mega-solar power to the EGSC as well as to a nearby Korean industrial park that is being developed (see Figure 3-7).

Company A has shown great interest in applying JCM to this mega solar project. However, as the development of the EGSC is gradually expanded in line with the number of investors found and increased, the development of mega-solar power will also be developed at the same time as the EGSC facilities expansion. For this reason, this project is decided to be positioned as a mid to long-term project at this time.

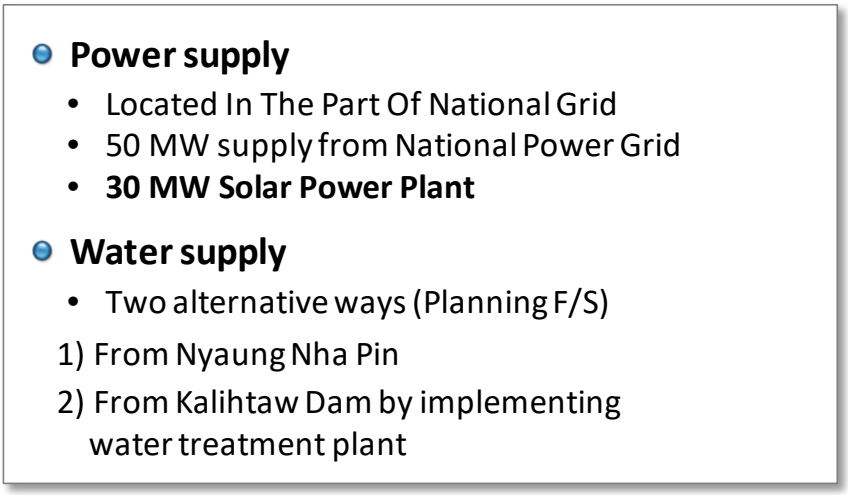


Figure 3-7 EGSC power supply plan

(3) Projects with lower possibility

Company B, founded in 1977, is one of Myanmar's leading conglomerates and is engaged in

cement production. As it is ranked fifth in Myanmar a cement manufacturing company, Company B has a policy to constantly adopt new technologies and develop its business with a differentiation strategy from the other higher ranked companies.

The company is currently planning to set up a biomass-fueled power generation facility (20MW) at a cement plant in the northern region of Myanmar. As biomass fuel, rice husk and other materials that can be procured from neighboring farmers will be used. However, as the amount of biomass that can be procured from neighboring farmers is not stable, there is a concern, depending on the season, that the amount to be procured will become insufficient. For this reason, the biomass reactor to be introduced is planned to perform coal co-firing when biomass fuel is insufficient.

As it has an experience in applying the JCM equipment financing programme in the past, Company B has a deep understanding of the JCM, and hopes to apply JCM to the above-mentioned biomass power generation business.

However, since the biomass ratio among the fuels is not 100% and there is a possibility of co-firing with fossil fuels even though it is a part, and even more the fuel to be co-fired is coal, it is judged that the application of JCM would be difficult, and that this project is positioned as a project with lower possibility.

3.3 Other project excavation activities

As shown in Table 3-2, on September 30, 2019, the EGSC and the JCM were introduced at the Myanmar Japanese Chamber of Commerce and Construction Subcommittee. About 100 people from Japanese construction companies participated in the briefing.

Figure 3-8 Construction Subcommittee

Contents

Chapter 4: City-to-City Collaboration Workshop

4.1 City-to-City Collaboration Workshop

(1) Background

Some of the participants and invitees at the City-to-City Collaboration Workshop (Seminar on City-to-City Collaboration) sponsored by the MOE who are affiliated with Kitakyushu were invited to the city to accompany others during the training program conducted there.

(2) Workshop schedule

In Kitakyushu: January 14 and 15, 2020

In Tokyo: January 16 and 17, 2020

(3) Details

The meeting minutes recorded during participation in the Kitakyushu and Tokyo workshops are included below.

(Memo 1)

JCM Seminar on City-to-City Collaboration - Kitakyushu Observation

Date: January 14 and 15, 2020
Location: Kitakyushu
Participants: Abe

Two days before and the day before the Seminar on City-to-City Collaboration for Zero-Carbon Society sponsored by the MOE and held at the Shinagawa Prince Hotel in Tokyo on January 16 and 17, 2020 some of the workshop invitees who are affiliated with Kitakyushu were invited to the city. Once there, they were provided with an explanation of Kitakyushu's history in dealing with environmental problems, the current state of Eco-Town, activities in Eco-Town, and given the opportunity to observe new test projects toward becoming a hydrogen (H) energy based society. NTT Data Institute of Management Consulting, who are involved in the 2019 City-to-City Collaboration project at each city also participated in the observation. Details of the observation are as follows.

Participants in the Kitakyushu observation are shown in Table 4-1 and the schedule is shown in Table 4-2. The five participants from Davao, Philippines were unable to make it to the observation due to planes being grounded from the January 12 volcanic eruption in the Philippines. Two participants in charge of eco-industrial park conception at the Vietnamese Ministry of Planning and Investment (MPI), which is the central ministry came to Kitakyushu, and five people came from Hai Phong, the sister city to Kitakyushu for a total of seven participants from Vietnam. This stems from Kitakyushu's support for eco-industrial park conception, with one industrial park that requested a model business being located in Hai Phong. Two participants came from the Iskandar Regional Development Agency (IRDA) in Malaysia, and two from the Alliance Stars Group in Yangon, Myanmar, with a total of 11 people joining in the observation.

As shown in Table 4-2, right after late night flights arrived from their respective countries at Fukuoka Airport on the morning of January 14, arriving participants traveled to Kitakyushu by chartered bus, left their luggage at the hotel, had lunch, and began the training program. After listening to an overview of Kitakyushu at Eco-Town Center, the participants observed operations at a home appliance recycling plant and office equipment (mainly copiers) recycling plant in Eco-Town, returned to the hotel for

a short time, then attended a welcome party.

On January 15, participants visited the Kitakyushu Environment Museum, learning about the history of environmental improvement efforts in Kitakyushu as well as current initiatives, then later touring a facility where testing of hydrogen energy usage is under way. After lunch, the participants took a tour of Kitakyushu, finally heading to Tokyo at night.

Details of activities are shown below.

Table 4-1 Kitakyushu Observation Participant List

Member list of JCM Workshop Partcipants

As of 7-JAN-2020

		Name	Organization	Position
1	Vietnam	Mr.Vu Quoc Huy	Ministry of Planning and Investment , Department of Economic Zone Management	Deputy Director General
2	Vietnam	Ms.Vuong Thi Minh Hieu	Ministry of Planning and Investment , Department of Economic Zone Management	Official
3	Vietnam	Ms.Nguyen Thi Bich Dung	People's Committee of Hai Phong City, Department of Foreign Affairs	Duputy Director
4	Vietnam	Mr. Pham Hong Ha	People's Committee of Hai Phong City, Department of Home Affairs	Vice Director
5	Vietnam	Mr. Nguyen Van Khoi	People's Committee of Vinh Bao District (Hai Phong City)	Vice Chairman
6	Vietnam	Mr. Hoang Trung Hieu	People's Committee of Do Son District (Hai Phong City)	Vice Chairman
7	Vietnam	Mr. Tran Minh Tan	People's Committee of Hai Phong City, Department of Public Security	Official
8	Malaysia	Ms. Norfiza binti Bashfari	People Management, Iskandar Regional Development Authority (IRDA)	Vice President
9	Malaysia	Ms. Wan Hezlin Enis binti Wan Ismail	People Management, Iskandar Regional Development Authority (IRDA)	Vice President
10	Myanmar	Mr. KIM Hyun Woo (Mike)	Alliance Stars Group	Manager
11	Myanmar	Ms.Daw San San Aye	Alliance Stars Group	Deputy Manager
12	Philippines	Mr. Sebastian Zimmerman Duterte	Davao City (City Councilor of Davao)	Vice Mayor
13	Philippines	Mr. J. Melchor JR. Bumpus Quitain	City Councilor of Davao	City councilor
14	Philippines	Ms. Diana Ann Welborn Quitain	City Councilor of Davao	Cheaf of Stuff
15	Philippines	Mr. Vince Jul O. Malicay	Office of Vice Mayor of Davao	Technical Adviser for Special Concerns or Executive Assistant of Vice Mayor Duterte
16	Philippines	Mr. Lawrence Alcazaren Zamora	Office of Vice Mayor of Davao	Security Officer, Presidential Security Group
17	Philippines	Mr. Kenny June B. Roma	Office of Vice Mayor of Davao	Security Officer, Presidential Security Group
18	Philippines	Mr. Ryan M. Monreal	Office of Vice Mayor of Davao	Security Officer, Presidential Security Group

Table 4-2 Kitakyushu Observation Schedule

Day1 14-January		
07:30 08:10 08:10		Vietnam group arrival (VN356) Myanmar group arrival (TG648) Malaysia group arrival (SQ656)
09:00	11:00	Move to Hotel (Nishitetsu-inn Kokura) by chartered bus
11:00		Check-in and Lunch *Only keep baggage (not stay at room)
13:00		Departure from Hotel to Kitakyushu Eco-Town
13:30	16:15	Kitakyushu Eco-Town (guidance, recycle factories of home appliance and OA equipment)
16:15		Move to Hotel
18:15		Departure from Hotel to Welcome party on foot
18:30	20:30	Welcome Party
Day 2 15-Janurary		
08:50		Meet up Hotel lobby after check-out *Do not leave baggage with the hotel.
09:00		Move to Kitakyushu Environmental Museum
09:30	10:30	Kitakyushu Environmental Museum
10:30	12:00	Kitakyushu Smart community (Hydrogen Town Demonstration test)
12:00		Move to Kokura
12:30	13:30	Lunch
13:30	14:40	Kokura Castle etc
14:40		Move to Kitakyushu AP
16:20	17:50	Kitakyushu AP – Tokyo Haneda AP (SFJ86)
17:50		Move to Hotel (Shinagawa Price Hotel) by chartered bus

<u>January 14</u>

(1) Eco-Town Center (13:30 - 14:00)

At Eco-Town Center in the Hibikinada area of Wakamatsu ward in Kitakyushu, participants listened to an explanation of Kitakyushu's history, a summary and features of the Hibikinada Marine Industrial Park, and the Kitakyushu Eco-Town Plan from the staff at the Center.

Ever since Yawata Steel Works was established in Kitakyushu in 1901, the city has developed into a manufacturing town. Various world-famous companies make their home

here, such as Nippon Steel, Yaskawa Electric, which manufactures industrial robots, and TOTO, which produces toilets and washbasin systems. For 20 years starting in the 1960s, the city experienced problems with pollution, spending nearly 800 billion yen, turning it into the advanced Eco-Town of today.

	
Explaining at Eco-Town Center 1	Explaining at Eco-Town Center 2

After learning about the background of Eco-Town in a classroom-style setting, the participants listened to an explanation on the steel, plastic, and fiber recycling programs in the town using Eco-Town Center facilities.

	
Explaining recycling of old clothes and fibers	Explaining the Comprehensive Environment Industrial Complex

	
Explaining urban mining	Group representing Hai Phong

(2) Nishinihon Kaden Recycle Corporation (14:15 - 15:00)

Nishinihon Kaden Recycle Corporation is a company that runs a home appliance recycling project in the Kitakyushu Eco-Town Comprehensive Environment Industrial Complex based on Home Appliance Recycling Law. They accept and recycle four types of home appliances including LCD/CRT TVs, washing machines/dryers, refrigerators, and air conditioners. With a processing capacity of 282 tons per day (1 million units per year at standard weight conversion), they are the largest-scale recycling plant in Western Japan.

First, company employees provided an explanation about the company, then the participants watched a video presentation explaining the recycling process for each appliance at the plant. The TV recycling process is shown in Figure 4-1, washing machine process in Figure 4-2, refrigerator process in Figure 4-3, and air conditioning process in Figure 4-4.

After watching the video, they took part in a tour of the plant that followed a tour course. The tour course allowed participants to see part of each recycling process as explained in Figures 4-1 to 4-4. Photos were prohibited during the tour.

Explaining the recycling company	Explaining the recycling processes

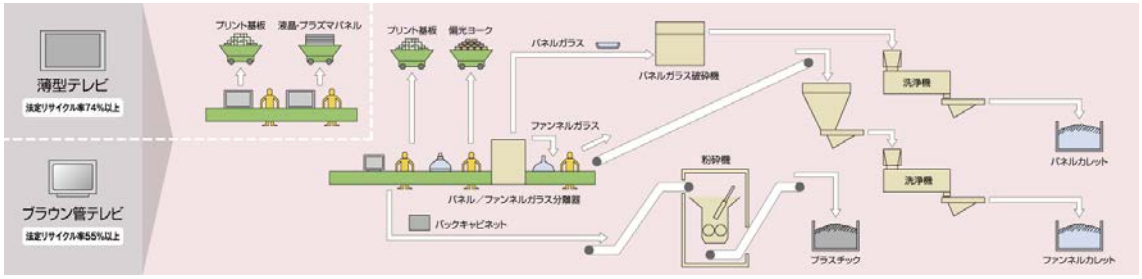


Figure 4-1 Recycling process for flat screen and CRT televisions

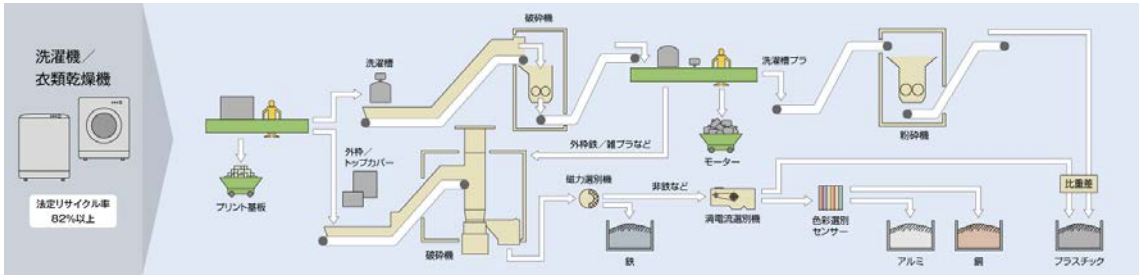


Figure 4-2 Recycling process for washing machines and clothing dryers

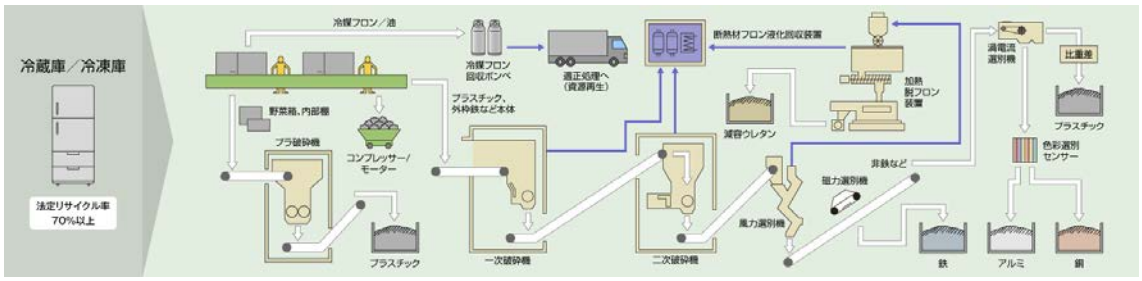


Figure 4-3 Recycling process for refrigerators

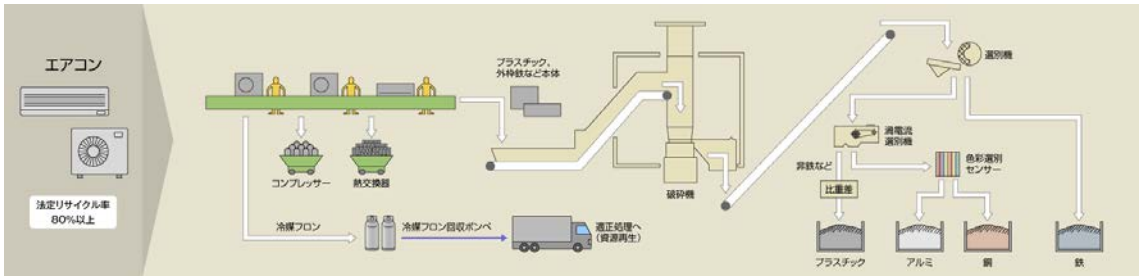


Figure 4-4 Recycling process for air conditioners

(3) Recycle Tech Corporation (15:15 - 16:00)

Recycle Tech Corporation is a business that mainly handles recycling of office

equipment, and is funded by the Shinryo Corporation which mainly handles industrial waste processing and recycling, and the Ricoh Co., Ltd. Their office equipment recycling process is shown in Figure 4-5.

After watching a video explaining the company and their recycling process, participants received an explanation on recycling showing actual dismantled office equipment samples, as well as a briefing on photovoltaic panel (PV panel) recycling efforts which was launched in recent years. Later they toured the recycling plant with participants asking questions about how the massive rows of copiers are managed. The staff explained that each copier was assigned a bar code upon arrival, helping to properly identify each copier and which step of the process it is currently in.

	
Company and recycling process explanation 1	Company and recycling process explanation 2

	
Office equipment recycling process explanation	PV panel recycling process explanation

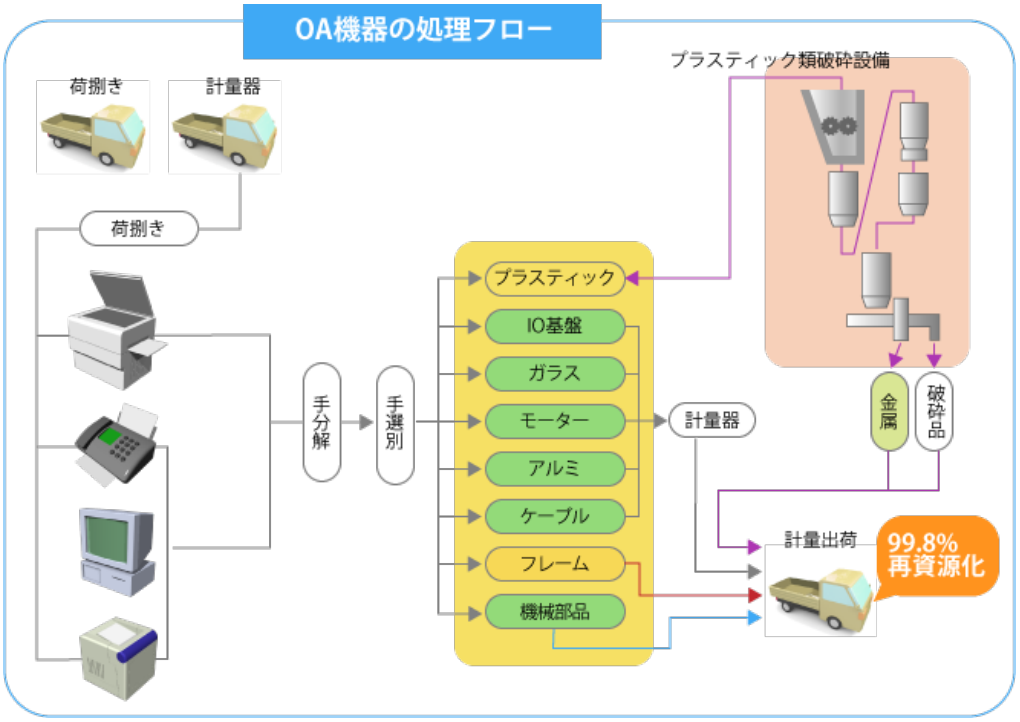


Figure 4-5 Office equipment recycling process

After a tour of the Recycle Tech Corporation office equipment recycling plant, the remaining time was used to show participants the wind power generation facilities at the industrial park. Participants stayed on the bus during the observation due to the rainy weather, however, Eco-Town Center employees talked about the wind power generation facilities on land and the offshore floating facilities, as well as future plans for offshore wind power initiatives.

Hibikinada Marine Industrial Park coastal wind

power generation facilities
(On clear days you can see the floating offshore wind turbines)

January 15

(1) Kitakyushu Environment Museum (9:30 - 10:30)

The Environment Museum cooperates with various institutions and groups in an effort to achieve an environmentally-friendly and sustainable society, such as schools, corporations, citizens, citizens' groups, and the government. It serves as a base for collaborative efforts in Kitakyushu's goal of becoming the environment capital of the world, providing a comprehensive place where citizens can gather together and learn about the environment.

After listening to an explanation on Kitakyushu's geographical location and background at the Environment Museum, the participants heard about how the environment was sacrificed to develop into a manufacturing town, and the severe situation it faced in the 1960s. At that time, efforts to solve environmental pollution began mainly thanks to the mothers of elementary school children in the area. People from the sciences and government then joined in, taking over 20 years and massive sums of money to revitalize the environment resulting in the Eco-Town of today that the world can be proud of.

Later, participants listened to an explanation of the Environment Museum and how it serves as a base for SDGs such as learning and gathering together, and about efforts toward becoming a resource recycling society. Participants were highly interested in the transformation of Kitakyushu, engaging in an active discussion on how it changed, what the role of the government was at that time, and how funds were used to solve problems.

	
In front of the Environment Museum -	Geographical explanation of Kitakyushu

Meeting the director	

	
Environmental pollution in the 1960s	Efforts to solve environmental problems

	
Development of knowledge gained in solving environmental problems	SDG initiatives

	
Resource and waste recycling	End of the Environment Museum tour

(2) Kitakyushu Smart Community (10:30 - 12:00)

In order for Kitakyushu to become a hydrogen energy based city, there are three efforts under way. (1) Testing and promotional activities at Kitakyushu Hydrogen Town in the Higashida area, (2) Creation of a carbon dioxide-free hydrogen production and supply depot in the Hibikinada area, and (3) Popularization of fuel cell vehicles and hydrogen stations across the entire city.

In the Environment Museum conference room, participants listened to a summary of efforts to transform Kitakyushu into a hydrogen energy based city, then heard an explanation of fuel cell construction (Figure 4-6) which is a technology required to achieve this goal, fuel cell vehicles (Figure 4-7), and a hydrogen transportation test project (Figure 4-8). Later they visited the neighboring Higashida area to view fuel cell vehicles, hydrogen-powered house, hydrogen transportation facilities, and hydrogen leak detection equipment. Participants showed great interest in the fuel cell vehicle.

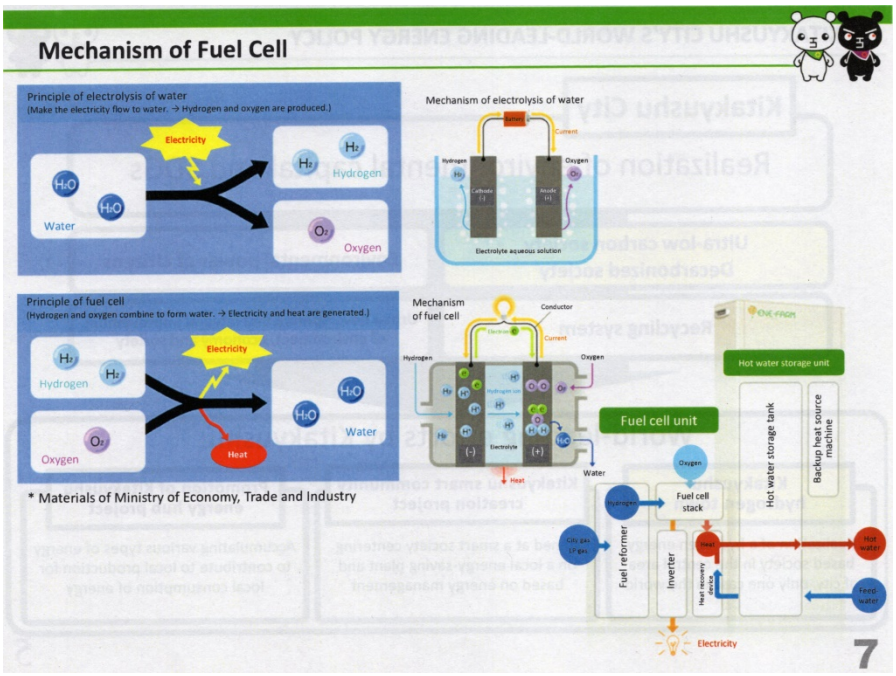
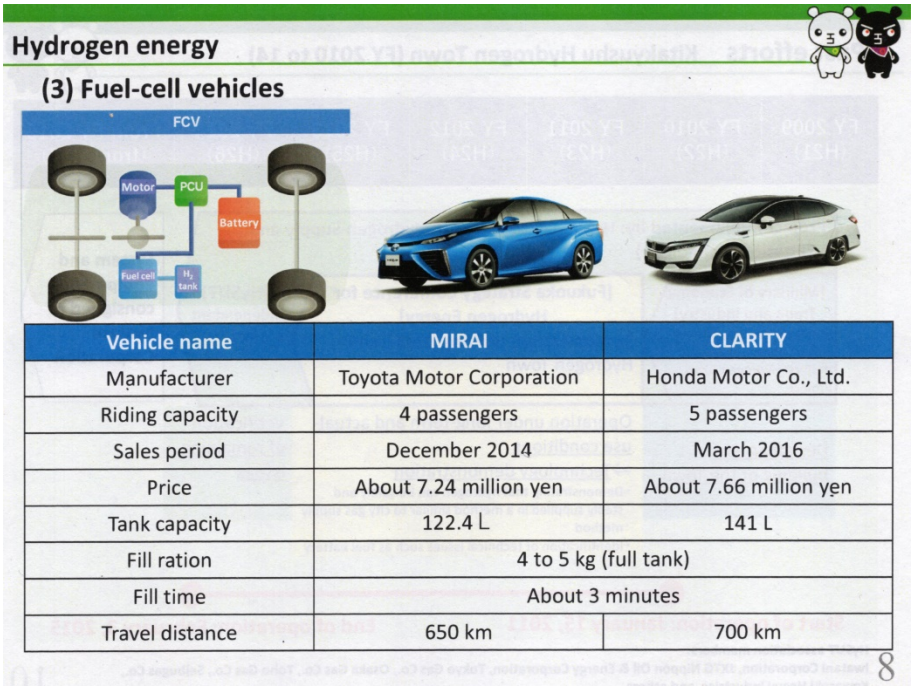


Figure 4-6 Fuel cell principles



Vehicle name	MIRAI	CLARITY
Manufacturer	Toyota Motor Corporation	Honda Motor Co., Ltd.
Riding capacity	4 passengers	5 passengers
Sales period	December 2014	March 2016
Price	About 7.24 million yen	About 7.66 million yen
Tank capacity	122.4 L	141 L
Fill ration	4 to 5 kg (full tank)	
Fill time	About 3 minutes	
Travel distance	650 km	700 km

8

Figure 4-7 Fuel cell vehicle (Toyota MIRAI and Honda CLARITY)

Figure 4-8 Hydrogen transportation test project

	
Lecture on efforts to achieve a hydrogen energy based city	Fuel cell vehicle (CLARITY) 1
	
Fuel cell vehicle (CLARITY) 2	Fuel cell house
	
Hydrogen usage test facilities explanation 1	Hydrogen usage test facilities explanation 2

	
Hydrogen transportation pipe	Hydrogen leak sensor (Left closed at all times)

JCM Seminar on City-to-City Collaboration

January 16 and 17, 2020
Venue: Shinagawa Prince Hotel Main Tower,
International Convention Center Pamir
Participants: Kobayashi, Yamakawa

We participated in the Seminar on City-to-City Collaboration for Zero-Carbon Society, organized by the Ministry of the Environment (MOE), held on January 16 and 17, 2020, in Tokyo. On the morning of the 16th, a closed seminar was held, followed by a site visit in Tokyo in the afternoon. On the morning of 17th, a closed seminar was held, followed by a open seminar in the afternoon.

■ **January 16 Morning Closed Seminar Program**

Time	Presentation
09:00-09:30	Opening remarks & Presentation titled: Domestic and international trends for creating a zero-carbon society Mr. Kotaro Kawamata, Director, Environmental Strategy Division, Minister's Secretariat, MOEJ
	Recent development of City-to-City Collaboration Projects & Points for next fiscal year Ms. Mahoyo Yamamoto, MOEJ
09:30-10:15	**I. Projects in Viet Nam** 1. Ho Chi Minh – Osaka Mr. Masaru Ishikawa Manager, Environmental Science & Engineering Dept., Nippon Koei Co., Ltd. 2. Hai Phong – Kitakyushu Mr. Yuichi Abe Associate Partner, Socio & Eco Strategic Consulting Unit, NTT Data Institute of Management Consulting, Inc. 3. Can Tho - Hiroshima Prefecture Mr. Kazuki Matsubara Senior Managerial Staff, Foreign Business Division, Commerce, Industry and Labor Bureau, Hiroshima Prefectural Government **II. Projects in the Philippines** 4. Davao – Kitakyushu Ms. Emiko Murakami, Director of Business Promotion, Kitakyushu Asian Center for Low Carbon Society, City of Kitakyushu 5. Quezon – Osaka Mr. Motofumi Suzuki Senior Advisor, Oriental Consultants, Co., Ltd. **III. Projects in Malaysia** 6. Kuala Lumpur – Tokyo Metropolitan Government Dr. Junichi Fujino Programme Director, City Taskforce, IGES 7. Iskandar – Kitakyushu Mr. Motoshi Muraoka Partner, Socio & Eco Strategic Consulting Unit, NTT Data Institute of Management Consulting, Inc. Q&A
10:15-10:25	Break

10:25-11:05	**IV. Projects in Myanmar** 8. Hlegu Township, Yangon Region – Kitakyushu Mr. Motoshi Muraoka Partner, Socio & Eco Strategic Consulting Unit, NTT Data Institute of Management Consulting, Inc. 9. Yangon – Kawasaki Mr. Takahiro Fukahori Manager, International Economic Affairs Office, Economic and Labor Affairs Bureau, Kawasaki City 10. Sagaing Region - Fukushima 11. Ayeyarwady Region- Fukushima Mr. Koji Kojima Research Director, Environmental and Energy Research Division, Mitsubishi Research Institute Inc. Mr. Naoki Kato Manager, Environment Division, Environment Department, Fukushima City **V. Projects in Thailand** 12. Laem Chabang Port, Bangkok Port – Yokohama Mr. Kousuke Shibasaki Deputy General Manager, Engineering Department, Yokohama Port Corporation 13. Eastern Economic Corridor – Osaka Mr. Masaru Ishikawa Manager, Environmental Science & Engineering Dept., Nippon Koei Co., Ltd. Q&A
11:05-11:15	Break
11:15-11:55	**VI. Projects in Indonesia** 14. Semarang – Toyama 15. Bali – Toyama Mr. Keiichi Kobayashi Section Chief, International Cooperation Section Environmental Policy Div., Toyama City Ms. Aki Baba Associate Senior Staff, Environmental Science & Engineering Dept., Nippon Koei Co., Ltd. 16. Jakarta - Kawasaki 17. Rokan Hulu, Riau Province – Kawasaki Mr. Takahiro Fukahori Manager, International Economic Affairs Office, Economic and Labor Affairs Bureau, Kawasaki City Q&A
11:55-12:00	Administrative announcement (IGES), End of session

(Note) The order of presentations may be changed.

- 09:00 Opening remarks & Presentation titled: Domestic and international trends for creating a zero-carbon society - (15 min): Mr. Kotaro Kawamata, Director, Environmental Strategy Division, Minister's Secretariat, MOE
  - ✧ City-to-city collaboration is one important means of achieving the goals of the Paris Agreement, and we would like to continue actively engaging in it in the future.
  - ✧ Ten Asian countries, 32 cities and 14 local governments have participated so far in city-to-city collaboration. 120 persons from six Asian countries, 17 cities, and eight local governments participated in this city-to-city collaboration seminar. This year, self-funded participation was also higher than the average year.

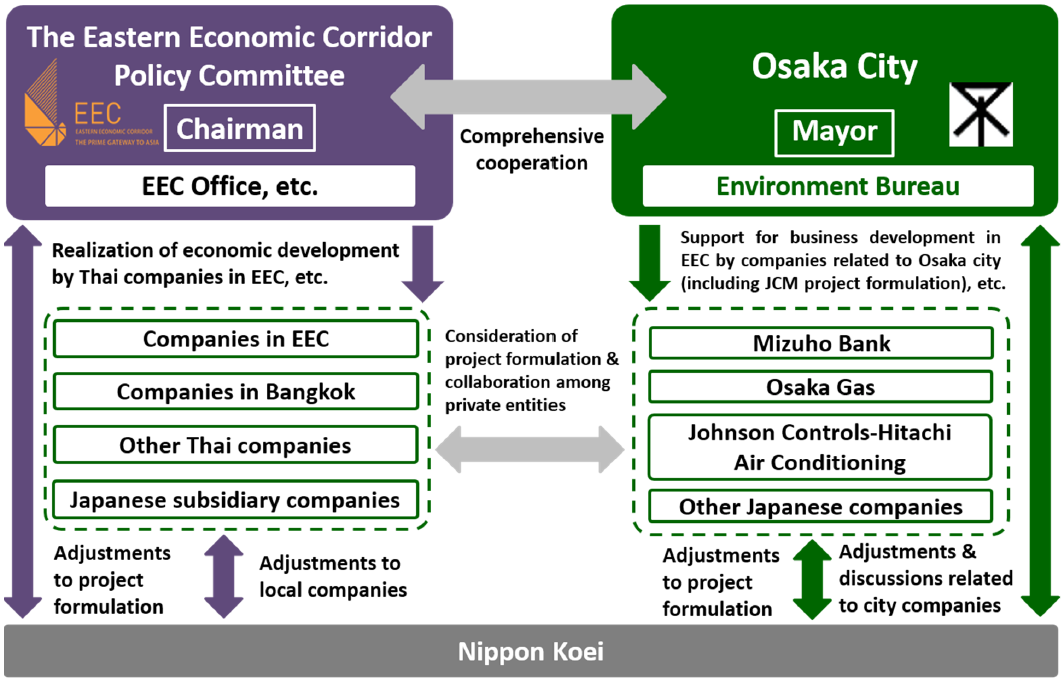
- ✧ The latest trend in decarbonization in Japan is that the number of local governments declaring that they aim to decarbonize is on the rise. The main causes of this include the devastating impact of the natural disasters this year and the growing call for local governments to decarbonize by Minister of Environment Koizumi after he took office in September. As a result, currently, 33 local governments have declared that they will be zero carbon cities. For example, Nagano Prefecture, which was severely damaged by typhoons this year, made a decarbonization declaration this year.
- ✧ For future international development, we plan to consider the holding of a "Zero Carbon City International Forum" in cooperation with local governments that have declared that they will become zero carbon cities.
- ✧ It is difficult for Japan as a whole to immediately realize decarbonization; however, we will make use of frameworks such as city-to-city collaboration projects and JCM equipment subsidies to proactively work toward decarbonization.

- 09:15 Recent development of City-to-City Collaboration Projects & Points for next fiscal (15 minutes):
  Ms. Mahoyo Yamamoto, International Cooperation / Environmental Infrastructure Office, Global Environment Bureau, International Strategy Division, MOE
  - ✧ As for the granted requests for this year, 10 out of 21 primary applications were granted and 7 out of 9 secondary applications were granted. The contents of the proposals for the secondary applications are a refinement of the contents of the successful bids in primary applications, and we are very satisfied with the results.
  - ✧ The change for this year's applications is that the project period has been changed to a maximum of three years. The reason for the change is that it is difficult to formulate a JCM equipment subsidy project in a single fiscal year, and it is necessary to work on designing systems, etc., over the course of several years. With the project period having been set to three years, this year, the contents of activities of 11 projects will be premised on plan formulation. It should be noted that although the proposals are for a three-year implementation plan, contracts will remain single-year contracts.
  - ✧ Although the naming has changed from low carbon to decarbonization, we recognize that decarbonization is something that is difficult to realize

immediately. We hope that next year's city-to-city collaboration projects will work with a view to achieving a zero-carbon society by 2050.

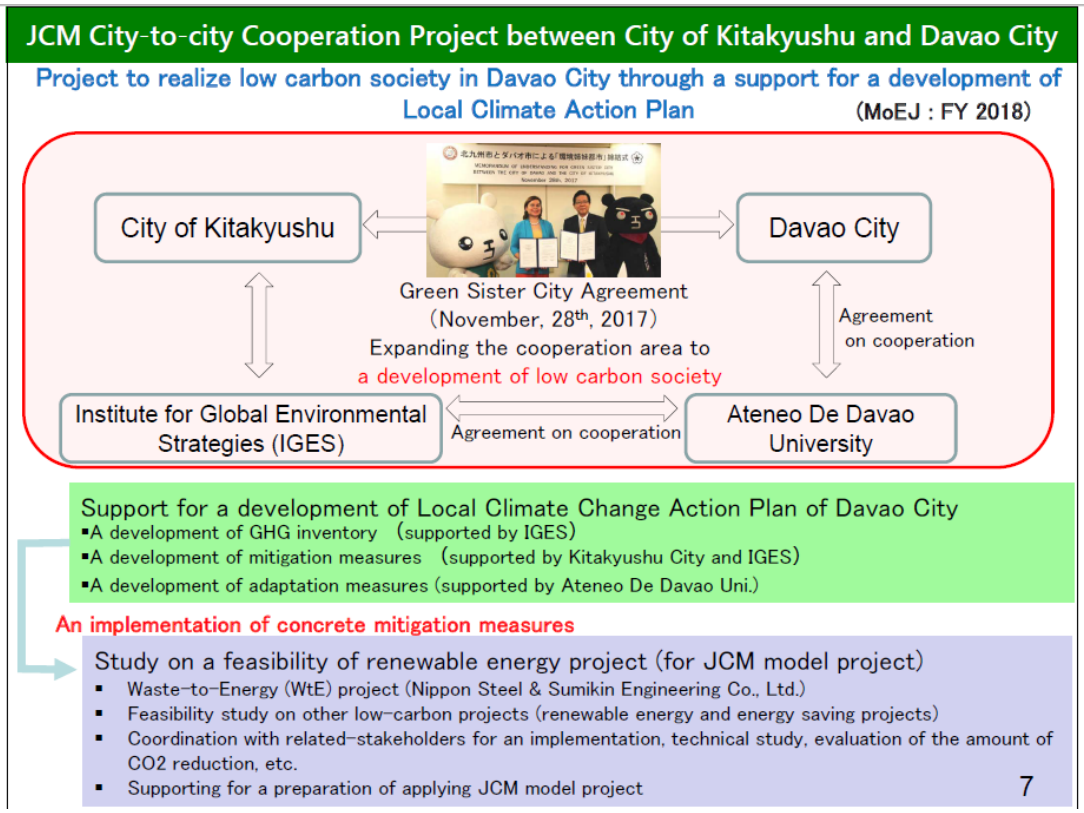
- ✧ The call for applications for next year's city-to-city collaborations is expected to start around late March.

- Introduction of projects in Vietnam
  - ➢ Ho Chi Minh - Osaka City Project (5 min): Mr. Masaru Ishikawa, Manager, Environmental Science & Engineering Dept., Nippon Koei Co., Ltd.
    - ✧ Osaka City is sharing its accumulated knowledge of climate change mitigation measures, adaptation measures, and administrative management with Ho Chi Minh City.
    - ✧ The project formulation activities include consideration of the introduction of energy-saving air-conditioners, gas boiler fuel conversion and photovoltaic power generation systems.
    - ✧ There are currently no particular issues, and both Ho Chi Minh City and Osaka City are very positive. As for activities for the next fiscal year and beyond, we would like to continue with the policy dialogue that has been implemented through city-to-city collaboration. Specifically, we will work on a policy dialogue on the proactive introduction of low-carbon technologies in Ho Chi Minh City. We will also continue to focus on project formulation. In addition, we also plan to work on project formation in public works. The industry is focusing its attention on the beverage industry and the energy-intensive cement industry.
    - ✧ The project structure is as shown below.



- Hai Phong - Kitakyushu City Project (5 min): Mr. Yuichi Abe, Associate Partner, Socio & Eco Strategic Consulting Unit, NTT Data Institute of Management Consulting, Inc.
  - ✧ In terms of activities, we are looking into the feasibility of introducing the following equipment for two steel companies with electric furnaces and the tenant companies of the Nam Cau Kien Industrial Park, which have the highest energy consumption.
    - (a) High efficiency blowers + high voltage inverters
    - (b) High efficiency pumps + high voltage inverters
- Can Tho - Hiroshima Prefecture Project (5 min): Mr. Kazuki Matsubara, Senior Managerial Staff, Foreign Business Division, Commerce, Industry and Labor Bureau, Hiroshima Prefectural Government
  - ✧ Rice cultivation is thriving in the city of Can Tho, and there is a demand for using the rice husks discharged from the rice mills. In this project, the rice husks discharged from the rice milling process are compressed into solid blocks, which will then be used as fuel to generate electricity through gasification, thereby providing 100% of the electricity used at the rice mill.
  - ✧ At present, rice mills are purchasing electricity from the Southern Power Corporation via the grid; however, replacing it with biomass power will contribute to reducing greenhouse gases.

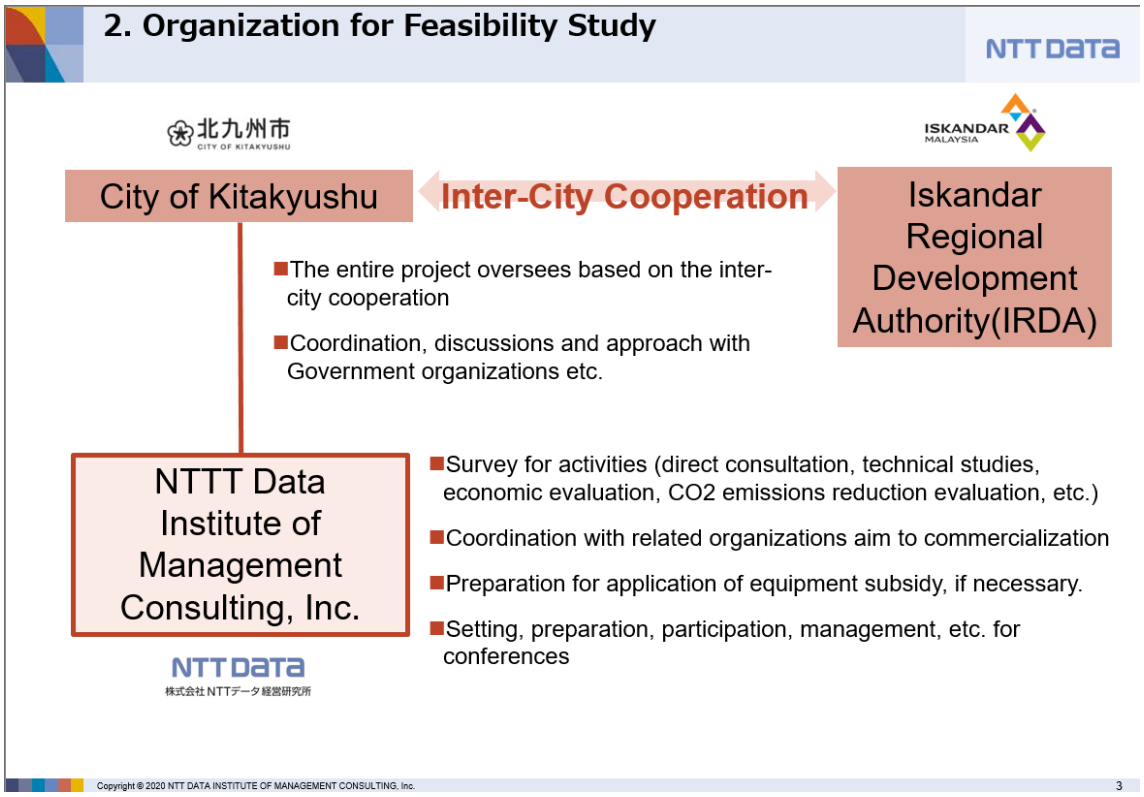
- Introduction of projects in the Philippines
  - Davao - Kitakyushu City Project (5 min): Ms. Emiko Murakami, Director of Business Promotion, Kitakyushu Asian Center for Low Carbon Society, MOE, City of Kitakyushu
    - ✧ The collaboration between Davao City and Kitakyushu City began when Kitakyushu City was consulted regarding the problem of waste by Davao City, via the Consulate-General, and technical cooperation was implemented.
    - ✧ JICA projects and city-to-city collaboration projects are being used to support Davao City.
    - ✧ With the issue of waste, it is not a problem that can be solved just by installing equipment and facilities locally, and continuity will be lost unless capacity is developed in the field through support for collection and transportation and human resource development. To this end, we will continue to focus on capacity building through JICA projects, while formulating JCM projects through city-to-city collaboration projects.
    - ✧ The project structure is as shown below.



- Quezon - Osaka City Project (5 min): Mr. Motofumi Suzuki, Senior Advisor, Oriental Consultants, Co., Ltd.
  - There are three main activities in this project.
    (a) Introduction of energy-saving equipment in Quezon City after the renewal of air conditioning systems
    (b) Investigation of CFC recovery and destruction and consideration of countermeasures
    (c) Support of capacity building
  - We expect the following three outputs from this year's activities.
    (a) Investigation of applicability of a JCM equipment subsidy for air conditioning energy saving
    (b) Confirmation of the current status of fluorocarbon collection, recovery and destruction in the Philippines (Manila)
    (c) Gathering of fluorocarbon information

- Introduction of projects in Malaysia
  - Kuala Lumpur - Tokyo Metropolitan Government Project (5 min): Dr. Junichi Fujino, Program Director, City Taskforce, IGES
    - The Kuala Lumpur Government and the Tokyo Metropolitan Government are supporting the development of a policy framework for building energy efficiency through city-to-city collaboration projects.
    - The Tokyo to Kuala Lumpur Low Carbon System (T2KLLCS) seminar was held in Kuala Lumpur on August 23, 2019. Scenes from the event are shown below.

- Iskandar - Kitakyushu City Project (5 min): Mr. Motoshi Muraoka, Partner, Socio & Eco Strategic Consulting Unit, NTT Data Institute of Management Consulting, Inc.
  - ✧ The Iskandar Regional Development Authority and Kitakyushu City also engaged in city-to-city collaboration in 2015 and 2016.
  - ✧ In this city-to-city collaboration project, the following three main activities are being considered.
    (a) Review of action plans based on the already formulated blueprint for low-carbon societies
    (b) Follow-up surveys of the surveys that were conducted in 2015 and 2016
    (c) Investigations to identify waste heat recovery power generation projects that have potential
  - ✧ As a result of this year's efforts, we formulated an action plan for the building of industrial symbiosis in collaboration with the Iskandar Regional Development Authority, and identified several potential projects for JCM equipment subsidy applications.
  - ✧ The implementation system is as follows.



- Introduction of projects in Myanmar
  - ➢ Hlegu Township, Yangon Region - Kitakyushu City Project (5 min): Mr. Motoshi Muraoka, Partner, Socio & Eco Strategic Consulting Unit, NTT Data Institute of Management Consulting, Inc.
    - ✧ This project is a derivative project of the FY2018 Kitakyushu City - Mandalay City city-to-city collaboration study project.
    - ✧ Specifically, it will aim to realize a low-carbon project (realization of an eco green city) in a smart-city development project within the Hlegu township in the Yangon Region.
    - ✧ The introduction of cogeneration equipment, chillers, and photovoltaic power generation systems will be examined. The equipment to be considered for introduction at each facility is as follows.

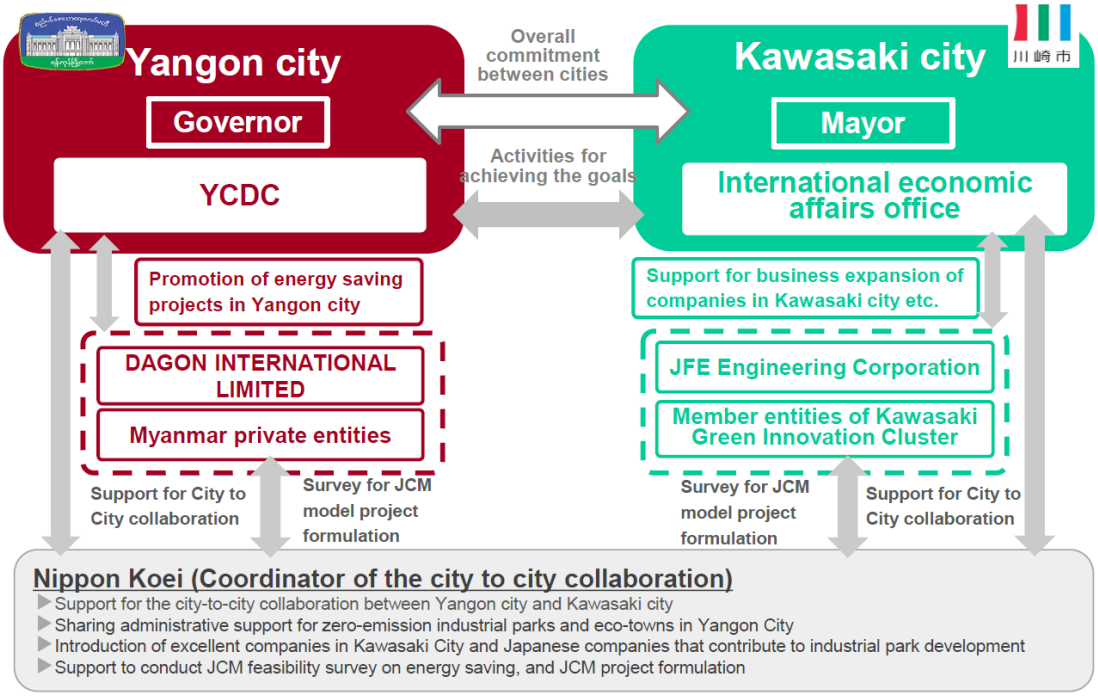
1.Background
About Eco Green City

- Approximately 1,453 acres of land will be developed in three phases over the 15 years from 2019 to 2034.
- As a more specific project, local power company Golden Green Energy will introduce a 30MW solar power facility.

Planned construction facilities	Assumed introduction technology
Water and sewage treatment plant	• High efficiency water treatment technology • inverter
Commercial facility (outlet mall, Movie theater)	• Cogeneration equipment • Chiller equipment • Solar power, battery
Agripark (Experience farms, farms, etc.)	• Biomass power generation • Solar power
Hospitals, hotels, museums, etc.	• Cogeneration equipment • Solar power, battery
School	• Solar power, battery
Public housing (Low-income and public servant housing)	• Solar power, battery

- Yangon - Kawasaki City Project (5 min): Mr. Takahiro Fukahori, Manager, International Economic Affairs Office, Economic and Labor Affairs Bureau, Kawasaki City
  - An exchange of opinions between Yangon City and Kawasaki City will be conducted to address the environmental issues that Yangon City faces. We will also share the know-how of the SDGs of both cities in order to achieve the sustainable development of both cities. We will also conduct a feasibility study for a JCM equipment subsidy application.
  - The implementation system is as follows.

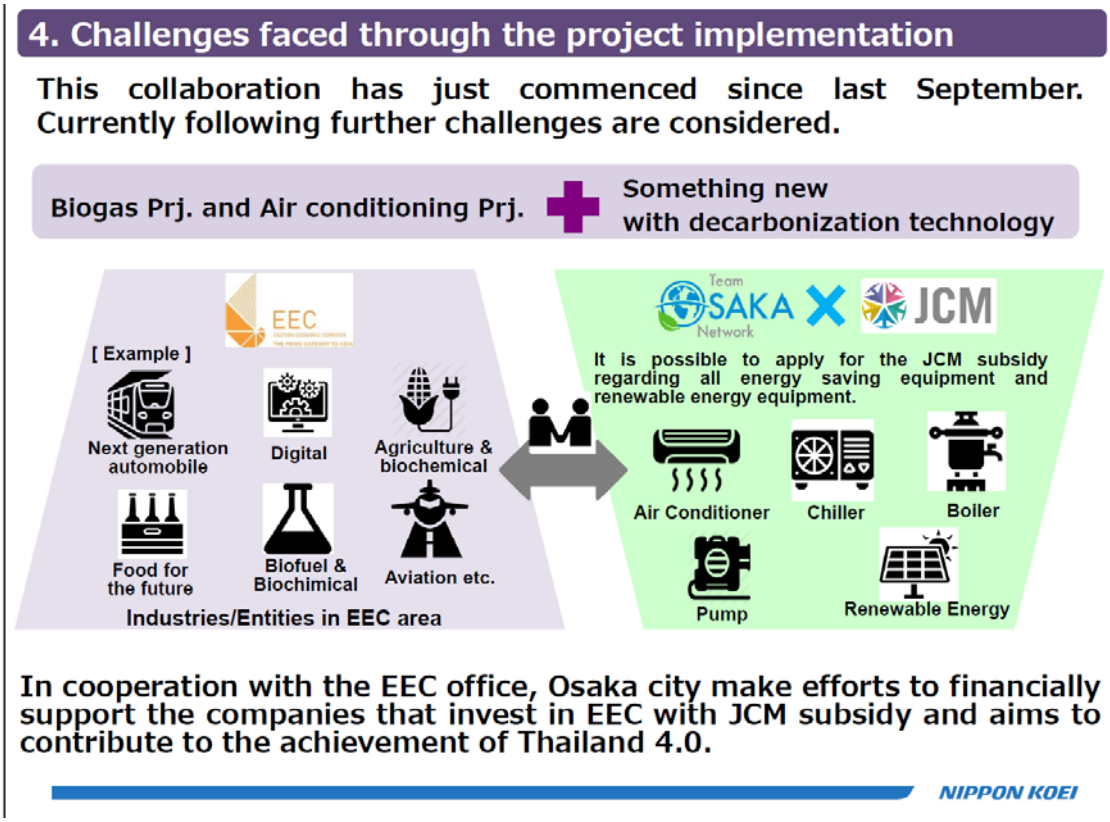
3 : Each Actor's role in the project implementation



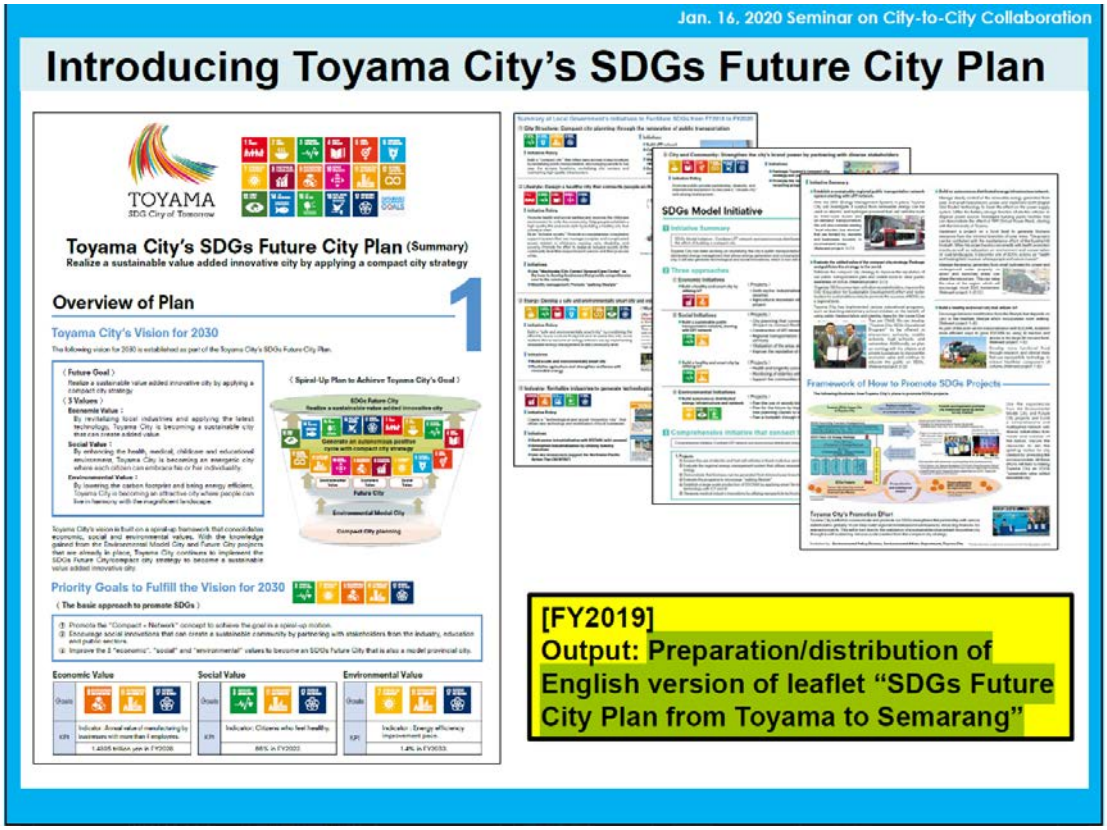
- Sagaing Region - Fukushima City Project (5 min): Mr. Koji Kojima, Research Director, Environmental and Energy Research Division, Mitsubishi Research Institute, Inc.
  - ✧ Through this project, we will consider a phased roll-out method for the rice-husk power generation system, the separation of municipal solid waste, and the appropriate treatment system in the region, aiming to support the establishment of a waste treatment system (master-plan formulation, proposal of related systems, awareness raising, etc.) and the construction of a low-carbon waste treatment system that takes advantage of local characteristics, in order to realize a low-carbon, sustainable regional city.
  - ✧ Several workshops and site visits are being conducted. Scenes from the workshops and site visits are shown below.

- Ayeyarwady Region - Fukushima City Project (5 min): Mr. Naoki Kato, Manager, Environment Division, Environment Department, Fukushima City
  - ✧ Through this project, discussions will be held regarding the promotion of environmental education at local elementary schools and the issue of waste treatment at final disposal sites. We are also focusing on collaborations with multiple cities.

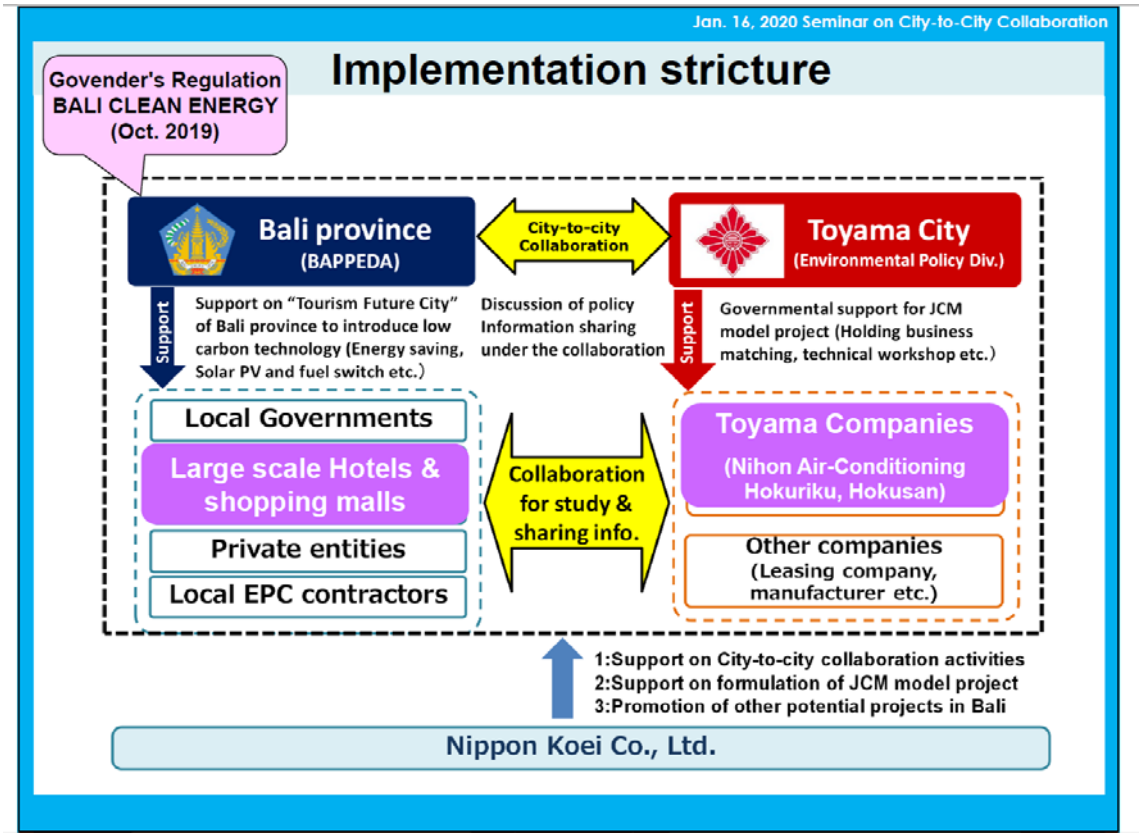
- Introduction of projects in Thailand
  - Laem Chabang Port, Bangkok Port - Yokohama City Project (5 min): Mr. Kousuke Shibasaki, Deputy General Manager, Engineering Department, Yokohama Port Corporation
    - ✧ Yokohama Port Corporation is an organization that carries out the construction and maintenance of Yokohama Port. In recent years, in consideration of environmental issues, they are making efforts to reduce the port's carbon dioxide (CO2) emissions.
    - ✧ With regard to environmental initiatives, Yokohama City has been engaged in city-to-city collaboration projects with Laem Chabang Port and Bangkok Port (including surrounding areas) since 2015. This year, we aim to reduce carbon emissions by supporting the efficient operation of railway terminals and coastal terminals at Laem Chabang Port and supporting the promotion of modal shifts in wide area logistics.
  - Thai Eastern Economic Corridor - Osaka City Project (5 min): Mr. Masaru Ishikawa, Manager, Environmental Science & Engineering Dept., Nippon Koei Co., Ltd.
    - ✧ In this project, a JCM project will be formulated within the jurisdiction of the Eastern Economic Corridor (EEC) of Thailand. Specifically, in addition to examining the introduction of biogas equipment and energy-saving equipment such as air conditioning, we will look into the introduction of renewable energy equipment.



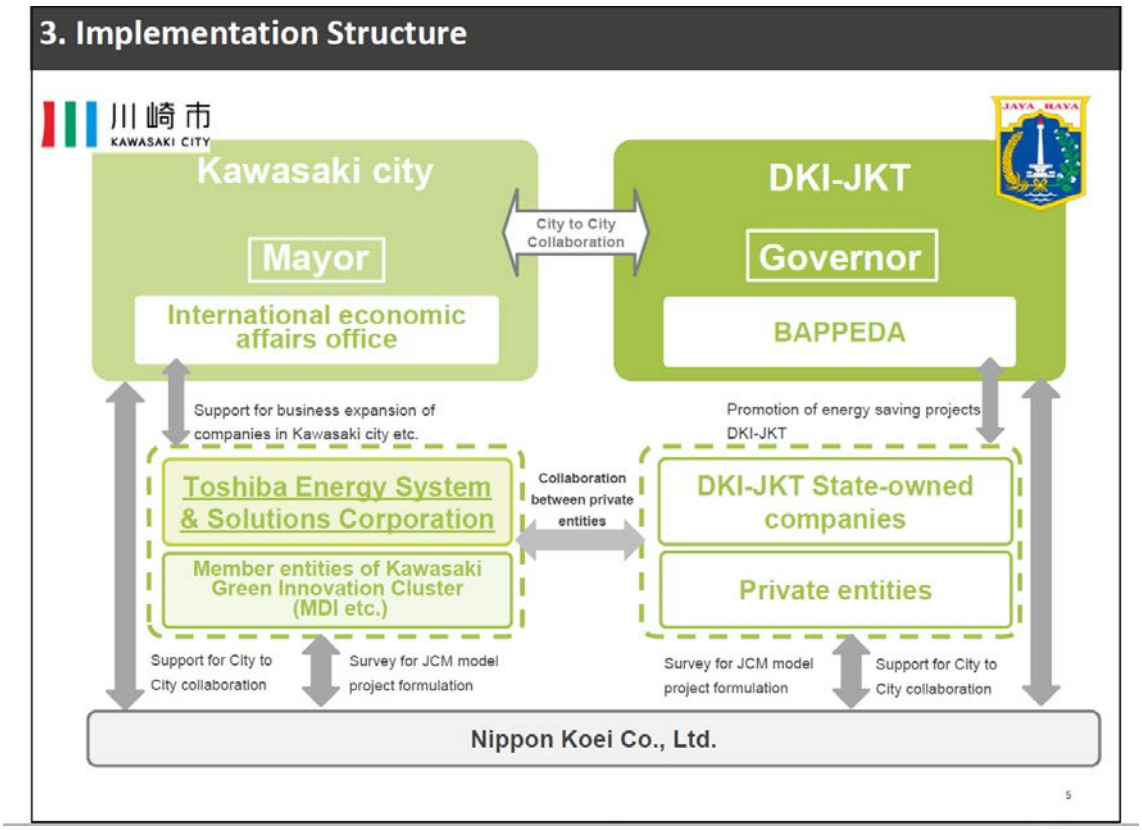
- Introduction of projects in Indonesia
  - Semarang - Toyama City Project (5 min): Mr. Keiichi Kobayashi, Section Chief, International Cooperation Section, Environmental Policy Div., MOE, Toyama City
    - In this project, specifically, the introduction of the following three types of equipment will be considered for promoting clean energy in Semarang City.
      (a) Renewable energy (photovoltaic and biomass power generation)
      (b) Energy-saving equipment (high-efficiency chillers and boilers, etc.)
      (c) Switching energy to natural gas (CNG)
    - We are also working on creating an English version of the SDGs city plan leaflet. An image of the leaflet is shown below.



- Bali - Toyama City Project (5 min): Ms. Aki Baba, Environmental Science & Engineering Dept., International Consulting, Nippon Koei Co., Ltd.
  - ✧ Toyama City, an environmental future city, will support Bali in creating a low-carbon and leading tourism city (tourism future city) based on its knowledge and track record on environmental policies and project formation.
  - ✧ Under the city-to-city collaboration between the two cities, Toyama-based companies with excellent low-carbon technologies (energy saving, renewable energy, fuel conversion, etc.) will specifically conduct the following activities to solve Bali's problems.
    (a) Introduction of energy-saving and renewable energy to large-scale tourist facilities such as hotels
    (b) Implementation of JCM project formation by introducing fuel conversion technology in the transportation sector
  - ✧ The implementation system is as follows.



- Jakarta - Kawasaki City Project (5 min): Mr. Takahiro Fukahori, Manager, International Economic Affairs Office, Economic and Labor Affairs Bureau, Kawasaki City
  - The goal of Kawasaki City and Jakarta City is to achieve sustainable green innovation. In order to achieve this goal, the project will specifically implement the following activities.
    (a) JCM equipment project formation (introduction of energy-saving equipment & introduction of renewable energy equipment)
    (b) Exchange of views on SDGs and holding of workshops
  - The implementation system is as follows.



- Rokan Hulu, Riau Province - Kawasaki City Project (5 min): Mr. Takahiro Fukahori, Manager, International Economic Affairs Office, Economic and Labor Affairs Bureau, Kawasaki City
  - The target of Rokan Hulu, Riau Province and Kawasaki City is the realization of a circular economy in the Riau Region - the world's largest palm oil producer.
  - We will consider introducing technology to supply electricity and steam, which are essential for palm oil production, by utilizing the palm empty fruit bunches (EFB) owned by the city-based enterprise group.

- Q&A
  - What are the merits of engaging in city-to-city collaboration in collaboration with multiple local governments?
    - When collaborating with multiple cities, it is possible to make use of the experiences with cities previously collaborated with.
    - If implemented in multiple cities, the possibility of horizontal development of the project can be explored.
- 11:55 Administrative announcement (IGES), End of session

■ **January 16 Afternoon site visit Tokyo, Japan**

Objectives	To promote understanding, including low-carbon technology and operation, through site visits.	
Sites to be visited	Group 1	Group 2
	Shinagawa Incineration Plant (13:30-16:00)	Tokyo Gas - Gas Science Museum What is gas (13:30-16:45)

■ **Photos**

Kitakyushu City's presentation at closed seminar

Hai Phong City project presentation at closed seminar

Iskandar project presentation at closed seminar

Yangon project presentation at closed seminar

■ **January 17 Morning Closed Seminar Program**

Closed Seminar: Exchange of views on decarbonized and sustainable city development

Time	Session
09:00-09:10	Orientation IGES Mr. Shiko Hayashi
09:10-10:00	Group A: Cities committing to master plan and energy saving project development ✧ Ho Chi Minh ✧ Quezon ✧ Kuala Lumpur ✧ Semarang ✧ Jakarta
10:00-10:10	Break
10:10-10:50	Group B: Cities promoting low-carbon cities such as industrial parks and smart cities ✧ Hai Phong ✧ MPI ✧ Hlegu (Yangon Region) ✧ Yangon
10:50-11:00	Break
11:00-11:40	Group C: Cities promoting low-carbon cities through improving waste management and introduction of biomass power plants ✧ Can Tho ✧ Sagaing ✧ Ayeyarwady
11:40-11:55	Reflection & Closing remarks MOEJ
11:55-12:00	Administrative announcement (IGES), End of session

- Three framing questions for discussion

1. The benefits of participating in the city-to-city collaboration project
2. Keys for promoting low-carbon, decarbonized and sustainable city development
3. The kind of role local governments should play in realizing a sustainable city and the necessary support

[Group A: Ho Chi Minh, Quezon, Kuala Lumpur, Semarang, Jakarta]

- Regarding Question 1 (The benefits of participating in the city-to-city collaboration project)
  - (Ho Chi Minh) The government will formulate a plan for a low-carbon society and realize low-cost development including PPP. Energy costs for companies will be reduced. It will be the most important capacity building.
  - (Quezon) Collaboration with Osaka City is important in realizing our vision. We concluded an MOU in 2018, and the advantage is that we were able to obtain information on low-carbon technologies. We are grateful that we are able to

learn about the activities of other cities through the exchange of information at conferences.

- (Kuala Lumpur) Our project is being implemented in collaboration with Tokyo. By having Tokyo share its successful and unsuccessful cases, we are able to consider initiatives to achieve the goal of reducing CO2 emissions by 2030. Comprehensive initiatives have been implemented through city-to-city collaboration.
- (Semarang) We have been engaging in city-to-city collaboration since 2017. The direct benefits are the transfer of knowledge and technology. Toyama City is a compact city and we learn a lot from its commitment to sustainable development.
- (Jakarta) The advantage is that we can check the progress of other cities and countries towards becoming low carbon.
- (IGES) We would like to hear KL's case studies and specific examples of comprehensive initiatives.
- (Kuala Lumpur) Usually, low carbon initiatives often focus on specific expertise. On the other hand, collaboration with Tokyo has led to the development of staff capabilities as well as technical topics.

・ Regarding Question 2 (Keys for promoting low-carbon, decarbonized and sustainable city development)

- (Ho Chi Minh) Ho Chi Minh is engaging in several initiatives. It is important to raise the awareness of local governments and private companies.
- (Quezon) It is important for all stakeholders to understand the importance of decarbonization and to implement multi-stakeholder initiatives.
- (Kuala Lumpur) Leadership and commitment are important. Next is the transfer of knowledge and technology.
- (Semarang) Commitment is extremely important. Furthermore, it is important to realize action in pilot projects and present the actual results and benefits to local government heads.
- (Jakarta) Providing stakeholders with incentives is key. In addition to technical and financial incentives, it is important to make it easier to obtain permits from the government.
- (IGES) Regarding multi-stakeholder involvement, what measures are there to encourage involvement?
- (Quezon) We are building relationships by visiting to all stakeholders directly. With regard to the relationship with C40 (Cities Climate Leadership Group), we

are currently having them formulate an action plan (benefits and stakeholder involvement in mitigation, adaptation and environmental policies).

- Regarding question 3 (The kind of role local governments should play in realizing a sustainable city and the necessary support)
  - (Ho Chi Minh) We want to create a stable environment that will enable companies to grow. We will introduce energy saving and renewable energy based on city-to-city collaboration. Financial support for feasibility studies is important. For JCM, it is important to be able to introduce new technologies with equipment subsidy.
  - (Quezon) The government stands at the forefront of mitigating and adapting to climate change. We are formulating an environmental law and creating a framework that can be extended to other local governments. We have created a new department for human resource development, but support, such as the sharing of know-how, is important.
  - (Kuala Lumpur) The role that cities should play is to set an example. If city hall becomes low-carbon first, citizens can use it as a model to imitate at home. We want Japan to share its experiences. In addition, funding is needed.
  - (Semarang) Policy support from the Government is needed. In Indonesia, local government efforts require the support of the central government. G2G discussions are also taking place with Japan. Action is taken at the administrative level. Furthermore, JCM equipment subsidies can also be implemented between private companies, but a wider player approach is required.
  - (IGES) How does Team Osaka's proposal differ from proposals from individual enterprises?
  - (Ho Chi Minh) The proposals are backed up by experience.

[Group B: Hai Phong, Ministry of Planning and Investment of Vietnam, Hlegu (Yangon Region), Yangon]

- Regarding Question 1 (The benefits of participating in the city-to-city collaboration program)
  - (Hai Phong) We are progress from feasibility study to pilot project in collaboration with Kitakyushu City.
  - (Ministry of Planning and Investment of Vietnam) City-to-city collaboration is helping us to realize Vietnam's national strategy of green growth. It is also

contributing to the achievement of SDGs and the development of the environment and society. Due to the similarity of the characteristics of the cities that are collaborating, as we hear of success cases, there is increasing interest in industrial parks and state governments.

- (Hlegu, Yangon Region) Myanmar has great interest in projects that contribute to city development. City-to-city collaboration programs can contribute to the achievement of low-carbon goals and provide an appropriate direction for development. Public and private involvement is required. Project finance is also important.
- (Yangon) We have concluded an MOU with Kawasaki City. It has led to collaboration with energy-saving technology and more. Another advantage is we have been able to exchange information.

・ Regarding Question 2 (Keys for promoting low-carbon, decarbonized and sustainable city development)

- (Hai Phong) Most important of all is to include decarbonization in the master plan for city development. And to also inform the citizens through it. Cooperation with the Government is also important. Confirmation of laws and provision of incentives. Ultimately, the whole of society needs to get involved. It is important to expand to involvement of local governments and citizens and international support. While it was necessary to set development goals in order to make the industrial park eco-friendly, with the support from Kitakyushu City, the management of the industrial park went smoothly.
- (Ministry of Planning and Investment of Vietnam) There are three important points. (a) Strategy and planning at the national level are important. Strategies are also being adopted at the local government level. Policy concerning SDGs is under review. A policy for eco-industrial parks was also formulated in 2019. On the other hand, it cannot be said that the legal framework has been sufficiently developed. Regulations on waste power generation are insufficient. (b) A consistent action plan is important. We want to work with the cooperation of an experienced country. (c) Support from overseas. It is important to obtain technical and financial support from the World Bank, IMF, UNIDO and JICA.
- (Hlegu, Yangon Region) (a) Improvement of the environmental awareness of citizens. Granting educational programs from the time of elementary school. (b) Realizing city-to-city collaboration. (c) Building various finance models.

- Regarding question 3 (The kind of role local governments should play in realizing a sustainable city and the necessary support)
  - (Hai Phong) The key point is that local governments make their own city development plans. In addition, it is important that plans are reviewed. There are proposals from international organizations, and we hope that there are initiatives that will lead to their realization.
  - (Ministry of Planning and Investment of Vietnam) Cities implement solutions for low-carbon societies. Strengthening international cooperation and sharing experiences is very important. Furthermore, dialogue with partner countries is important.
  - (Hlegu, Yangon Region) Building a finance model is important. Most projects are carried out by the private sector, but many of them face financial challenges. Myanmar has also received support from the likes of the ODA and the World Bank, and financial support is of the utmost importance.
  - (Yangon) The sharing of knowledge is important for its role in realizing a low-carbon society. We would like to create a database on air pollution and waste separation.

[Group C: Can Tho]

- Regarding Question 1 (The benefits of participating in the city-to-city collaboration program)
  - (Can Tho) We implemented several initiatives related to GHG reduction, with the cooperation of Japan. We obtained a lot of knowledge through the city-to-city collaboration project. Through the sharing of skills and experiences, participation in training programs, inspections, and tours, we gained the know-how to realize the project.
  - (Sagaing Region) The advantage of participating in a city-to-city collaboration project is that it can raise awareness of low-carbon societies, and that the framework can be deployed horizontally in other areas.
  - (Ayeyarwady Region) The advantage of participating in a city-to-city collaboration project is that we can obtain many opportunities from the program. We can learn about sustainable development with low carbon technologies, infrastructure and mitigation measures.

- Regarding Question 2 (Keys for promoting low-carbon, decarbonized and sustainable city development)
  - (Can Tho) Multi-stakeholder participation is a major premise. Municipal government leadership, consensus with the local community, and the coordination of local and central governments are important. In addition, it is necessary to secure a budget for technology introduction. As for international cooperation, we want you to share your success stories.
  - (Sagaing Region) Systematic planning and the establishment of a circular economy are important. Cooperation between government and citizens is important.
  - (Ayeyarwady Region) For decarbonization and sustainable city development, dialogue and projects with companies for low-carbon initiatives are required.

- Regarding question 3 (The kind of role local governments should play in realizing a sustainable city and the necessary support)
  - (Can Tho) It is important to realize the plans of the municipal government. It is important for the city to coordinate for the participation of multi-stakeholders. Financial support is necessary.
  - (Sagaing Region) It is important to formulate a waste-management policy.
  - (Ayeyarwady Region) It is important that cities strengthen their partnerships. Frameworks such as PPP is also important.

- Comments from Ms. Yamamoto of the MOE
  - Thank you all for your cooperation, including your stories about zero carbon cities.
  - I realize that there is no single solution, and you are each working on a variety of initiatives. I understand that everyone is advancing their initiative with an awareness of being a leader.
  - There were many mentions of finance. I myself felt that there was a financing problem when I participated in COP25, so I want to work to resolve it.
  - I understand that there is a need for mutual understanding of city-to-city collaboration. In addition to this event, we are holding medium-sized seminars and workshops. Last year there was a move to newly adopt Hiroshima Prefecture through a workshop. Next month, a seminar will also be held in Yokkaichi City, Mie Prefecture. New cities will be prioritized; however, I would like you to raise your hands.

■ January 17 Afternoon Open Seminar Program

Time	Session
14:00-14:10	Opening remarks Tomohiro Kondo Director General, Global Environment Bureau, MOEJ
14:10-14:30	Recent development of intl. env. cooperation Ryuzo Sugimoto Director, International Cooperation and Sustainable Infrastructure Office, MOEJ
14:30-14:50	Recent development of intl. urban development cooperation Masahiro Ito Director, International Affairs Office, City Bureau, MLIT
14:50-15:10	Actions for realizing the Thailand 4.0 Muk Sibunruang Executive Director, Investment Strategy and Promotion Division, Eastern Economic Corridor (EEC) Office of Thailand
15:10-15:30	Break
15:30-17:00	Panel discussion on matching for intercity collaboration & project development Panelists: Ryuzo Sugimoto Director, International Cooperation and Sustainable Infrastructure Office, MOEJ Masahiro Ito Director, International Affairs Office, City Bureau, MLIT Muk Sibunruang Executive Director, Investment Strategy and Promotion Division, EEC Office of Thailand Makoto Mihara Manager for International Cooperation, Environmental Policy Division, Environment Bureau, City of Osaka Melchor Quitain City Councilor of Davao City, the Philippines Norfiza Bashfari Vice President, People Management, Iskandar Regional Development Authority (IRDA) Emiko Murakami Director of Business Promotion, Kitakyushu Asian Center for Low Carbon Society, City of Kitakyushu Facilitator: Hideyuki Mori Executive Director, IGES Q&A using interactive tool "Sli.do" Closing Remarks

- 14:00 Opening remarks from organizer, Mr. Tomohiro Kondo, Director General, Global Environment Bureau, MOE
  - The Paris Agreement has started. Municipal and local governments are key players, as efforts lead by non-governmental organizations, including local governments, are encouraged. City-to-city collaboration is very important. This year, 17 projects were adopted.
  - With regard to the latest trends in decarbonization in Japan, typhoons and floods damaged the country in 2019. Nagano Prefecture was one of the worst affected areas, but Nagano Prefecture has formulated its plans having been affected by climate change. With regard to CO2 emission reduction, 33 local governments have stated that they are aiming to have net zero emissions.
  - As for future international development, a forum is scheduled to be held, for sharing and communicating zero carbon city declarations, gathering together the heads of cities advocating reduction of CO2 emissions in Japan and overseas. The targets will be higher than ever before, so a more proactive commitment will be required. We have established various menus, such as creating scenarios using AI and financial support utilizing JCM, so please make use of them.

- 14:10 Domestic and overseas moves to build a zero-carbon society
  - Latest trends in environmental infrastructure export strategies
    Mr. Ryuzo Sugimoto Director, International Cooperation / Environmental Infrastructure Office, Global Environment Bureau, International Strategy Division, MOE
    - Japan's initiatives are being disseminated at COP25.
    - 32 local governments in 10 countries are involved in city-to-city collaboration projects.
    - At COP25, the minister actively discussed the matter of Article 6 of the Paris Agreement. Although no agreement was reached, a course was set for an agreement at COP26.
    - Introduction of JCM success stories.
      - Transformer introduction project in Vietnam and Laos: Initially it was introduced only in Vietnam, but has been extended to Laos with the cooperation of manufacturers.
      - The project to introduce LED street lights in Siem Reap, Thailand, and Phnom Penh, Cambodia, and the project to introduce high-efficiency water

pumps in Danang, Vietnam, got started because there were subsidies available, but they are cases where the benefits were understood, and their introduction advanced on a business basis.

- With the renewable energy project in the Philippines, the region was able to benefit from energy costs no longer flowing out of the region.

- Latest trends in city infrastructure export strategies

  Mr. Masahiro Ito, Director, International Affairs Office, City Bureau, MLIT

  - With regard to the Japanese and overseas markets, the Japanese market is shrinking due to population decline. On the other hand, markets outside Japan (Asia region) are expected to expand.
  - Japan's advantage is smart cities (Initiatives across multiple fields, such as environment, energy, transportation, medical and health). Transit-oriented development (TOD), such as "Kashiwanoha" along the Tsukuba Express line, is important. It also contributes to achieving SDGs.
  - The "Japan-ASEAN Smart City Network High-Level Meeting" was held to expand the opportunity for case introductions to ASEAN. A public-private conference has been established.
  - JASCA was established, and a system for building smart cities in the ASEAN region was created. Of the 21 JOIN-funded projects, nine were related to city development. We are examining ways to support energy, water supply, data analysis, and other items that are associated with urban development in the future. We are also working to be able to assist smaller-scale development projects.
  - Outside Japan, we have begun to pay attention to collaboration between local governments.

- Actions for realizing Thailand 4.0

  Ms. Muk Sibunruang, Executive Director, Investment Strategy and Promotion Division, EEC Office of Thailand

- The EEC includes the Chachoengsao, Chon Buri and Rayong provinces.
- The expressway from Bangkok to Rayong will be extended. Laem Chabang Port and Map Ta Phut Port will be updated. In addition to these infrastructure improvements, we will finance investments in specific industries. We will start with an investment of THB 1.7 trillion in areas such as tourism, medical service provision and demand-driven education.

- 15:30 Panel discussion on matching for city-to-city collaboration & project formulation

[How to build relationships of trust between cities]

- (Osaka) City-to-city collaboration projects also involve human relationships, and stakeholder collaboration and communication are important. The decision-makers of the other party are often quite senior, and movements may need to span long periods. It is important to build trust by taking into account the circumstances regarding that point.
- (Kitakyushu) In addition to going to the field surveys, we also used JICA's invitation project to have them visit Kitakyushu City and they gained experience and we deepened mutual understanding. It is important to note that the month in which the fiscal year starts and ends varies from country to country.

[Collaboration with private companies]

- (Osaka) The cooperation of private companies is essential. Local governments provide policy support, and this includes examples of businesses that are reducing CO2 emissions. We do various searches for companies that have solutions and carry out matching. It is important to make a master plan from the upstream and take a bottom-down approach.
- (Kitakyushu) Kitakyushu City matches small and medium-sized enterprises in the city with companies that have seeds. IRDA (Iskandar Regional Development Agency) in Malaysia and Hai Phong City in Vietnam have been working from upstream. The LED introduction project in Davao, Philippines, has also progressed from the top down.

[Expectations for city-to-city collaboration projects]

- (Thai EEC) More than 50% of the EEC has been developed by Japanese investment. We learn a lot about foreign direct investment, especially with regard to transport infrastructure. If we can make a successful case of the EEC, we would like to expand further.
- (Malaysia IRDA) We are very pleased to be working with Japan. IRDA is promoting initiatives such as the Eco-Life Challenge, in collaboration with Toyama, for micro-hydroelectric power generation, and Kyoto and Tokyo. While there are differences in language, we do not feel that it is an obstacle. We collaborate with Japan with mutual respect. In addition to providing us a package

of support, from feasibility studies to actual project implementation, they also carrying out capacity building. The fact that there are models that have been proven in Japan has led to the motivation that IRDA can do the same.

[How private companies can participate]

- (Osaka) Team Osaka has exceeded 100 members. We currently, exchange information through issuing newsletters and holding meetings and international conferences.
- (Kitakyushu) Basically, we are advancing projects together with local companies in the city. Businesses that wish to collaborate with us in the future should set up a branch office in Kitakyushu City. The city also has its own subsidy system for small and medium-sized enterprises. Activities in collaboration with the city have also served as PR for companies to secure human resources.

[Areas we want local governments to work on]

- (MOE) We feel that the trends have changed from seven years ago when JCM first started. We feel that the Paris Agreement in 2015 and the formulation of the SDGs marked a major turning point, but we also feel that the roles and effects of local governments and cities have clearly expanded. SDGs have been localized and, the goal of sustainability has been set in all cities. We would like them to start with communication between people, then move on to the transfer of systems and plans and the realization of projects. We feel that the significance of city-to-city collaboration lies in planning and creating ongoing, sustainable projects.

[Comment from MLIT]

- There are two points. The first is that, with regard to decarbonization, many contributions can be made if it can be tied to city development. Since licensing in the partner country is a particular bottleneck in the project, we hope that Japan local governments can cooperate to solve the problem. The second is that, there is an expectation that cooperation from the upstream process of city development and the creation of a master plan is possible. We believe that know-how regarding the creation of smart cities based on Japan's high dependency on public transportation can contribute internationally.

[What do you think about the package projects? Expectations for Japanese companies]

- (Malaysia IRDA) It is important to look at all areas in a similar way. We believe that having a master plan for the IRDA as a whole will accelerate achievement of goals towards zero carbon.
- (Thai EEC) The biggest goal is to attract companies. If we can also able to decarbonize it would be extremely good. There are also plans for smart cities in the EEC. We also hope for education that will deepen the understanding of Industry 4.0. Furthermore, since agriculture is thriving in Rayong Province, there could be potential in the agricultural field and in biomass utilization.

[Comment from the MOE]

- (MOE) Given the longevity of urban infrastructure, the infrastructure we will invest in from now will be in use in 2050. We think that it is important to incorporate those value that can be demonstrated even in such a case. We should question whether technology is moving towards decarbonization or becoming a debt for the future, and help steer it in the direction of decarbonization and provide support for investment. We also feel the importance of networking. When matching needs with seeds, we think that it is better to connect many-to-many rather than one-to-one.

[Characteristics of Japanese companies overseas entities would like to collaborate with]

- (Thai EEC) Is it a business operator with the technology targeted by the Thai side? People are also important.
- (Malaysia IRDA) Whether or not it is fit for business purposes is important.

[Difference in sense of speed between local governments]

- (Osaka) It appears that Japan is said to be slower moving, but I believe it is important to maintain close communication and achieve tangible results.
- (Kitakyushu) In our case, we are pushing the other side to keep up. I hope we can collaborate well.

[The key to project success]

- (Malaysia IRDA) All members involved in the project are enthusiastic.

Appendix a:Kick Off Meeting

環境省　地球環境局
国際連携課　国際協力･環境インフラ戦略室　御中

令和元年度　低炭素社会実現のための都市間連携事業
「ヤンゴン管区スマートシティ開発における低炭素化促進事業」
キックオフミーティング用資料

2019年8月19日
NTTデータ経営研究所
社会･環境戦略コンサルティングユニット

目次

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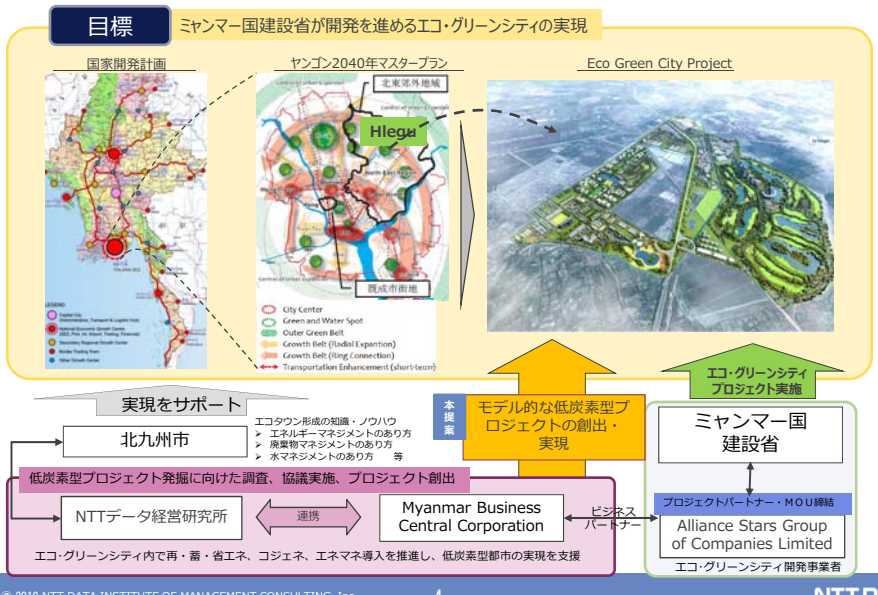
1.事業概要（全体目標と体制）

1．事業概要（全体目標）

ヤンゴン管区Hleguタウンシップ内のスマートシティ開発事業における、低炭素化プロジェクトの実現を目指す。

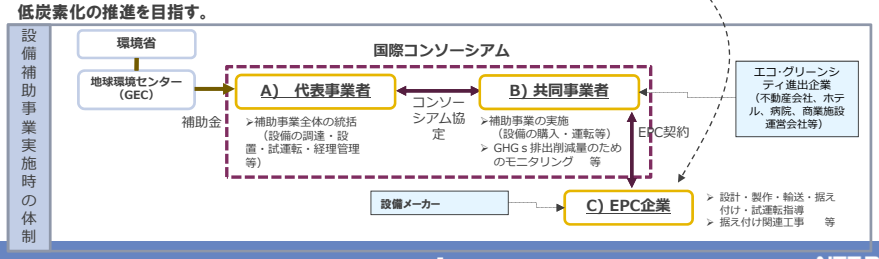


1．事業概要（体制）

ヤンゴン管区スマートシティ開発における低炭素化促進事業

【応募者】NTTデータ経営研究所　【共同応募者】北九州市、Myanmar Business Central Corporation（外注）

【想定するプロジェクト】
エコ・グリーンシティの低炭素化の方針策定から関与し、新規建設予定の住宅、商業施設、病院、ホテル等の設備に再・蓄・省エネシステム、コジェネレーションによる熱電併給、エネルギーマネジメントシステム等を導入することで、街全体の低炭素化の推進を目指す。



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2.調査概要（想定される導入技術）

NTT DATA

2. 調査概要（想定される導入技術）（１）

エネルギー分野において、想定している活動内容、導入技術を以下に記載する。

内容	• ミャンマー国建設省が進める大規模スマートシティ開発プロジェクト「Eco Green City Project」を対象として、低炭素社会形成に関する経験・ノウハウ等を有する「北九州市」の支援のもと、スマートシティ内においてJCMクレジット獲得につながる案件の形成等を目指した調査活動を実施する。 • 具体的には、**エコグリーンシティ内に建設される高密度住居、大規模商業施設、バスターミナル、オフィスビル、病院、ホテル等に対して太陽光発電設備や高効率空調・給湯設備、コージェネレーション設備の導入、エリアー体のエネルギーマネジメントシステムの導入による低炭素化**や、**エリア内から排出される廃油や廃棄物の燃料化など、エリア内の資源循環による低炭素化**を目指した調査活動を実施する。
想定技術	• 太陽光発電システム＋大型蓄電池 • 高効率チラー、高効率照明設備 • 自動制御システム等 • コジェネレーションシステム • 高効率設備の導入（ポンプ、電動機等） • 水耕栽培技術 • 太陽光や水圧・水落差エネルギーを活用した設備の導入

2. 調査概要（想定される導入技術）（２）

第１回現地調査（8/13-8/16）の結果、以下の具体的可能性が見えてきている。

✓約1,453エーカーの土地を2019年から2034年の16年間で、3フェーズに分けて開発予定である
✓敷地内に建設予定の施設等は下表の通り
✓更なる具体案件として、現地の電力会社であるGolden Green Energyが30MWの太陽光発電設備を導入予定である

建設予定施設	想定される導入技術
上下水処理場	• 高効率処理技術 • インバーター
商業施設 （アウトレットモール、 映画館など）	• コジェネ設備 • チラー設備 • 太陽光発電、バッテリー
アグリパーク （体験農園、農場など）	• バイオマス発電 • 太陽光発電
病院、ホテル、博物館など	• コジェネ設備 • 太陽光発電、バッテリー
学校（小、中、高校）	• 太陽光発電、バッテリー
公営住宅 （低所得者や公務員住宅）	• 太陽光発電、バッテリー

2. 調査概要（導入技術の実績）（３）

・太陽光発電、高効率チラー、廃熱回収発電

実施期間	導入技術	納入場所	概要説明
平成27年4 月～平成29年1月	太陽光発電	マレーシア	クアラルンプールに存する新設ビルの屋上に高効率太陽電池を設置し、CO2の排出削減を実現する。
平成28年9月～平成29年10月	廃熱回収発電	タイ	バンコクの郊外のセメント工場を対象に、廃熱回収発電システムを導入し、CO2排出削減につなげる。
平成28年2月～平成28年9月	太陽光発電、高効率チラー	ベトナム	ホーチミン近郊に新設される大型ショッピングモールを対象に太陽光発電システムを導入し、CO2排出削減を実現する。
平成28年10月～平成30年6月	太陽光発電	コスタリカ	ベレン市において、大規模太陽光発電所の導入を通じてCO2の排出削減を実現する。
平成28年11月～平成31年1月	太陽光発電	カンボジア	プノンペン都に新設される大型ショッピングモールの屋上に、太陽光発電システムを導入し、CO2排出削減を実現する。
平成29年3月～平成29年11月	太陽光発電	チリ	サンチャゴ市に位置するカトリック系大学に屋根置き太陽光発電システムを導入し、CO2の排出削減を実現する。

・コジェネレーションシステム

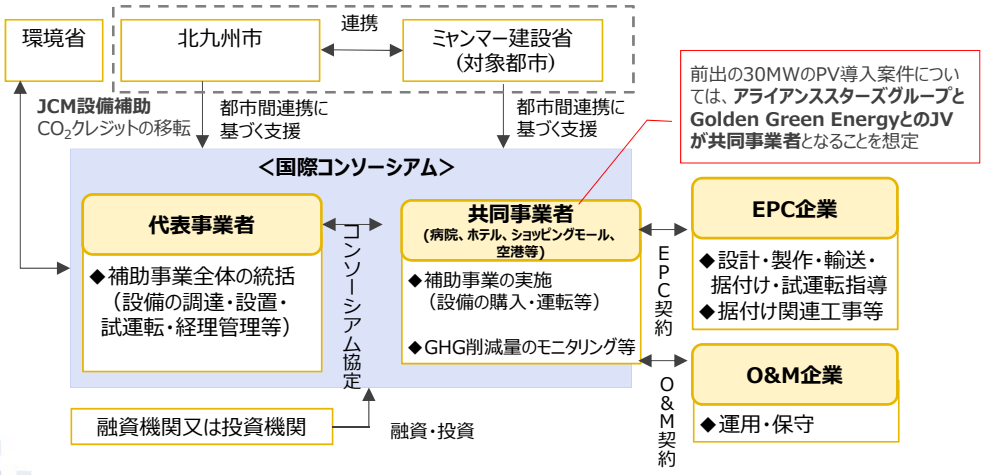
納入年月	納入場所	概要説明
平成27年	インドネシア	自動車製造工場におけるｶﾞｽｺｰｼﾞｪﾈﾚｰｼｮﾝｼｽﾃﾑの導入(川崎重工製　7.8MW高効率ガスエンジン)
平成27年	タイ	二輪車製造工場におけるｵﾝｻｲﾄｴﾈﾙｷﾞｰ供給のためのｶﾞｽｺｰｼﾞｪﾈﾚｰｼｮﾝｼｽﾃﾑの導入(新日鉄住金エンジニアリング製　7MW級ガスエンジン)

・バイオマスボイラ

納入年月	納入場所	概要説明
令和元年～	ベトナム	化学工場へのバイオマスボイラーの導入

2. 調査概要（想定される設備補助の実施体制）（１）

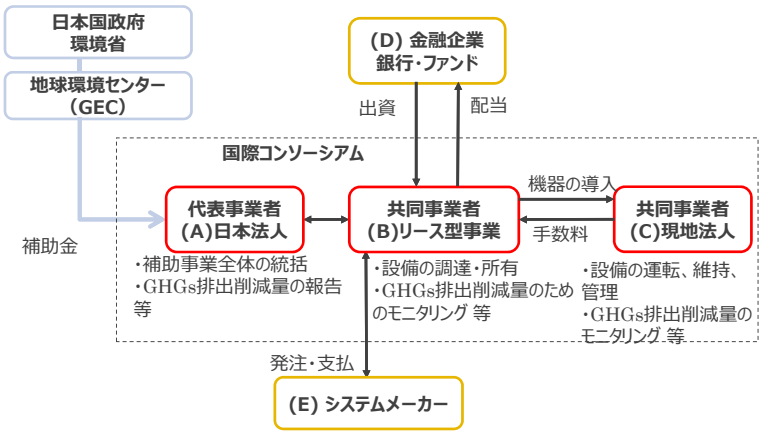
・代表事業者(日本企業)とミャンマー企業とで国際コンソーシアムを形成する。
・日本の環境省JCM設備補助事業を活用する（補助金：初期設備導入費の最大50%)。



2. 調査概要（想定される設備補助の実施体制）（２）

現地法人の初期投資を抑えるための実施体制

・代表事業者(日本企業)とミャンマー企業とで国際コンソーシアムを形成する。
・日本の環境省JCM設備補助事業を活用する（補助金：初期設備導入費の最大50%）。



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3.スケジュール（獲得目標）

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3. スケジュール（獲得目標）（１）

エコグリーンシティプロジェクトは、2019年から2034年の15年間を３つのフェーズに分けて実施される。
フェーズ１：住居ビル、サービスゾーン、管理棟、道路等インフラの開発（2019年～2023年）（667.8エーカー）
フェーズ２：住宅地域、国際病院、国際学校、公園、ホテル地域、ゴルフコース、メディアサーク開発（785.32エーカー）
フェーズ３：その他
現時点で想定している調査活動のスケジュールは以下のとおりである。

活動項目	2019年度 1Q	2019年度 2Q	2019年度 3Q	2019年度 4Q	2020年度	2021年度
長期的な都市間連携の関係性構築およびエコグリーンシティの低炭素化に向けた計画策定	現地キックオフ（関係政府機関訪問）	第２回現地調査 ・低炭素化施策の協議	第３回現地調査 ・低炭素化施策の協議 北九州市へ事業関係者の招聘とエコタウン紹介（JCMセミナー前後予定）	第４回現地調査 ・低炭素化施策の協議 ・本年度成果物としての低炭素化計画の取り纏め ・第一号JCM事業の協議	都市間連携の継続 ・低炭素化施策の協議 ・行政能力開発支援、人材開発支援	
JCM適用事業の組成に向けた活動	現地キックオフ（都市開発者）	第２回現地調査 ・スマートシティ進出候補企業との直接協議	第３回現地調査 ・スマートシティ進出候補企業との直接協議（技術評価、経済性評価、CO2排出削減量評価）	第４回現地調査 ・スマートシティ進出候補企業との直接協議	設備補助申請（案件組成でき次第随時） 都市開発フェーズ２、フェーズ３の進出企業に対して同様のアプローチで案件化を目指す。	
	（MBC社が適宜実施）政府機関、都市開発企業、スマートシティ進出候補企業との直接協議、フォローアップ					
報告書の作成				☆ 本年度報告書		
現地調査	☆	☆	☆	☆		

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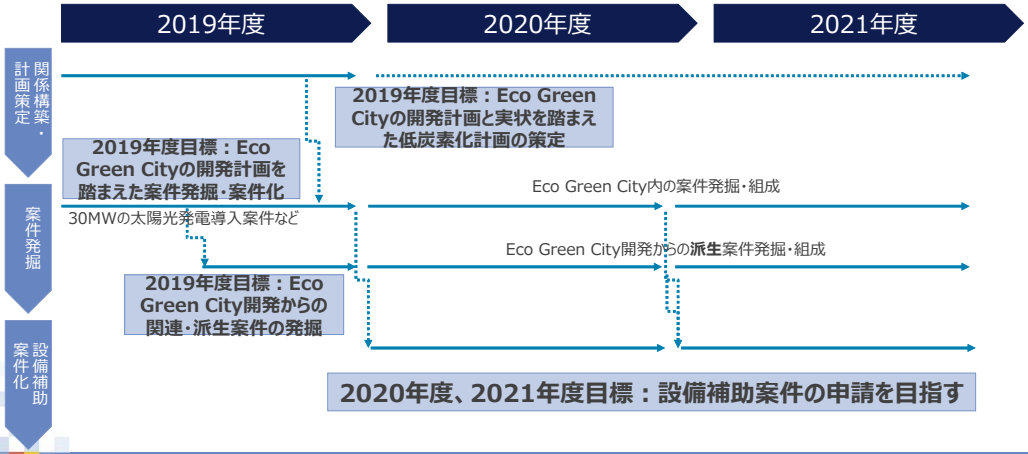
3. スケジュール（獲得目標）（２）

- ✓ 本年度事業においては、Eco Green Cityの開発計画と実状を踏まえた低炭素化計画の策定、並びにこれを踏まえた案件発掘、組成を目指す。併行して、Eco Green City開発からの派生案件の発掘も目指す。
- ✓ 2020年度、2021年度においては、本年度調査にて発掘、組成する案件の設備費所申請を目指す。



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Appendix b：Mid Progress Report

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令和元年度　低炭素社会実現のための都市間連携事業
ヤンゴン管区スマートシティ開発における低炭素化促進事業
中間報告資料

2019年12月25日
NTTデータ経営研究所　社会環境戦略コンサルティングユニット

アジェンダ

1. 本プロジェクトの概要
2. スケジュール
3. 進捗報告
4. 今後のアクション

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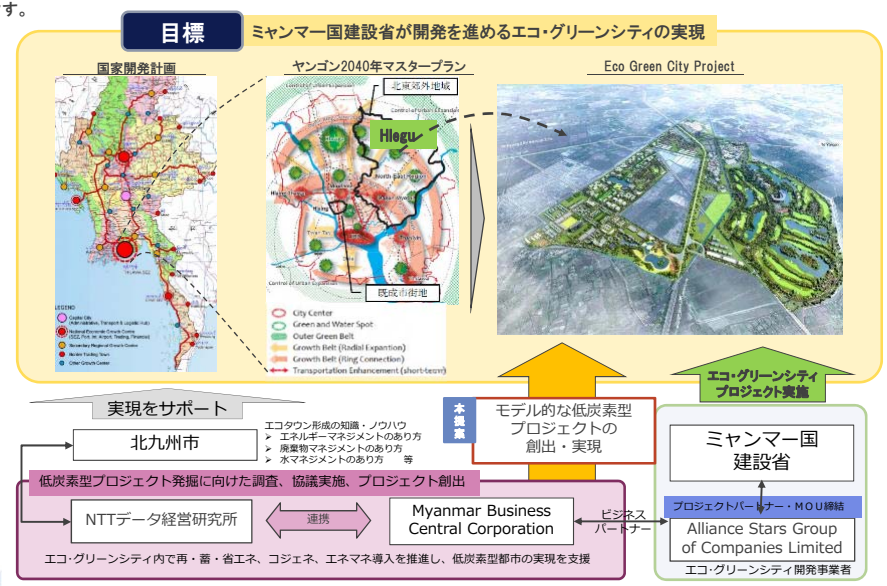
1. 本プロジェクトの概要【提案書より再掲】

ヤンゴン管区Hlegu タウンシップ内のスマートシティ開発事業（Eco Green City Project）における、低炭素化プロジェクトの実現を目指す。



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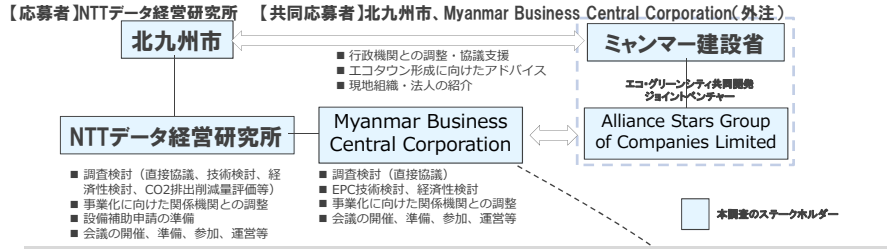
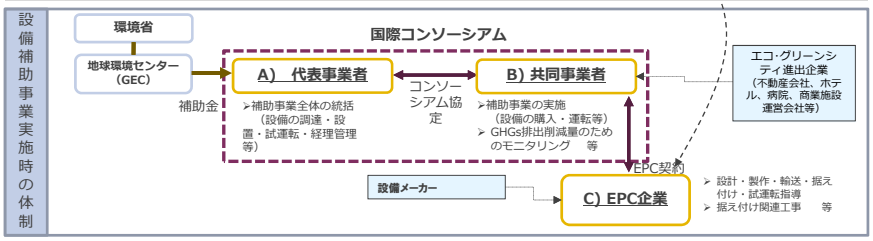
1. 本プロジェクトの事業実施体制【提案書より再掲】

ヤンゴン管区スマートシティ開発における低炭素化促進事業



【想定するプロジェクト】
エコ・グリーンシティの低炭素化の方針策定から関与し、新規建設予定の住宅、商業施設、病院、ホテル等の設備に再・蓄・省エネシステム、コジェネレーションによる熱電併給、エネルギーマネジメントシステム等を導入することで、街全体の低炭素化の推進を目指す。



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2. スケジュール
2. スケジュールの確認

本プロジェクトのスケジュールは以下の通り。第3回目の渡航は、アポイントメント調整の関係で当初予定（12月）より遅く実施する予定。

活動項目	2019年						2020 年	
	7月	8月	9月	10月	11月	12月	1月	2月
	第1回渡航 9/30-10/4			第2回渡航 9/30-10/4			第3回渡航(仮)	
活動1： 長期的な都市間連携の関係性構築およびエコグリーンシティの低炭素化に向けた計画策定		☆現地キックオフ		・低炭素化の協議 ・マスタープランのドラフト作成・意見交換			本年度成果物としてのマスタープランの取りまとめ	
活動2： JCM適用事業の組成に向けた活動		☆現地キックオフ		・スマートシティ進出候補企業との直接協議 ・経済性検討およびCO2削減効果検討				
○ 現地調査		●		●			●	
○ 環境省との打ち合わせ		●キックオフ		●中間報告会		●中間報告会	●最終報告会	
○ 報告書の作成		●契約						●最終版

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3. 進捗報告
3. 0. 本日の報告範囲

本日は、現地調査の概要、活動1,2の進捗報告をさせていただく。
ご意見等をお聞かせいただきたい。

活動項目	2019年						2020 年	
	7月	8月	9月	10月	11月	12月	1月	2月
	第1回渡航 8/13-8/16			第2回渡航 9/30-10/3			第3回渡航(仮)	
活動1： 長期的な都市間連携の関係性構築およびエコグリーンシティの低炭素化に向けた計画策定		☆現地キックオフ		・低炭素化の協議 ・マスタープランのドラフト作成・意見交				
活動2： JCM適用事業の組成に向けた活動		☆現地キックオフ		・スマートシティ進出候補企業と ・経済性検討およびCO2削減				
○ 現地調査		●		● 本日の報告範囲			●	
○ 環境省との打ち合わせ		●キックオフ		●中間報告会		●中間報告会	●最終報告会	
○ 報告書の作成		●契約						●最終版

本日の報告事項
1.現地調査概要
2.活動1の進捗報告
3.活動2の進捗報告

NTT DATA

3. 進捗報告
3. 1. 現地調査概要

これまでに2回の現地調査を実施した。それぞれの概要は以下の通り。

分類	調査実施期間	訪問者	活動概要	
第1回 現地調査	2019/8/13 ～ 2019/8/16	• 北九州市 • NTTデータ経営研究所 • MBC	活動1	• Eco Green City現場の視察 • Alliance Stars との打ち合わせ
			活動2	• 個別企業との直接協議 • Daiichi Asia • Shwe Taung Cement • ティラワ工業団地
第2回 現地調査	2019/9/30 ～ 2019/10/3	• 北九州市 • NTTデータ経営研究所 • MBC	活動1	• Alliance Stars との打ち合わせ • マスタープランドラフトの作成・意見交換

			活動2	• 個別企業との直接協議
				  • Proven
				  • F&P Asia
				  • Yangon Metal Industry
				  • Central Hotel

3. 進捗報告
3. 1. 現地調査概要・・・【ご参考】第1回現地調査訪問先詳細

以下のスケジュールで第1回現地調査を実施した。

第1回現地調査

8月13日(火) ヤンゴン	移動(東京→ヤンゴン)
8月14日(水) ヤンゴン	10:00-11:00 → 在ミャンマー日本国大使館打ち合わせ 14:00-16:00 → Eco Green City 現場視察 18:00-19:00 → Alliance Stars Group 打ち合わせ
8月15日(木) ネピドー	移動(ヤンゴン→ネピドー) 10:00-12:00 → 建設省住宅開発局打ち合わせ 12:00-13:00 → JICA 専門家鹿子木様打ち合わせ 14:30-15:30 → 天然資源環境保護省環境保護局打ち合わせ (18:00-19:00) → Shwe taung cement Kyaw 様打ち合わせ
8月16日(金) ヤンゴン	移動(ネピドー→ヤンゴン) 9:30-11:00 → DAIICHI ASIA打ち合わせ 13:00-14:00 → ティラワ工業団地視察 移動(ヤンゴン→東京)

3. 進捗報告
3. 1. 現地調査概要・・・【ご参考】第2回現地調査訪問先詳細

以下のスケジュールで第2回現地調査を実施した。

第2回現地調査

日程	訪問先
9月30日（月） ヤンゴン	MBC
	JCCM 日本人建設会
	Central Hotel
	Alliance Stars Group
10月1日（火） ヤンゴン	F&P Asia
10月2日（水） ヤンゴン	Proven group
	エネルギー大臣
10月3日（木） ヤンゴン	Yangon Metal Industry
	JICA

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3. 進捗報告
3. 2. 活動1の進捗報告・・・Alliance Star Groupとの議論の結果

Eco Green City開発に係る環境関連のマスタープラン策定のための議論を行っている。
北九州モデルをベースに項目の洗い出しを実施し、詳細について調整中。

活動1実施事項

- Eco Green City開発に際し、環境配慮・脱炭素化のためのKPIを含むマスタープランを策定し、本年度成果物とする。
- 北九州市の有する都市環境行政のノウハウ等を体系的に整理した「北九州モデル」の骨子をベースにプラン案を作成。
- これまでにすでに制定されている関連の公式な計画（ヤンゴン市の持続可能な開発計画, National Environment Policy of Myanmar　等）を確認し、大枠の方針はこれを踏襲する
- 個別の詳細な内容については、Eco green Cityの開発を請け負っているAlliance Stars　Groupとの直接協議により内容を詰めている。

マスタープラン策定のステップ

北九州モデルを踏まえたアイデア出し・ドラフト作成
↓
Eco Green City開発事業者との調整
↓
マスタープラン第一版の策定

現地調査（ディスカッション）結果

第1回

- JCMに関する制度紹介の実施
- Eco Green City　開発状況・現場の確認
- JCMモデルプロジェクトになりうる案件に関するディスカッション

【結果】

- Eco Green City内ではエネルギーマネジメントやクリーナープロダクションの実現に関心がある。
- 30MWのPV設置を検討中である

第2回

- Eco Green Cityのグリーン開発に向けたマスタープラン策定に向けたドラフト提示・ディスカッションの開始

【結果】

- マスタープラン策定に向けた議論について前向きにご対応いただける旨の回答
- 継続的に項目出し等を実施することで合意

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3. 進捗報告
3. 2. 活動1の進捗報告・・・Alliance Star Groupとのマスタープラン策定の経過

Eco Green Cityの低炭素型開発に向けたマスタープラン策定に向けて、Alliance Star Groupとテーマ別の目標・パイロットプロジェクトに関するアイデア出しを実施中。引き続き、関係法令等を確認しながらブラッシュアップを進める。

検討中のアイデア概要

※斜字は当初提案内容。下線はJCM事業化の可能性が特に高そうなもの

主なテーマ	目標	数値目標	KPI	パイロットプロジェクト
エネルギー	• エネルギー利用効率向上 • 低炭素エネルギーの利用拡大	• 再生可能エネルギーの利用率を高め、既存エネルギーとの効率的な使用調整を図る • ビル・住宅、商業施設等のCO2排出量の削減 • 時間別、季節別のエネルギー利用を見える化し、省エネ・節電のスマートエネルギーネットワークを構築する	• エネルギー消費削減量 • CO2排出削減量	• エネルギーマネジメントシステムを活用した省エネプロジェクト • EGC内へのクリーンエネルギー設備の導入プロジェクト(太陽光・バイオマス等)
水	• *上水、下水管理を効率化し、水源の汚染物を削減する。* • スマートウォーターシステム(再利用水処理施設、水の循環システムによる効率化、雨季の雨水の貯留・活用)	• 排水の削減と再利用率の向上	• 入居者の水使用量	• 循環型の高度水処理施設の導入 • ICTを活用した水道インフラ管理
廃棄物管理	• まちの中から発生する廃棄物等を可能な限り再利用(エネルギー回収を含む)し、埋め立て廃棄物の量を削減する	• 廃棄物管理の実施によるエネルギー(30%)と処理・回収コストの削減(30%)	• 廃棄物処理の適正化	• 廃棄物処理の適正化

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3. 進捗報告
3. 2. 活動1の進捗報告・・・Alliance Star Groupとのマスタープラン策定の経過

Eco Green Cityの低炭素型開発に向けたマスタープラン策定に向けて、Alliance Star Groupとテーマ別の目標・パイロットプロジェクトに関するアイデア出しを実施中。引き続き、関係法令等を確認しながらブラッシュアップを進める。

検討中のアイデア概要

※斜字は当初提案内容。下線はJCM事業化の可能性が特に高そうなもの

主なテーマ	目標	数値目標	KPI	パイロットプロジェクト
交通	• 交通信号や公共交通を中心に、ICTを活用したスマート・モビリティ • シェアリング・トランスポーテーションの実現	• スマートモビリティによる交通の効率化とコスト削減 • エコビークルとシェアリングによる交通利便の向上	• エリア内の移動効率向上 • *公共交通機関の利用率*	• スマートモビリティの活用 • 電動自動車・電動自転車のシェアリング • ロジスティックハブへのEV充電スタンドの設置 • ソーラーLED 街灯の設置
環境保全	• *大気・水質・土壌等のモニタリング*	• *大気・水質・土壌等の環境基準を策定*	• *大気・水質・土壌等いずれの環境基準も法例基準よりも高く設定されている。*	• *大気・水質・土壌のモニタリング*
自然共生社会・緑化(独自提案)	• 都市型アグリリゾートの実施 • グリーンインフラの構築	• アグリリゾートによる自然共生 • 公共施設・屋上の緑化率の向上、植栽の実施	• 緑化空間の確保	• グリーンインフラの構築

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3. 進捗報告
3. 2. 活動1の進捗報告・・・Alliance Star Groupとのマスタープラン策定の経過(参考資料)

マスタープラン策定に際してはミャンマー国内の法令に関する調査を合わせて実施し、KPI・数値目標等策定の際の参考材料とする。

確認の必要な法制度の抽出(経過資料)

カテゴリ	関連法制度
全般	ミャンマーの持続可能な開発計画(Myanmar Sustainable Development Plan 2018-2030)
環境保全	環境保全法(Environmental Conservation Law)
	環境保全法の規則(Environmental Conservation Rule)
	環境影響評価(Environmental Impact Assessment: EIA)
廃棄物関連	ヤンゴン市開発法(The City of Yangon Development Law, The State Law and Order Restoration Council Law No.11/90)
	開発委員会法(Development Committees Law, The State Law and Order Restoration Council Law No. 5/93)
	清掃規則(Cleaning Rules, Order No.3/96)
	ヤンゴン市汚染管理・清掃規則(Pollution Control and Cleansing Rules, Order No.10/99)
…	

3. 進捗報告
3. 3. 活動2の進捗報告・・・新規ポテンシャル案件①A社への30MWPV導入

A社は、Eco Green Smart Cityの開発を行うAlliance Star Groupのグループ会社である。EGC近隣への大規模PV導入を検討中である。

企業概要

企業名	◆ A社 ◆ Alliance Stars Groupのグループ会社
設立年	◆ 2013年8月に設立
業界	◆ エネルギー関連会社
エリア	◆ ミャンマー/ヤンゴン
企業概要	◆ ミャンマー国内各地で発電機の建設から管理までを行っている。 ◆ 複数の水力発電プラントの建設実績がある。

現地調査結果

- ◆ 太陽光発電設備を設置するために、Eco Green Smart City付近に120エーカーの土地を確保済みである。
- ◆ 現在、どの程度のパネル設置が可能か、費用感の確認を含めたプレFSのため、業者からのプロポーザルを待っているところである。実際の発注は2020年以降を検討している。
- ◆ 最終的には30MW規模の発電設備としたいが、段階的に規模を大きくしていくこととしたい。まずは10MW程度の設備導入からスタートしたい。
- ◆ 電力供給先はEco Green Smart City域内に加え、今後建設される、韓国資本の入った工業団地も対象として視野に入れている。

第3回現地調査では、引き続きプロポーザルの状況確認を行い、2020年以降のJCM申請を視野に入れた検討を深める。

3. 進捗報告
3. 3. 活動2の進捗報告・・・新規ポテンシャル案件②F社へのPV・リジェネバーナー導入

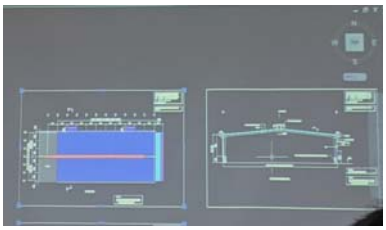
活動1を通して、JCM化の可能性を見込める案件を発掘。
バッテリー製造工場屋根へのPV設置と、溶融炉(バーナー)の効率化について検討中。

企業概要

企業名	◆ F社
設立年	◆ 1996年設立
業種	◆ 製造業
工場拠点	◆ ヤンゴン市内
企業概要	◆ 潤滑油、スペアパーツ、外装および内装アクセサリなど、自動車のアフターマーケットセクター向けの商品製造 ◆ バイク用のバッテリー(TOYO)製造

現地調査結果

- バッテリー工場の屋根置きPVに関心を持っている。
  - 図面や屋根の耐荷重量のデータを確認中。ここで得た情報をもとに、具体的な発電量・コスト試算を行い、提案を深める。
- 金属の溶融炉(バーナー)を有しており、リジェネバーナーの導入可能性を検討中。



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3. 進捗報告
3. 3. 活動2の進捗報告・・・新規ポテンシャル案件③ B社へのバイオマス混焼発電機導入

THE STRENGTH TO BUILD

過去にJCM設備補助事業を実施した、B社にて、新規工場敷地内に発電設備(石炭とバイオマスの50%混焼)の導入を検討中。

企業概要

企業名	◆ B社
設立年	◆ 1977年に設立
業種	◆ セメント製造
エリア	◆ 本社はヤンゴン ◆ ミャンマー・マンダレーの山岳地帯のセメント工場

現地調査結果

- 2018年にセメント工場の廃熱回収発電にて設備補助を受けた企業より、新規案件に関する照会を受けている。
- 石炭炊き、或いは褐炭、もみ殻、他の燃料との混焼による20MW自家発電設備の導入を検討中。
- 100%バイオマス燃料利用ではないが、近隣住民の環境意識が高まる中で、バイオマス混焼による環境負荷の低減を目指している。

石炭とバイオマスの混焼であるものの、CO2排出量の算出等シミュレーションを行い、
排出量削減につながる可能性があればJCM申請も視野に入れる。

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3. 進捗報告
3. 3. 活動2の進捗報告・・・新規ポテンシャル案件④E社（協議開始）

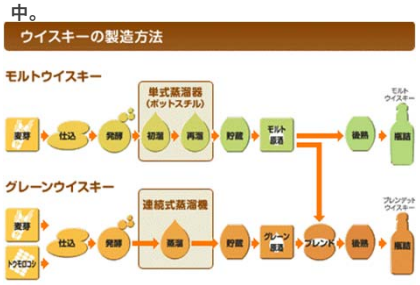
ミャンマー国内大手ウィスキーメーカーであるE社に対してJCM制度紹介を行う機会を得た。今後、蒸留プロセスの省エネ等を視野に議論を進める。

企業概要

企業名	◆ E社
設立年	◆ 1995年に設立
業種	◆ 製造業
エリア	◆ ヤンゴン

想定している脱炭素手法

ウィスキー製造のプロセスのうち、熱需要の大きい蒸留プロセスの効率化・省エネ化等の提案を検討中。



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3. 進捗報告
3. 3. 活動2の進捗報告・・・新規ポテンシャル案件【ご参考】その他活動

ポテンシャル案件の発掘のため、講演等を実施。第2回現地調査にて、ミャンマー日本商工会議所　建設部会の会合にてJCM制度紹介を実施。

講演の様子(2019/9/30)

- Alliance Stars Groupが開発予定のEco Green Cityについてプロジェクト概要を紹介。
- あわせて、北九州市・NTTデータ経営研究所から、JCM設備補助制度についても概要を紹介した。

- 日系のゼネコン企業担当者が100名程度参加。
- 参加企業より、廃棄物発電の次のプロジェクトをミャンマーで検討中である旨情報提供いただいた。

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4. 今後のスケジュール

第3回渡航を1月下旬から2月にかけて予定している。引き続き、各活動の深堀を実施し、3/2に最終報告書を提出。

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Trusted Global Innovator

Appendix c: Myanmar Eco Green Smart City

Alliance Stars Group of Companies

20th Nov. 2019

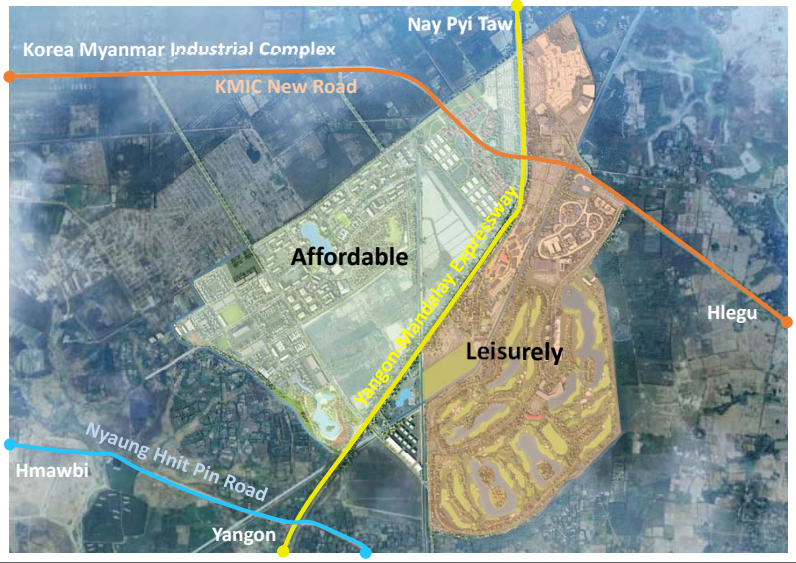
Alliance Stars Group of Companies

[Total Area]
1,453 Acre
588 Ha
5.88 km²

Alliance Stars Group of Companies

Eco Green Smart City Project

Introduction



Alliance Stars Group of Companies

Eco Green Smart City Project

MOA : Ministry of Agriculture
MOF : Ministry of Finance
MOC : Ministry of Construction

Project History

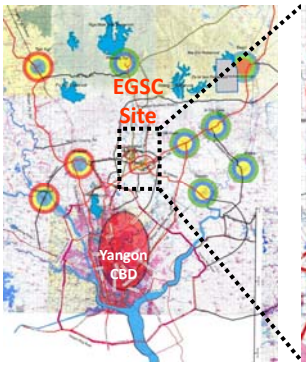
Mar 2015	May 2016	Aug 2017	May 2018	Jan 2019	Aug 2019	Oct 2019
EGSC Plan Announcement	ASG confirmed Master Developer	Master Plan Completion	Priority National Development PJT	PJT Contract with MOC	MOU with Seoul Metro	MOU with Seoul Metro

- ❍ Mar 2015 — Eco Green Smart City Plan Announcement (MOA → MOF → MOC)
- ❍ Mar 2015 — Confirmed Alliance Stars Group of Companies as the Master Developer
- ❍ May 2016 — Initial MOU followed by the process of Relocation and Resettlement
- ❍ 2017-2018 — Feasibility Study
- ❍ Aug 2017 — Master Plan Completion by Nikken Sekkei Civil Engineering LTD
- ❍ May 2018 — Approval of Priority National Development Project
- ❍ Jan 2019 — Project Contract with MOC
- ❍ Apr 2019 — Project Phase 1 A, B Construction on going
- ❍ Aug 2019 — MOU with Seoul Metro (Korea Government Co.) for Logistic Hub
- ❍ Oct 2019 — MOU with Posco E&C (Korea Major EPC Co.) for Water Infrastructure

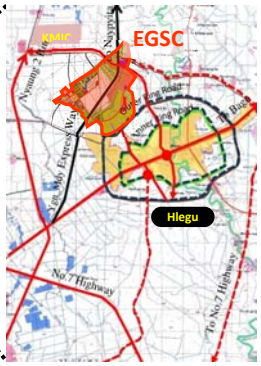
Alliance Stars Group of Companies

Eco Green Smart City Project

Background



Yangon Region
New Town Development Plan



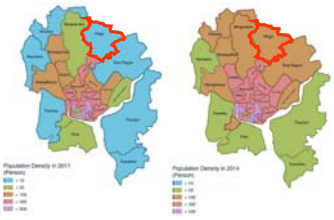
Yangon Region
Road Development Plan
(Hlegu area)

Yangon

- Population : **7.4 Million** in 2014 (High increase rate)
- Total area : **10,276.7 km²**
- Economic Capital of Myanmar
- Various development projects in progress

Hlegu

- Population : **270,741** in 2014 (High increase rate)
- Total Area : **1,494.2 km²**
- Transportation and Logistics Center of Northern Yangon
- Faster to develop than other areas

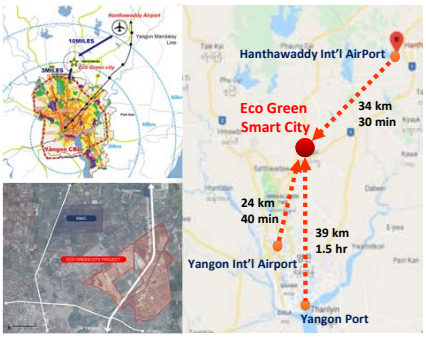


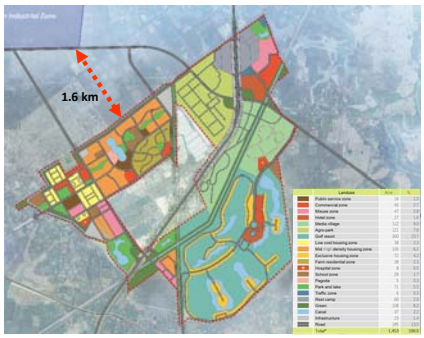
Yangon Region Population Condition

Alliance Stars Group of Companies

Eco Green Smart City Project

Background





- **Main Area of Yangon Development Plan**
  - Hlegu, Yangon region
  - 5 km distance from Yangon CBD
- **Korea-Myanmar Industrial Complex**
  - 1.6 km distance from KMIC
  - Consider linking road, electricity, and water infrastructure

- **EGSC Development Plan**
  - Area: 1,453 acre(5.88 km^2, 588 Ha)
  - Planning Population: 150,000

(Income Low: 30,000 / Mid: 70,000 / High: 50,000)

  - Residential, commercial and cultural facilities

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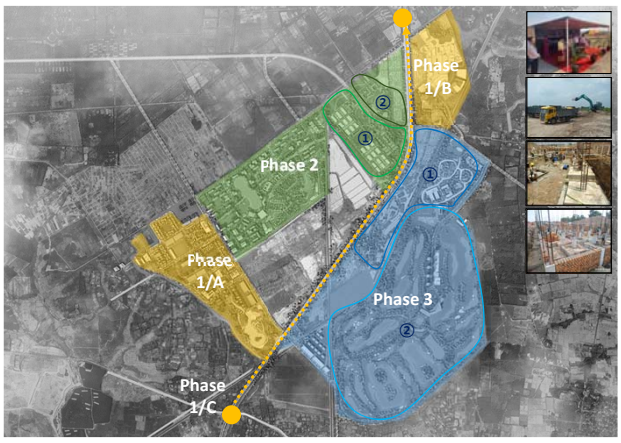
Eco Green Smart City Project

Master Plan



- Location : **Hlegu Townhip, Yangon Regional Division**
- Project Method : **PPP (*MOC → **DUHD → ***ASG)**
  ASG is Master Developer & Land owner
- Order Cost : **2 Billion USD (estimated by Myanmar government)**

* MOC : MINISTRY OF CONSTRUCTION
** DUHD : DEPARTMENT OF URBAN AND HOUSING DEVELOPMENT
*** ASG : ALLIANCE STARS GROUP OF COMPANIES

Phase 1 (2019-2025)

① **A: Low-cost Housing (On going)**
② **B: Logistic Hub (On going)**
③ C: Moving the Toll gate
④ Infrastructure
⑤ Highway Rest Camp
⑥ Bus terminal, Mall, Wholesale etc.

Phase 2 (2026-2030)

① **Agricultural research park**
② **Agricultural Resort**
③ Mid-cost Housing
④ Water Entertainment
⑤ Hospital, Mall, etc.

Phase 3 (2031-2035)

① **Media Village**
② **Golf resort**
③ High-rise Office Building
④ High-cost Housing
⑤ Luxury Hotel
⑥ International School,
High class Hospital, etc.

* The Content and the order above is subject to change

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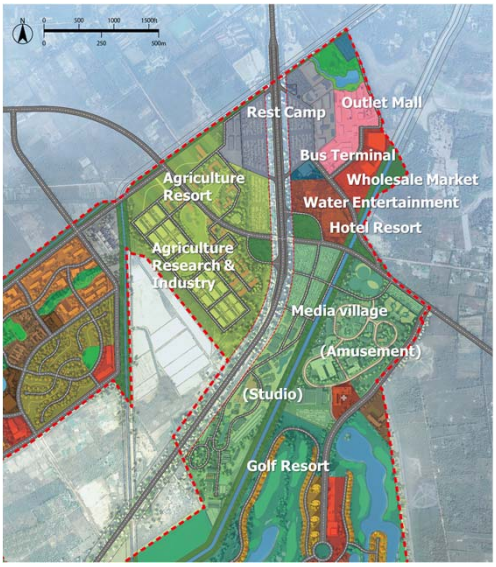
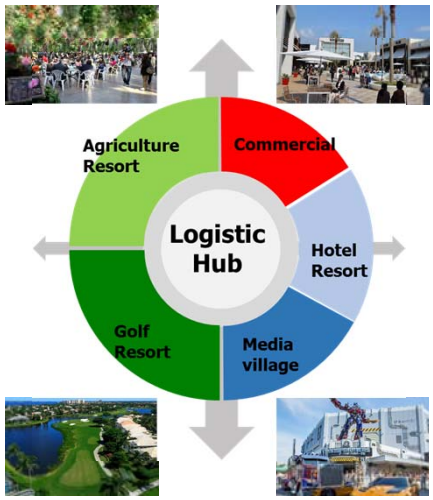
Eco Green Smart City Project

Urban Core





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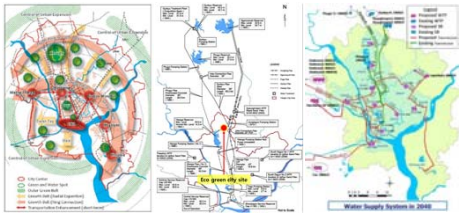
Eco Green Smart City Project

Possibility

<4 Mega Projects of MOC>

1. Eco Green Smart City
2. Korea-Myanmar Industry Complex
3. New Mandalay Resort City
4. Smart District



- **PJT Will of Myanmar Government**
  - Listed in Myanmar Government Priority Development List → **Project Bank**
  - Only Obtained Government Permission Amongst MOC's 4 Mega Projects
- **Part of MSDP**
  *Myanmar Sustainable Development Plan
- **Part of Greater Yangon 2040 Plan**

- **Power supply**
  - Located In The Part Of National Grid
  - 50 MW supply from National Power Grid
  - **30 MW Solar Power Plant**
- **Water supply**
  - Two alternative ways (Planning F/S)

1) From Nyaung Nha Pin
2) From Kalihtaw Dam by implementing water treatment plant

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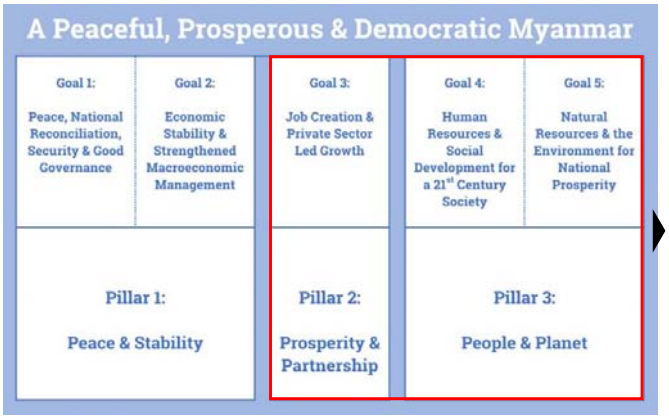
Eco Green Smart City Project

Possibility



Objectives of EGSC In Compliance With *MSDP (2018-2030)

*** Myanmar Sustainable Development Plan (MSDP)**

Source: Myanmar Times, Friday, June 21 2019, Credit: HTET SHINE
Internet: https://www.mmtimes.com/news/myanmar-sustainable-development-plan-drafted-govt-feedback-sought.html

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Eco Green Smart City Project

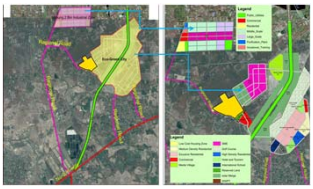
Project Progress (Phase 1/A)

Low Cost Housing (160 Acres)

- 5 Blocks
- 121 Buildings
- 3,341 Units

- Implementation: Fast Moving
- In Progress: 28 Buildings

Planned Schedule
- 2020 December transfer to Myanmar gov.
- 28 Buildings (Block II)
- 1,070 Units



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Eco Green Smart City Project

Project Progress (Phase 1/B)

Logistic HUB (133 Acres)

- **Current Developing Area** (23.19 Acres)

(1) Petrol Station
(2) Food Court
(3) Landmark Hotel
(4) Eco Tourism Park
(5) Shopping Centre
(6) Restaurants
(7) Car Service Centre
(8) Car Parking

- **Planned facilities**

(1) Event Park
(2) Bus Terminal
(3) Shopping Mall
(4) Outlet Mall
(5) Wholesale Market
(6) Palm Resort
(7) Water Entertainment

- **Variable according to the demand**

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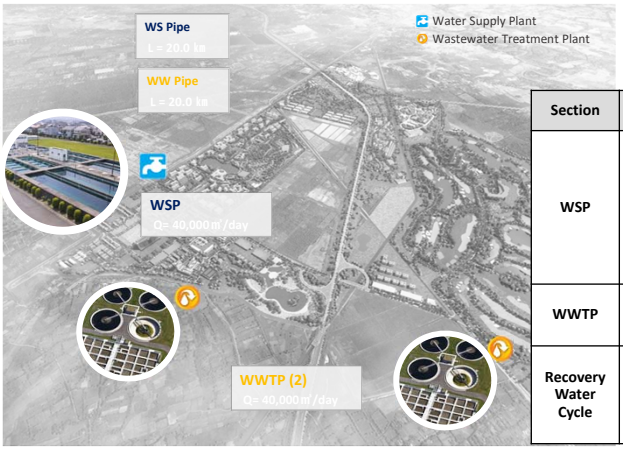
Eco Green Smart City Project

Water Infrastructure Issue (F/S with Posco E&C)



Section	Issue
WSP	• Yangon LPCD = 180L/day → EGSC LPCD = 200L/day • Popul. x LPCD = **30,000 ton/day** • Consider Public Facilities & KMIC • Top priority in securing water resources • Customized water treatment technology according to needs
WWTP	• Energy independence • Reuse treatment water
Recovery Water Cycle	• Response of Water Cycle Distortion by Development • Eco-friendly Urban Image • Environmental-sensitive Government Responses

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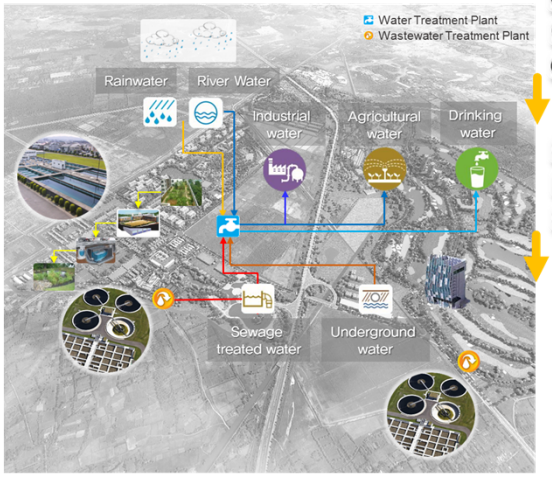
Eco Green Smart City Project

F/S Solution Concept for Eco Green Smart City



Water Issue

1. *Water Shortage*
2. *Energy Shortage*
3. *Water cycle distortion*

Smart technology

1. *Smart Water Gird*
2. *Decentralized Water Supply System*
3. *Positive Impact Development*

Expected Benefits

1. *Water resource securement*
   - Independence rate 0% → 40%
2. *Low-cost low-energy water supply*
   - Energy&cost saving 0% → 20%
3. *Water cycle Recovery*
   - Recovery rate 0% → 30%

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Eco Green Smart City Project

Project Banks

○ **Main objective**

- **To Provide Affordable Housing for low-income citizen**
- **To improve Communication and Transportation in the north of Yangon**
- **To improve the standard of living of the residents of Yangon**

○ **MSDP certification, Eco Green City Project became a part of several project banks**

- **Union Project Bank**
  : A national initiative to support the development of the most effective and publically-beneficial projects that align with MSDP under the objective of infrastructure enhancements to be financed using either public funds, ODA, private investment or a combination of these
- **Yangon Project Bank**
  : Just like the Union Project Bank, Yangon Project Bank is an initiative focuses the projects in the Yangon Region
- **Greater Yangon 2040 Plan**

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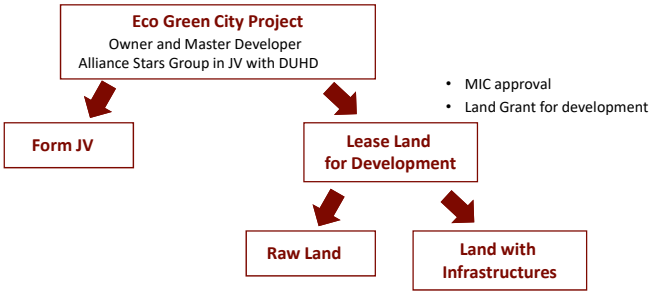
Eco Green Smart City Project

Individual Consignment for each Development Plot

- Alliance Stars Group has all the certification on land and permit of master developer
- Possible to consign plot by plot development
  Ex) Plan for developing value adding industrial zone

Two Possible Ways of Development



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Eco Green Smart City Project

Tax Benefit

- Tax benefits depending on the type of investment (business) operating in Eco Green City Project
- Location of this project belong to **Sector B (level 2) of Myanmar Investment Commission's (MIC) tax holiday scheme**, so the investor will be entitled for a **5-year tax holiday**.

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Eco Green Smart City Project

- **External Reference Links**

Eco Green City Facebook	https://www.facebook.com/ecogreencity.com.mm/
Alliance Stars Group of Companies Facebook	https://www.facebook.com/alliancestars.biz/
The Myanmar Builders Guide	https://www.buildersguide.com.mm/my/latest-project/item/1754-low-cost-housing-in-eco.html
Myanmar Times	https://www.mmtimes.com/news/eco-green-city-commence-year-end.html https://www.mmtimes.com/news/ministry-construction-commits-four-mega-projects-2018.html
Myanmar Business Today	https://www.mmbiztoday.com/articles/eco-green-city-be-implemented-three-phases
iMyanmarHouse.com	https://www.imyanmarhouse.com/en/news/read/735379
MYANMAR INSIDER	https://www.myanmarinsider.com/eco-green-city-project-to-be-implemented/
7DAY DAILY	http://www.7daydaily.com/story/117131
ELEVEN MEDIA GROUP	https://elevenmyanmar.com/news/two-billion-dollar-eco-green-city-project-under-way
Mingalar Myanmar	https://www.mingalarrealestateconversation.com/news/2018/05/29/government-announces-4-mega-development-projects-across-myanmar/1527561823

- **External Download Links**

DUHD_4_Mega_Projects.pdf
https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&ved=2ahUKEwjXsdSU95zjAhVkguYKHcTIC_0QFjAFegQICBAC&url=http%3A%2F%2Fwww.construction.gov.mm%2Findex.php%2Fprojects%2Fcivilprojects%2Fitem%2Fdownload%2F47_01108db4233842c981cdc174f8012452&usg=AOvVaw3_GDhr7fXkX4nEaQ30qrQV

Alliance Stars
Group of Companies

Thank you!

For Further Information or enquire please contact the following personnel:

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Business Development Manager

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mike@alliancestars.biz
www.alliancestars.com

Telephone
(+95) 9-4286-40054 (Myanmar)

1. Introduction of us

Introduction of NTT DIOMC

NTT DATA

Corporate outline

Name	NTT DATA INSTITUTE OF MANAGEMENT CONSULTING, Inc.
Date of Establishment	April 12, 1991
Shareholder	NTT DATA Corporation 100%
Capital	¥450 million
Head Office	10th floor, JA Kyosai Building, 7-9, Hirakawa-cho 2-chome, Chiyoda-ku, Tokyo 102-0093, Japan Tel +81-3-3221-7011 (main number) Fax +81-3-3221-7022
Office Toyosu	25th floor, Toyosu Center Building, 3-3, Toyosu 3-chome, Koto-ku, Tokyo 135-6025, Japan Tel +81-3-3221-7011 (main number) Fax +81-3-3534-3880
Office Singapore Branch	20 Pasir Panjang Road, #11-28 Mapletree Business City, Singapore 117439
URL	http://www.keieiken.co.jp/english/

Society, Environment and Energy

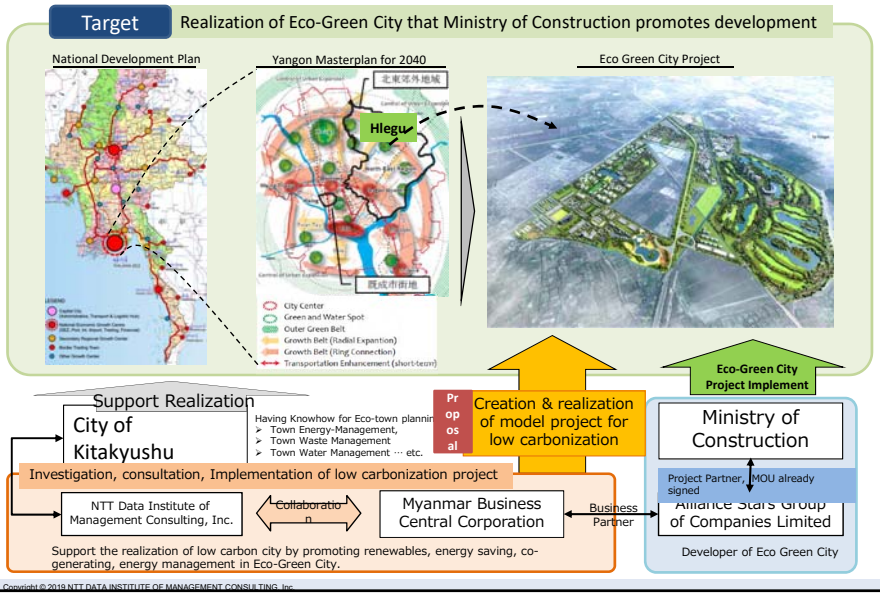
The environmental and energy sectors continue to be the scene of dynamic developments exemplified by the revision of energy policy, approaches to global warming, and recycling of dwindling resources. They also hold much promise for industrial activity. We promote client approaches through activities including support for smart community development, assistance with export of infrastructural elements, and creation of new business by private-sector consortiums.

- Development of environmental business and environmental management
- Social and environmental communication
- Building of recycling-oriented social systems
- Measures to mitigate global warming
- New energy and energy conservation
- Systems for assurance of safety/security and management of chemical substances
- Smart communities
- Infrastructural export

Overview

NTT DATA

This Project is derived from City-to-City collaboration survey in FY2018 between Kitakyushu and Mandalay. Aim to realize low-carbon projects in smart city development projects in Hlegu Township, Yangon Region.

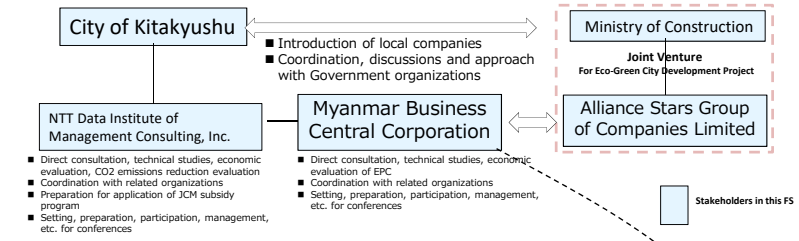


Project Overview

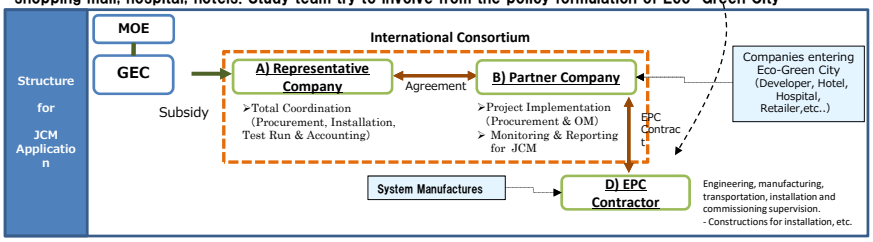
NTT DATA

Promote low carbonization in the Smart City project in Yangon province

【Applicant】NTT Data Institute of Management Consulting, Inc.【Co-Applicant】City of Kitakyushu、Myanmar Business Central Corporation



【Assumed Project】
Aim to low carbonization of the entire city by introducing Energy system (Renewables, Saving, Storage) ,Combined heat and power, city energy management system into planned green filed construction project such as house, shopping mall, hospital, hotels. Study team try to involve from the policy formulation of Eco-Green City



Project Experiences and 3 Year Project Plan

NTT DATA

This Project is based on the Kitakyushu City's activity in Myanmar. 3 Year Project Plan is shown in following table.

- Kitakyushu City has kept relationship with Mandalay city in the filed of Environment and Water sector since 2012, and based on this relationship, Kitakyushu City had conducted many activities in Myanmar and participated in Japan-Myanmar exchange event.
- In Nov.-2013 and Feb.-2014, through the supporting program by CLAIR (Council of Local Authorities for International Relations), the officer of Kitakyushu City visited Yangon City and discussed the possibility of future corporation, possible project in Environmental conservation, conducted survey the situation of waste management in Yangon.
- In water sector, Kitakyushu City conducted survey the situation of water management and use in main 3 cities including Yangon in March-2012.
- In Jan-2018, participated in "Japan –Myanmar Environmental Week" event held by MOEJ and MONREC and the officer of Kitakyushu City had presentation about Transfer of Environmental technology in the "Environmental Infrastructure Technology Seminar" in Yangon.

Acitivity	FY 2019				FY 2020	FY 2021
	Aug	Sep.-Oct.	Nov.- Dec.	Jan. – March		
Built long term city-to-city relationship, Make plan for low-carbonization of Eco Green City	Kick Off MTG (with Local Govement)	2nd Filed Survey ・Discuss the policy & Planning for low carbonization	3rd Filed Survey ・Discuss the policy & Planning for low carbonization ・Invite stakeholder to Kitakyushu city and introduce Eco-Town (JCM seminar)	4th Filed Survey ・Discuss the policy & Planning for low carbonization ・Finalize low carbonization plan as an output of this fiscal year ・Discuss 1st JCM subsidy project	Continue City to City collaboration ・・Discuss the policy & Planning for low carbonization ・Capacity building for government officer, governance system	
Activity for formulate JCM subsidy project	Kick Off MTG (Developer team of Eco Green City)	2nd Filed Survey ・Discuss JCM formulation with Candidate entering to smart city	3rd Filed Survey ・Discuss JCM formulation with Candidate entering to smart city (Technical, economical, CO2 reduction, etc..)	4th Field Survey ・Discuss JCM formulation with Candidate entering to smart city	JCM subsidy application (any time) / Continue acivity for JCM project formulation in Smart City development phase-2 & 3, in same approach.	
	(Conducted by MBC Corporation) Follow up and direct consultation with Government, Developer, Candidate company who entering smart city.					
Final Reporting				☆ Submit final repot this fiscal year		
Filed Survey	☆	☆	☆	☆		

2. Introduction of JCM

1-1. Basic Concept of the JCM (Joint Crediting Mechanism)

NTT DATA

- Facilitating diffusion of leading low carbon technologies, products, systems, services and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing countries;
- Appropriately evaluating contributions from Japan to GHG)emission reductions or removals in a quantitative manner, and use them to achieve Japan's emission reduction target;
- Contributing to the ultimate objective of the UNFCCC by facilitating global actions for GHG emission reductions or removals

Source: Ministry of Environment, Japan

1-2. JCM Partner Countries

NTT DATA

- Japan has held consultations for the JCM with developing countries since 2011 and has established the JCM with Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Viet Nam, Lao PDR, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Chile, Myanmar, Thailand and the Philippines.

Source: Ministry of Environment, Japan

1-3. JCM Subsidy Program

NTT DATA

The budget for projects starting from FY 2019 is 9.9 billion JPY (90 mm USD) in total by FY2021.

(1 USD = 100 JPY)

※Includes collaboration with projects supported by JICA and other governmental-affiliated financial institute.

Government of Japan

Finance part of an investment cost (**less than half**)

Conduct MRV and expected to deliver at least half of JCM credits issued

International consortiums
(which include Japanese entities)

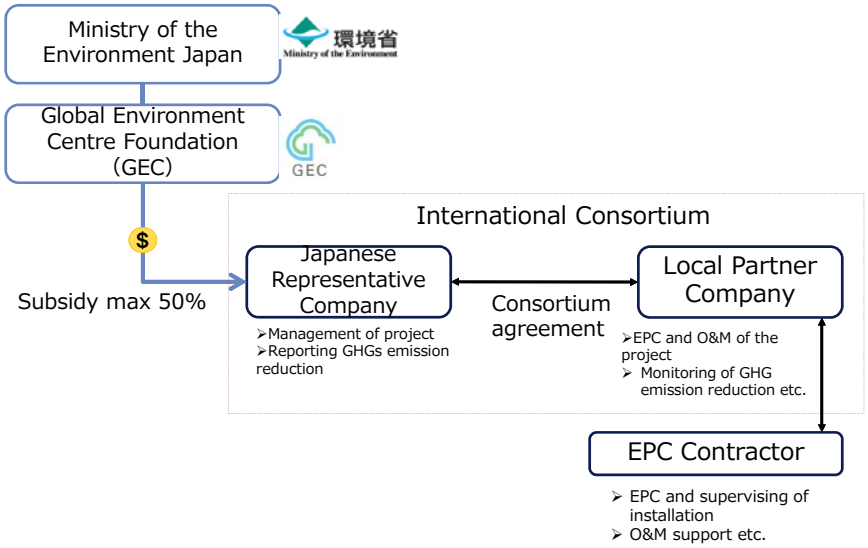
- Scope of the financing: facilities, equipment, vehicles, etc. which reduce CO2 from fossil fuel combustion as well as construction cost for installing those facilities, etc.
- Eligible Projects : starting installation after the adoption of the financing and finishing installation within three years.

Source: Ministry of Environment, Japan

1-4. Organization at Implementation Phase

NTT DATA

Required organization scheme for JCM subsidy application



1-5. Overview of Financing Program

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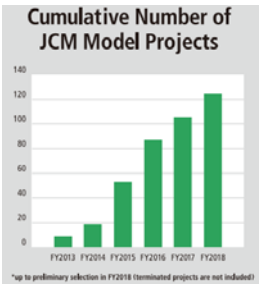
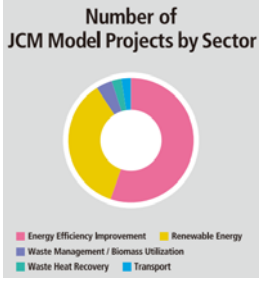
Overview of Financing Programme for JCM Model Project in FY2018

Budget	JPY6.9 billion (Approx. USD69million)
Executing Entity	International Consortium that consists of a Japanese entity and a JCM partner-country entity(ies)
Implementation Period	From FY2018 to FY2020 (max. 3 years)
Scope of Financing	Facilities, equipment, vehicles, etc. which reduce CO2 from fossil fuel combustion as well as construction cost for installing those facilities, etc.
Eligible Projects	Start installation after the Contract of Finance is concluded and finish installation within 3 years.
Maximum percentage of Financial Support	Maximum of 50% and reduce the percentage according to the number of already selected project(s) using a similar technology in each partner country.
Cost-effectiveness	Cost-effectiveness of GHG emission reductions is expected to be JPY4,000/tCO2 or better. ※ If the number of PV projects in a partner country are 5 or more, cost-effectiveness is expected to be JPY3,000/tCO2 or better.

Financial support per project
From ¥50million to ¥2billion (approx.)





1-6. Schedule from Application to Project Implementation

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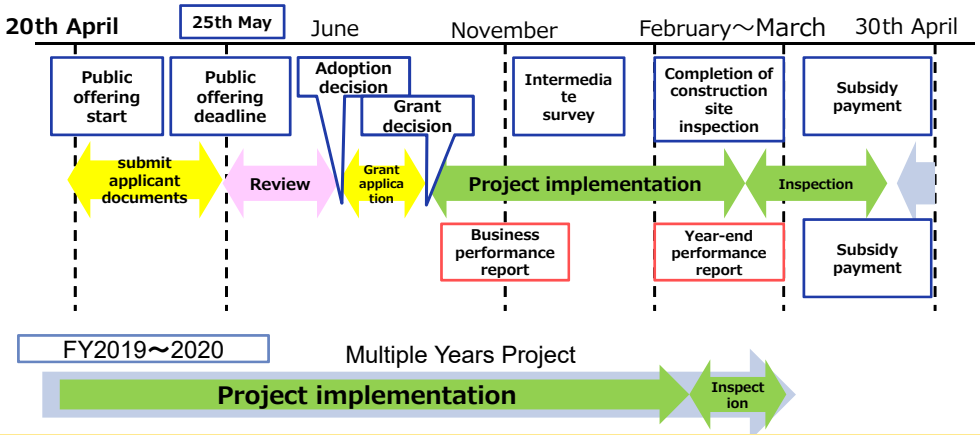
(Example) FY2018

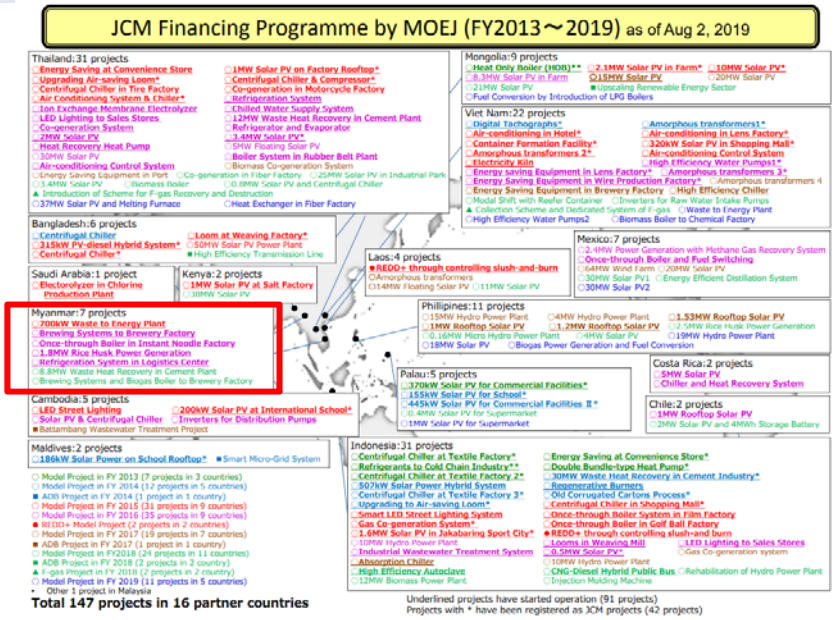


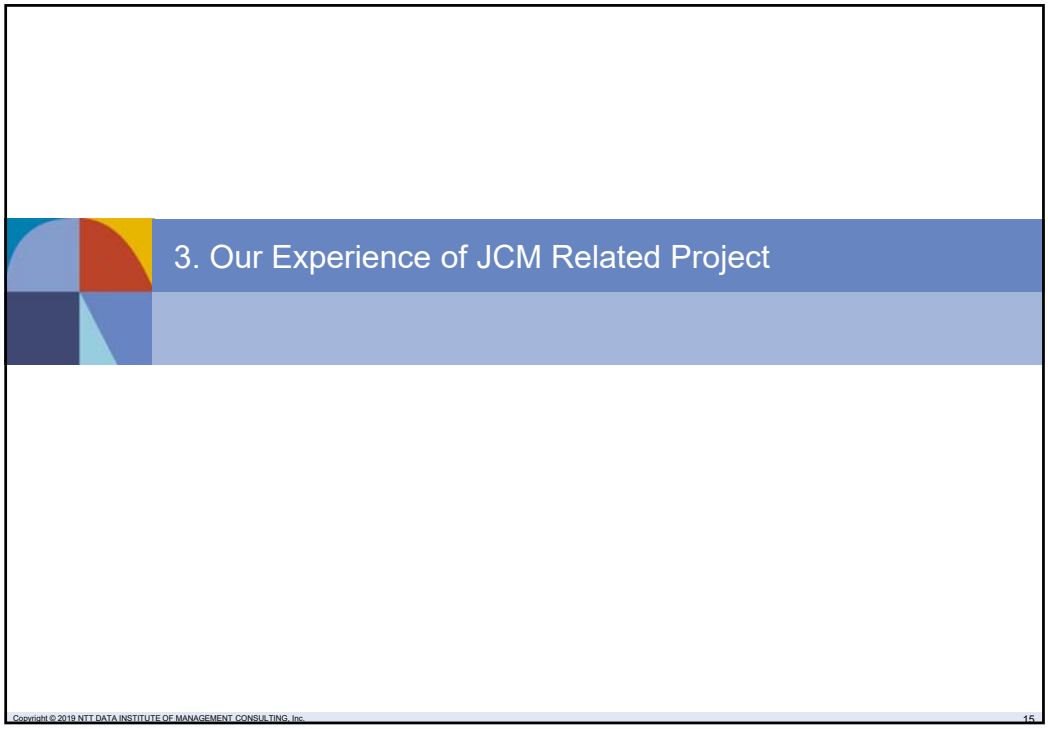
FY2019～2020 Multiple Years Project

- **Grant application is needed from the adoption unofficial within 3 months.**
- **pay estimate to the end of each FY year, the settlement payment in the final year**

1-7. JCM Subsidy Program by MOEJ (FY2013-2019)

NTT DATA





2-2.Experience of JCM related Projects (1/2) ◆Industrial Sector

NTT DATA

NO	Outline of Activity	Purpose	Phase
1	Installation of Co-generation System into the Factory and Industrial Estate (Indonesia, Vietnam)	Reduce CO2 Emission & Energy Cost	Study
2	Installation of Economizer for the Existing Boiler in Factory (Malaysia)	Reduce CO2 Emission & Energy Cost	Study
3	Installation of Exhaust Heat Recovery & Electricity Generation System into the Existing Cement Factory (Vietnam and Thailand)	Reduce CO2 Emission & Energy Cost	Study, Implementation
4	Replacement or Installation of Saving Energy Type of Electrical Furnace into Casting Companies (Vietnam)	Reduce CO2 Emission & Energy Cost	Implementation
5	Installation of Electricity Generation System using Rice Husk (Indonesia)	Reduce CO2 Emission & Energy Cost	Study
6	Installation of Solar Electricity Generation System on the Roof of the Existing Cold Storage Warehouse (Malaysia)	Reduce CO2 Emission & Energy Cost	Study
7	Replacement of Existing Lighting System into LED Lighting System (Indonesia)	Reduce CO2 Emission & Energy Cost	Implementation
8	Changing Fuel Type from Oil to Natural Gas in a Factory (Malaysia)	Reduce CO2 Emission & Energy Cost	Study
9	Installation of Mini-hydro Electricity Generation System in Isolated Area (Kenya and Ethiopia)	Reduce CO2 Emission & Energy Cost	Implementation
10	Installation of Mega Solar Electricity Generation System (Costa Rica)	Reduce CO2 Emission & Energy Security Increase	Implementation
11	Installation of Landfill Gas Recovery & Electricity Generation System (Mexico)	Reduce CO2 Emission & Energy Cost	Implementation
12	Introduction of Biomass Boiler to Chemical Factory(Viet Nam)	Reduce CO2 Emission & Energy Cost	Implementation

2-2. Experience of JCM related Projects(2/2)

NTT DATA

◆Commercial Sector

No	Outline of Activity	Purpose	Phase
1	Replacement or Installation of Saving Energy Type of Chiller or Air-conditioning System into Hotel, Commercial Building and Shopping Mall (Indonesia, Vietnam, Cambodia, Costa Rica)	Reduce CO2 Emission & Energy Cost	Implementation
2	Installation of Mini Co-generation System into Hotel (Indonesia)	Reduce CO2 Emission & Energy Cost	Study
3	Replacement of Refrigerated Show Case into Saving Energy Type (Vietnam)	Reduce CO2 Emission & Energy Cost	Study
4	Replacement of Air-conditioning System, Lighting System and Refrigerated Show Case of Convenience Store into Saving Energy Type (Vietnam, Thailand)	Reduce CO2 Emission & Energy Cost	Implementation
5	Installation of Solar Electricity Generation System on the Roof of the New Building (Malaysia, Thailand), Hospital (Cambodia) , Shopping Mall (Vietnam) and university (Chile)	Reduce CO2 Emission & Energy Cost	Implementation, Study
6	Introduction of EV Bus & Solar Electricity Generation System with Funding Mechanism in an Isolated Island (Vietnam)	Keep Environment and Reduce CO2 Emission	Study
7	Installation of Solar System & Saving Energy Equipments into the Existing School, Building and Hotel, using Environmental Fund & ESCO + Leasing System (Costa Rica)	Reduce CO2 Emission & Energy Cost	Study

2-3. Introduction of Our Project 1.

NTT DATA

Introduction of 8.8MW Power Generation System by Waste Heat Recovery for Cement Plant

Representative Participant

Global Engineering Co., Ltd.

Partner Participant： Shwe Taung Cement Company Limited

Host Country	Myanmar
Year	2018
Type	JCM Model Project
Sector	Renewable Energy

Outline of GHG Mitigation Activity

Status：Installing　JCM Project Cycle：Not registered

Shwe Taung Cement installs a waste heat recovery power generation (WHRPG) system for their cement factory located in Mandalay, which produces 1,500 ton/day of clinker from the existing line and 4,000 ton/day from a new line. This project contributes to mitigating power shortage in Myanmar, and to the CO2 emission reduction by reducing the consumption of natural gas that is a major source of energy in the country.
This WHRPG system consists of an air quenching cooler (AQC) boiler and a latest preheater (PH) boiler which recovers waste heat and converts into power more efficiently.
All the electricity generated from the project is self-consumed at the factory.

A set of equipment introduced in this project is shown in the red frame below.

2-3. Introduction of Our Project 2.

NTT DATA

2MW Solar Power and 4MWh Storage Battery Project in San Pedro de Atacama City

Representative Participant

Liberal Solution Co., Ltd.

Partner Participant： MGM Innova Capital Chile SpA

Host Country	Chile
Year	2018
Type	JCM Model Project
Sector	Renewable Energy

Expected GHG Emission Reductions

2,352 tCO2/year

Emission reduction ERp = REp − PEp *PEp =0 = Rep

REp = Reference emissions = [Estimated annual energy generation] x [Emission factor of grid electricity]

= 4,413MWh/year x 0.533 tCO2/MWh

=2,352 tCO2/year

PEp = Project emissions=0

Status：Installing JCM Project Cycle：Not registered

Site of JCM Project

2-3. Introduction of Our Project 3.

NTT DATA

Introduction of 1MW Solar Power System and High Efficiency Centrifugal Chiller in Large Shopping Mall

Representative Participant

AEON MALL Co., Ltd.

Partner Participant： AEONMALL (CAMBODIA)CO., LTD.

Host Country	Cambodia
Year	2016
Type	JCM Model Project
Sector	Energy Efficiency Improvement Renewable Energy

Outline of GHG Mitigation Activity

Status：Active JCM Project Cycle：Not registered

This project reduces electric power consumption of a new large shopping mall by introducing 1MW-class photovoltaic generation equipment(PV) and high-efficient chiller.

The electricity generated by the PV replaces grid power, resulting in the GHG emission reduction, along with the energy-saving effect by the chiller.

2-3. Introduction of Our Project 4.

NTT DATA

Introduction of High Efficiency Air-conditioning system in hotel (Vietnam, 2015)

MODEL Introduction of High Efficiency Air-conditioning in Hotel

PP(Japan): NTT DATA INSTITUTE OF MANAGEMENT CONSULTING, Inc.
PP(Vietnam): Peace Real Estate Investment Company Limited

Expected GHG Emission Reductions

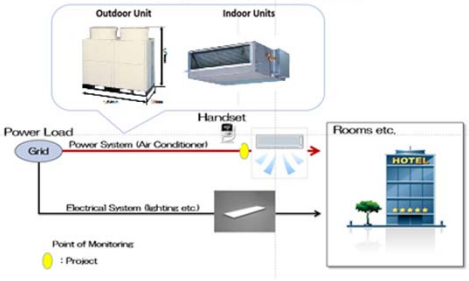
826 tCO2/ year

Calculated based on the electricity consumptions of non-inverter air conditioner and project air-conditioner as well as grid emission factor in Vietnam (3,412tCO2/year - 2,586tCO2/year = 826tCO2/year).

Outline of GHG Mitigation Activity

While non-inverter air conditioner with poor energy efficiency is popular in hotels in Vietnam, this project is intended to achieve the energy saving as a whole with the introduction of high efficiency air-conditioning system, which is introduced to the new Novotel Suites in Hanoi (total floor area of about 29,000㎡, 17 floors above ground, two floors underground, 200 rooms), and achieves GHG emission reductions from reducing power consumption with introduction of high efficiency air-conditioning.
(Equipment performance : COP 4.53, 73.0kW x 1set, COP4.09, 90kW x 12set, COP4.05, 95.0kW x 2set, COP3.29, 109kW x 1set, COP3.27. 125kW x 1set)

<Introducing of Inverter Air Conditioner>



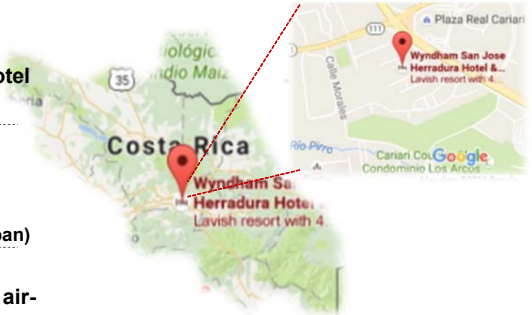
Source：JCM HP

2-3. Introduction of Our Project 5.

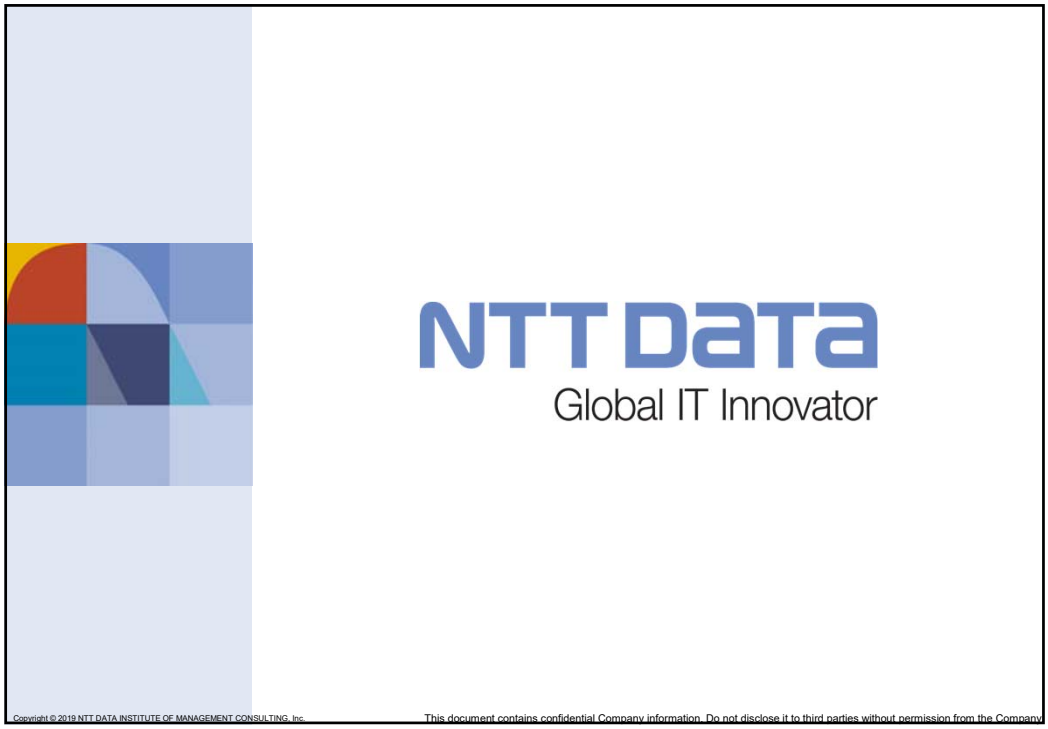
NTT DATA

Introduction of the High Efficiency Chiller and the Exhaust Heat Recovery System

Place	**Wyndham San Jose Herradura Hotel (San Jose, Costa Rica)**
Adapted Technology	**1.High Efficiency Chiller (Daikin, Japan)** **2. Exhaust Heat Recovery system Templifier (water heater)(Daikin, Japan)**
Outline of Project	This project aims to improve the energy efficiency of a luxury hotel's **air-conditioning system & hot water supply system** by replacing the existing centrifugal chiller with a high efficiency chiller and existing heavy oil boilers with a water heater utilizing the waste heat from the chiller.



Nos. Room : 229
Floor : 4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月次報告書（令和元年 7 月）

業　務　名	令和元年度低炭素社会実現のための都市間連携事業委託業務 （ヤンゴン管区スマートシティ開発における低炭素化促進事業）
受　託　者	株式会社　NTTデータ経営研究所　（共同事業者　北九州市）
期　　間	令和元年7月23日(火)～令和元年7月31日(水)

【実績概要】

① 第1回現地調査を8月に実施予定。出張にむけて、訪問先とのアポイント調整、通訳手配等を実施した。

② 環境省様とのキックオフミーティングを8月に開催予定。キックオフミーティングに向けて、関係者打ち合わせならびに資料の準備

【打合せ・現地渡航等】

① 第1回現地調査を8月12日の週で調整中。

② 環境省様キックオフ会を8月19日に実施予定。

以上

月次報告書（令和元年 8 月）

業　務　名	令和元年度低炭素社会実現のための都市間連携事業委託業務 （ヤンゴン管区スマートシティ開発における低炭素化促進事業）
受　託　者	株式会社　NTTデータ経営研究所　（共同事業者　北九州市）
期　　間	令和元年8月1日（木)～令和元年8月31日(土)

【実績概要】

① 環境省様とのキックオフミーティングを8月19日に開催。キックオフミーティング用の資料を作成の上、本PJの概要やスケジュール、目標に関して共有した。

② 第1回現地調査を8月13日～8月16日に実施。アライアンススターグループとのキックオフミーティング、およびアライアンススターグループのネットワークを生かした案件発掘活動を実施した。

【打合せ・現地渡航等】

① 第1回現地調査を8月13日～8月16日で実施。

② 環境省様キックオフ会を8月19日に実施。

以上

月次報告書（令和元年 9 月）

業　務　名	令和元年度低炭素社会実現のための都市間連携事業委託業務 （ヤンゴン管区スマートシティ開発における低炭素化促進事業）
受　託　者	株式会社　NTTデータ経営研究所　（共同事業者　北九州市）
期　　間	令和元年9月2日（月）～令和元年9月30日(月)

【実績概要】

① 第2回現地調査を9月29日～10月4日に実施。そのための準備活動として訪問機関とのアポ取り、資料準備等を実施。

② 9月29日には、現地の日本大使館で開催された現地日系企業の建設部会にてJCMの説明を実施。

【打合せ・現地渡航等】

① 第2回現地調査を9月29日～10月4日で実施。

② 9月29日に現地日系企業の建設部会にてJCMに説明を実施。

以上

月次報告書（令和元年 10 月）

業　務　名	令和元年度低炭素社会実現のための都市間連携事業委託業務 （ヤンゴン管区スマートシティ開発における低炭素化促進事業）
受　託　者	株式会社　NTTデータ経営研究所　（共同事業者　北九州市）
期　　間	令和元年10月1日（火)～令和元年10月31日(木)

【実績概要】

① 第2回現地調査を9月29日～10月4日に実施。現地調査においては、アライアンススターグループ・MBCとマスタープラン作成に関するディスカッションを実施。

② 案件発掘に向けてアライアンススターグループ・MBC社のネットワークを生かし、バッテリー製造工場等を発掘。

③ 帰国後は、現地調査結果を踏まえて北九州市モデルを活用したマスタープランの検討を実施。

【打合せ・現地渡航等】

① 第2回現地調査を9月29日～10月4日に実施。

② マスタープランの検討を実施

月次報告書（令和元年 11 月）

業　務　名	令和元年度低炭素社会実現のための都市間連携事業委託業務 （ヤンゴン管区スマートシティ開発における低炭素化促進事業）
受　託　者	株式会社　NTTデータ経営研究所　（共同事業者　北九州市）
期　　間	令和元年11月1日（金)～令和元年11月29日(金)

【実績概要】

① 第1回、第2回の現地調査の現地調査結果を取りまとめた上、現地調査の結果を踏まて、マスタープランの検討を実施。

② また、アライアンススターグループ・MBCのネットワークを生かして発掘した案件について、具体的な適用技術の検討を実施。

③ 環境省様との進捗報告用の資料作成。

【打合せ・現地渡航等】

① 次回現地調査のスケジュール調整を開始。

② 日本でのワークショップへの参加者との調整を開始。

月次報告書(令和元年 12 月)

業　務　名	令和元年度低炭素社会実現のための都市間連携事業委託業務 （ヤンゴン管区スマートシティ開発における低炭素化促進事業）
受　託　者	株式会社　NTTデータ経営研究所　（共同事業者　北九州市）
期　　間	令和元年12月2日（月)～令和元年12月27日(金)

【実績概要】

① 第1回、第2回の現地調査の現地調査結果を取りまとめた上、現地調査の結果を踏まて、マスタープランの検討を継続。

② また、アライアンススターグループ・MBCのネットワークを生かして発掘した案件について、具体的な適用技術の検討を継続。

③ 12月25日（水）に環境省様との進捗報告打合せを実施。

【打合せ・現地渡航等】

① 次回現地調査のスケジュール調整を実施。

② 日本でのワークショップへの参加者との調整を実施。

月次報告書(令和２年１月)

業　務　名	令和元年度低炭素社会実現のための都市間連携事業委託業務 （ヤンゴン管区スマートシティ開発における低炭素化促進事業）
受　託　者	株式会社　NTTデータ経営研究所　（共同事業者　北九州市）
期　　間	令和2年1月6日（月)～令和2年1月31日(金)

【実績概要】

① 第3回現地調査を1月28日～30日に実施。

② 出張にむけて、訪問先とのアポイント調整、車の手配を実施した。

③ アライアンススターグループ・MBCとマスタープランに関する打合せを実施するとともに、同グループのネットワークを生かして案件発掘活動を実施。既に入手済みの工場の屋根データ等をもとに太陽光発電設備の導入規模等を推計し、ディスカッションを行った。

【打合せ・現地渡航等】

① 第3回現地調査を1月29日～30日に実施

月次報告書(令和２年２月)

業　務　名	令和元年度低炭素社会実現のための都市間連携事業委託業務 （ヤンゴン管区スマートシティ開発における低炭素化促進事業）
受　託　者	株式会社　NTTデータ経営研究所　（共同事業者　北九州市）
期　　間	令和2年2月3日（月)～令和2年2月28日(金)

【実績概要】

① 第3回現地調査を受けての調査取り纏めを実施した。

② 最終報告書の作成を実施した。

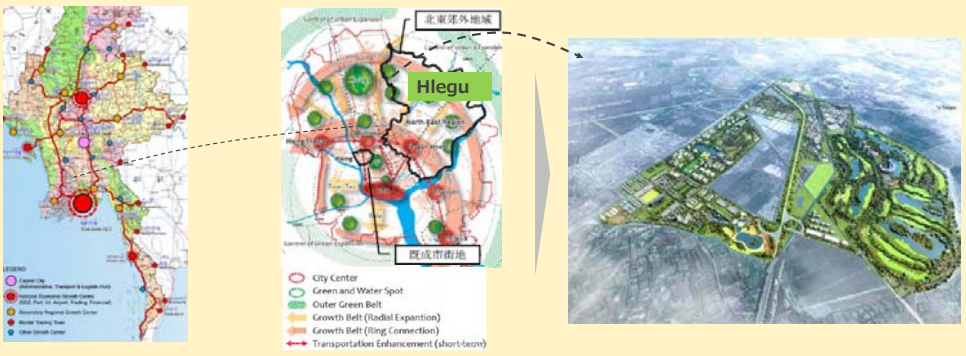
【打合せ・現地渡航等】

① 環境省様最終報告会を2/28に実施

1.Background

- This Project has been promoted under collaboration between Ministry of Construction of Myanmar through Alliance Star Group and Kitakyushu City Japan.
- "Eco Green City" is a large-scale smart city development project being undertaken in Yangon by Alliance Star Group, under Ministry of Construction.
- We aim to reduce CO2 emissions by utilizing decarbonization technology in this region.

National Development Plan **Yangon Masterplan for 2040** **Eco Green City Project**



1.Background
About Eco Green City

- ◆ Approximately 1,453 acres of land will be developed in three phases over the 15 years from 2019 to 2034.
- ◆ As a more specific project, local power company Golden Green Energy will introduce a 30MW solar power facility.

Planned construction facilities	Assumed introduction technology
Water and sewage treatment plant	• High efficiency water treatment technology • inverter
Commercial facility (outlet mall, Movie theater)	• Cogeneration equipment • Chiller equipment • Solar power, battery
Agripark (Experience farms, farms, etc.)	• Biomass power generation • Solar power
Hospitals, hotels, museums, etc.	• Cogeneration equipment • Solar power, battery
School	• Solar power, battery
Public housing (Low-income and public servant housing)	• Solar power, battery

2. Organization for Feasibility Study

- ◆ This Project has been promoted under collaboration with Ministry of Construction of Myanmar and Kitakyushu City Japan.

City of Kitakyushu

- ■ Introduction of local companies
- ■ Coordination, discussions and approach with Government organizations

Ministry of Construction, Myanmar

Joint Venture
For Eco-Green City Development Project

NTT Data Institute of Management Consulting, Inc.

- ■ Direct consultation, technical studies, economic evaluation, CO2 emissions reduction evaluation
- ■ Coordination with related organizations
- ■ Preparation for application of JCM subsidy program
- ■ Setting, preparation, participation, management, etc. for conferences

Myanmar Business Central Corporation

- ■ Direct consultation, technical studies, economic evaluation of EPC
- ■ Coordination with related organizations
- ■ Setting, preparation, participation, management, etc. for conferences

Alliance Stars Group of Companies Limited

3. 3-years activity plan

- This Project is based on the Kitakyushu City's activity in Myanmar. 3 Year Project Plan is shown in following table.
- In FY2019, we started with making plan for low-carbonization of Eco green city.
- Also, our activity extends to making low carbon technology implementation projects.

Acitivity	FY 2019				FY 2020	FY 2021
	Aug	Sep.-Oct.	Nov.- Dec.	Jan. – March		
Built long term city-to-city relationship, Make plan for low-carbonization of Eco Green City	Kick Off MTG (with Local Goverment)	2nd Filed Survey ・Discuss the policy & Planning for low carbonization	3rd Filed Survey ・Discuss the policy & Planning for low carbonization ・Invite stakeholder to Kitakyushu city and introduce Eco-Town (JCM seminar)	4th Filed Survey ・Discuss the policy & Planning for low carbonization ・Finalize low carbonization plan as an output of this fiscal year ・Discuss 1st JCM subsidy project	Continue City to City collaboration ・・Discuss the policy & Planning for low carbonization ・Capacity building for government officer, governance system	
Activity for formulate JCM subsidy project	Kick Off MTG (Developer team of Eco Green City)	2nd Filed Survey ・Discuss JCM formulation with Candidate entering to smart city	3rd Filed Survey ・Discuss JCM formulation with Candidate entering to smart city (Technical, economical, CO2 reduction, etc..)	4th Field Survey ・Discuss JCM formulation with Candidate entering to smart city	JCM subsidy application (any time) / Continue activity for JCM project formulation in Smart City development phase-2 & 3, in same approach.	
	(Conducted by MBC Corporation) Follow up and direct consultation with Government, Developer, Candidate company who entering smart city.					
Final Reporting				☆ Submit final repot this fiscal year		
Filed Survey	☆	☆	☆	☆		

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4.Business Summary of This Fiscal Year

- The status of the study on each theme is as follows;

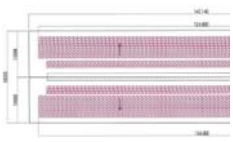
1.Making Master plan for Green Development

- We are now discussing about making plan for green development of Eco Green City with Alliance Star Group.
- Discussions are conducted using the framework of Kitakyushu City. "Kitakyushu Model"

2.Making low-carbon project using JCM (one case)

- We are now discussing with local company.

target	Battery factory
technology	PV and Battery
overview	By installing PV panels on the roof and battery in the factory, reducing emission of CO2.



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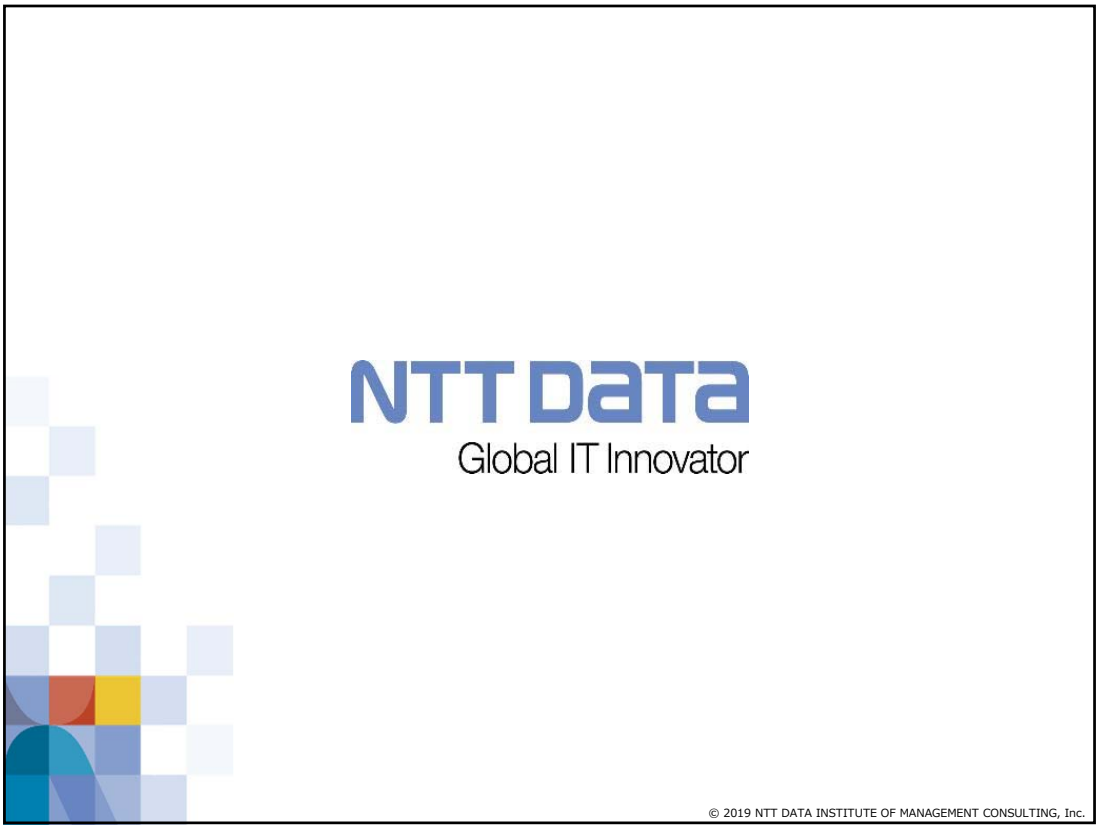
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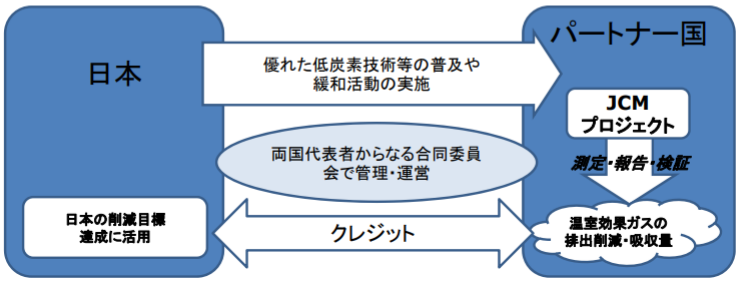
1. JCMとは

- 優れた低炭素技術・製品・システム・サービス・インフラの普及や緩和活動の実施を加速し、途上国の持続可能な開発に貢献。
- 温室効果ガス排出削減・吸収への我が国の貢献を定量的に評価するとともに、我が国の削減目標の達成に活用。
- 地球規模での温室効果ガス排出削減・吸収行動を促進することにより、国連気候変動枠組条約の究極的な目的の達成に貢献。



2. JCM署名国一覧

日本は、2011年から開発途上国とJCMに関する協議を行ってきており、モンゴル、バングラデシュ、エチオピア、ケニア、モルディブ、ベトナム、ラオス、インドネシア、コスタリカ、パラオ、カンボジア、メキシコ、サウジアラビア、チリ、ミャンマー、タイ、フィリピンとJCMを構築。


【モンゴル】
2013年1月8日
（ウランバートル）

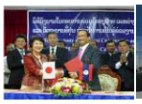

【バングラデシュ】
2013年3月19日
（ダッカ）


【エチオピア】
2013年5月27日
（アジスアベバ）


【ケニア】
2013年6月12日
（ナイロビ）


【モルディブ】
2013年6月29日
（沖縄）


【ベトナム】
2013年7月2日
（ハノイ）


【ラオス】
2013年8月7日
（ビエンチャン）


【インドネシア】
2013年8月26日
（ジャカルタ）


【コスタリカ】
2013年12月9日
（東京）


【パラオ】
2014年1月13日
（ゲルルムド）


【カンボジア】
2014年4月11日
（プノンペン）


【メキシコ】
2014年7月25日
（メキシコシティ）


【サウジアラビア】
2015年5月13日


【チリ】
2015年5月26日
（サンティアゴ）


【ミャンマー】
2015年9月16日
（ネピドー）


【タイ】
2015年11月19日
（東京）


【フィリピン】
2017年1月12日
（マニラ）

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3. JCM設備補助事業の概要

2019年度予算：
2019年度から開始する事業に対して、3か年で合計99億円

環境省

JICAなど政府系金融機関が支援するプロジェクトと連携した資金支援を含む

初期投資費用の1/2以下を補助

MRVの実施によりGHG排出削減量を測定。クレジットの発行後は1/2以上を日本政府に納入

国際コンソーシアム
（日本の民間団体を含む）

出典：GEC資料

補助対象者
（日本の民間団体を含む）国際コンソーシアム

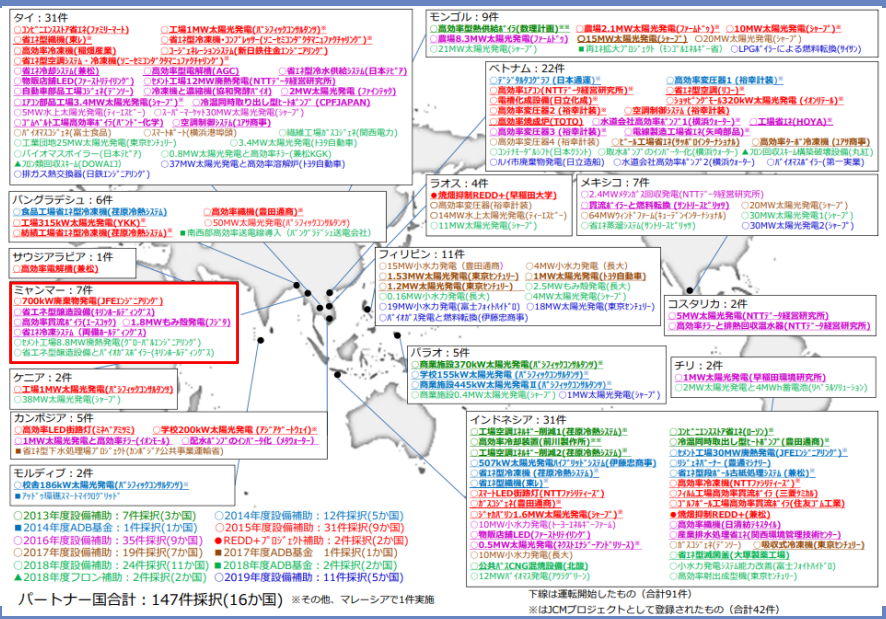
事業実施期間
最大3年間

補助対象
エネルギー起源CO2排出削減のための設備・機器を導入する事業（工事費、設備費、事務費等を含む）

補助対象要件
補助交付決定を受けた後に設備の設置工事に着手し、3年以内に完工すること。また、JCMプロジェクトとしての登録及びクレジットの発行を目指すこと

NTT DATA

4. JCM設備補助事業　採択案件一覧（FY2013~2019 8月2日時点）



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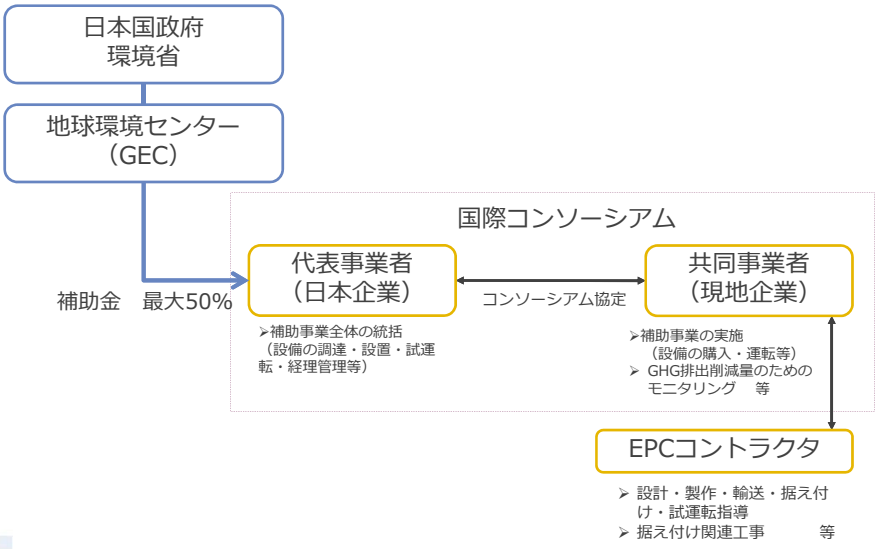
5. 事業実現時の実施スキーム

想定している事業実施スキーム、国際コンソーシアムの構成等を以下に示す。



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6. JCM設備補助申請時の注意点

補助率の上限

対象国での「類似技術」の採択案件数により、補助率が異なる。

事業を実施する国における「類似技術」のこれまでの採択案件	0 (初の導入事例)	1件以上 3件以下	4件以上
補助率の上限	Maximum 50 %	Maximum 40%	Maximum 30%

費用対効果、および、投資回収年数

申請した案件の審査にあたり、(1)費用対効果、および、(2)投資回収年数の2点が審査項目として確認される。

(1) 費用対効果については、4,000円/tCO_2。

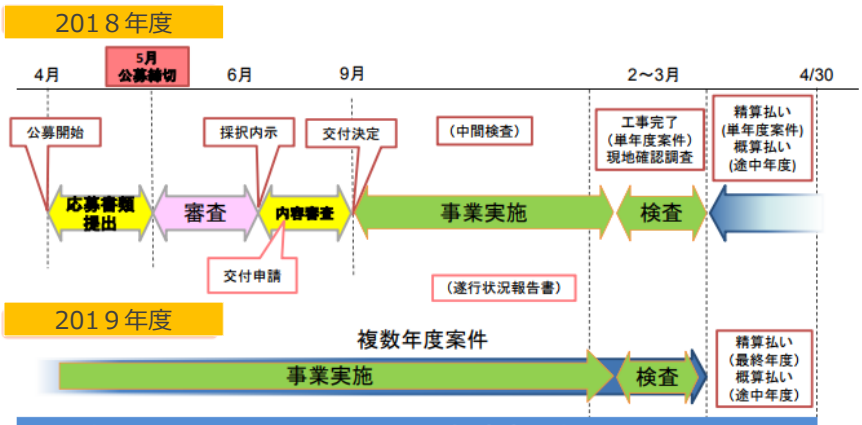
「補助金額 ÷ 導入する設備の日本の補助対象設備の法定耐用年数期間中の累計温室効果ガス削減量(CO2換算) = 温室効果ガス 1トン(CO2換算)の削減にかかる補助金額」

(2) 投資回収年数については、3年以上。

「(総事業費 – 補助金額)÷年間の運転費用削減額」
または
「(総事業費 – 補助金額)÷(年間収入 – 年間運転費用)」

7. JCM設備補助事業申請から事業実施までのスケジュール

(例)



- 採択内示から3ヶ月以内に交付申請書要提出・受理
- 各年度末に概算払、最終年度に精算払い

8-1. JCMプロジェクト例 ①Waste Heat Recovery Power Generation

セメント工場への12MW廃熱回収発電システムの導入

代表事業者

株式会社エヌ・ティ・ティ・データ経営研究所

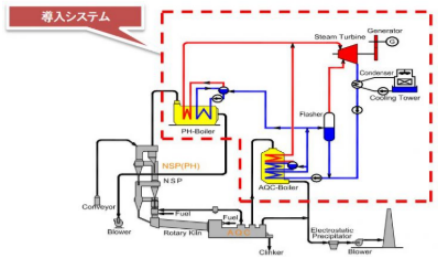
共同事業者:Siam City Power Company

パートナー国	タイ
年度	2016年
区分	設備補助
分野	エネルギー生産

GHG排出削減プロジェクトの概要

タイ、サラブリー県におけるセメント生産工場に廃熱回収発電設備を導入し、発電された電力を工場内で使用する。

これにより系統からの電力を代替し、GHG排出削減に貢献する。



Source: http://gec.jp/jcm/jp/projects/16pro_tha_04/

8-2. JCMプロジェクト例 ②PV Panels and High Efficiency Chiller

大型ショッピングモールへの1MW太陽光発電と高効率チラーの導入

代表事業者

イオンモール株式会社

共同事業者:AEONMALL (CAMBODIA)CO., LTD.

パートナー国	カンボジア
年度	2016年
区分	設備補助
分野	省エネルギー エネルギー生産

GHG排出削減プロジェクトの概要

1MW級太陽光発電設備と高効率チラーを導入することで、新設大型ショッピングモールの電力消費量を大幅に削減する。

太陽光発電による電力をショッピングモール内で使用することにより系統からの電力消費を削減し、高効率チラーによる省エネルギー効果とあわせてGHG排出削減を実現する。

Source: http://gec.jp/jcm/projects/16pro_cam_01/

8-3. JCMプロジェクト例 ③High Efficiency Air Conditioning System

ホテルへの高効率インバーター・エアコンの導入

プロジェクト実施者

株式会社エヌ・ティ・ティ・データ経営研究所

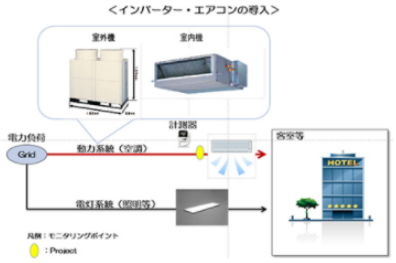
共同事業者:Peace Real Estate Investment Company Limited

パートナー国	ベトナム
年度	2015年
区分	設備補助
分野	省エネルギー

GHG排出削減プロジェクトの概要

ベトナムのホテルにおいてはエネルギー効率の劣る非インバーター・エアコンが普及しているが、高効率インバータ・エアコンの導入により空調システム全体として省エネを図る。
ハノイの新設Novotel Suites(延べ床面積約29,000㎡、地上17階、地下2階、客室数200)において、インバーター・エアコン((省エネ性能:COP 4.53、73.0kW×1セット、COP4.09、90kW×12セット、COP4.05、95.0kW×2セット、COP3.29、109kW×1セット、COP3.27、125kW×1セット)を導入し、電力消費量を低減することでGHG排出量削減を行う。

<インバーター・エアコンの導入>



Source: http://gec.jp/jcm/projects/15pro_vie_01/

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8-4. JCMプロジェクト例 ④High Efficiency Boiler

ゴムベルト工場における高効率ボイラシステムの導入

代表事業者

バンドー化学株式会社

共同事業者:Bando Manufacturing (Thailand) Ltd

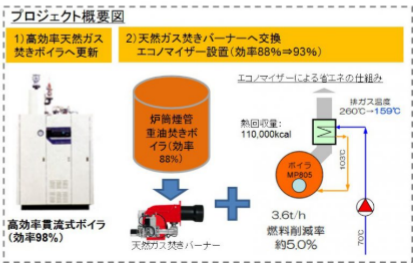
パートナー国	タイ
年度	2016年
区分	設備補助
分野	省エネルギー

GHG排出削減プロジェクトの概要

本プロジェクトでは、ゴムベルト製造工場において使用している4台の低効率の炉筒煙管式重油焚きボイラを更新または改良することにより効率を上げ、CO2排出量削減に貢献する。

1)高効率天然ガス焚き貫流式ボイラ(効率98%)に更新する。(1台)

2)バーナーを交換し、CO2排出係数の小さい天然ガス焚きへ燃料転換を図る。同時に、エコノマイザーを追加設置して5%の効率改善を図る。(3台)



Source: http://gec.jp/jcm/jp/projects/16pro_tha_13/

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8-5. JCMプロジェクト例 ⑤Cogeneration System

自動車部品工場へのコージェネレーション設備の導入

代表事業者

株式会社デンソー

共同事業者:Siam DENSO Manufacturing Co., Ltd. (略称:SDM)

パートナー国	タイ
年度	2016年
区分	設備補助
分野	省エネルギー

GHG排出削減プロジェクトの概要

タイ国の自動車部品工場において、ガスエンジン発電によるコージェネレーションシステム(ｶﾞｽｴﾝｼﾞﾝ7,800KW級+蒸気吸収式冷凍機700RT)を導入することで、

(1)模場面での貢献(省エネ・CO2排出量削減の促進)

(2)社会面での貢献(分散型電源による安定供給)

(3)技術面での貢献(現地技術者の運転保全スキル習得)

(4)経済面での貢献(オンサイトコージェネレーションシステムの　　ビジネスモデルの波及性)

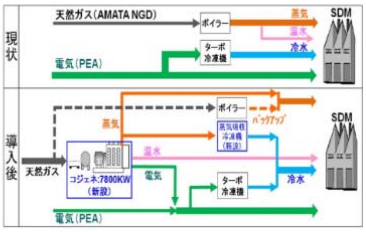
を目指すものである。

(1)模場面での貢献については、以下 ①～③に裏付けられ、総合エネルギー効率を高め、省エネ・CO2排出量削減に 大きく寄与する。(右図参照)

①自家発電設備の工場内設置による送電ロスの抑制

②日本製の世界最高レベルの高効率ガスエンジン発電設備の採用

③年間通じた工場全体空調の熱源としてコージェネレーション排熱を有効利用



Source: http://gec.jp/jcm/jp/projects/16pro_tha_13/

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8-6. JCMプロジェクト例 ⑥Biogas Recovery

タピオカ澱粉工場におけるバイオガスによる石炭代替利用

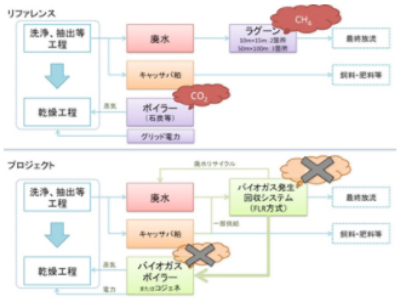
調査実施団体

パシフィックコンサルタンツ株式会社

パートナー国	ラオス
年度	2015年
区分	FS(実現可能性調査)
分野	廃棄物・バイオマス

GHG排出削減プロジェクトの概要

タピオカ澱粉製造工場において、バイオガスボイラーおよび廃水の嫌気発酵によるバイオガス発生・回収システムを導入し、得られるバイオガスにより石炭を全量代替し、GHG排出削減を図る。
本プロジェクトの実施により、石炭の燃焼に伴うCO2およびオープンラグーンからのCH4発生を回避することで、年間22,824 tCO2の温室効果ガス排出量の削減が見込める。



Source: http://gec.jp/jcm/projects/15fs_lao_01/

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8-7. JCMプロジェクト例 ⑦Package of Energy-Efficiency Technology

バンコク港への省エネ設備の導入

代表事業者

横浜港埠頭株式会社

共同事業者: タイ港湾庁

パートナー国	タイ
年度	2017年
区分	設備補助
分野	省エネルギー

GHG排出削減プロジェクトの概要

本事業では、タイ港湾庁が管理・運営するバンコク港に新設予定の輸出用コンテナ・フレイト・ステーション(CFS)及びコンテナヤードに以下の設備を導入する。

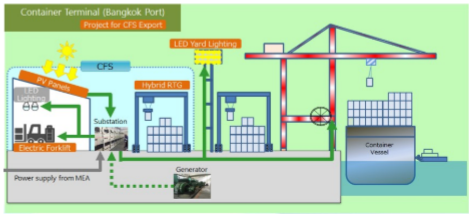
①荷役作業に用いる電動フォークリフト

②ハイブリッドラバータイヤ式ガントリークレーン(RTG)

③コンテナヤードを照らすLEDヤード照明

④港湾設備に電力を供給する太陽光発電

これらの低炭素技術を活用することにより、GHG排出量を削減する。



Source: http://gec.jp/jcm/jp/projects/17pro_tha_02/

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