

A Public-Private Partnership Model for Urban Development -Miyako City's "Smart Community" Project-

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Abstract:

Through the construction of the Miyako City Smart Community, we have gained a new appreciation of the fact that energy and communications are deeply connected to urban development and that they greatly impact civilian life in various ways. The initiative redefined the roles of the public and private sectors and featured a concrete action plan jointly implemented by both sides. The project was developed and operated using private-sector knowhow, under a system with government-backed environmental planning in areas such as local coordination in project advancement. The initiative was a part of a business structure that arose in response to a natural disaster, but came to offer a new method of urban planning based on a new public-private sector partnership involving a variety of stakeholders.

Keywords:

city planning, consensus, harmony, PPP

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1. Introduction

The recovery efforts following the Great East Japan Earthquake have now passed their critical phase, so the main challenge that lies ahead is the reconstruction of the devastated communities. Since the objective of reconstruction is to revitalize the industry and economy of the affected areas, everyone with a stake in the outcome, not only the government, must come together in order to tackle the challenge with entrepreneurial spirit. Thus, as with other recovery projects, achieving a rapid response is very difficult.

It has long been recognized that developing the economy and industry of an area with a clear vision of the city by making general upgrades is desirable. In practice, however, this kind of development has at times resulted only in scattered improvements, typified by urban facilities and infrastructure. This makes it difficult to connect the economic activities of the city at large in emergencies. In view of the Great East Japan Earthquake, it is now time to seriously rethink our concept of cities in relation to disasters and emergencies. It is necessary, for example, to clarify measures to prevent the impacts of disasters when considering our approach to vital social infrastructure and urban design, and to formulate a clear response to emergencies by preparing “business continuity plans,” as part of the urban planning process.

In this paper, we look at the case of Miyako City in Japan’s Iwate Prefecture, which was severely damaged by the 2011 earthquake off the Pacific coast of Tohoku, and discuss the new approach to urban development based on “public-private partnership” that has been adopted there.

2. Outline of Miyako City

The subject of this study is the Miyako City Smart Community Project, undertaken in Miyako City, Iwate Prefecture. Miyako City is the eighth largest municipality in Japan (of 790), located at the easternmost edge of the island of Honshu. It is a regional city rich in resources, with some 90% of its total area covered by forests. In addition, Miyako City has remarkable natural surroundings including the wealth of natural resources in the Rikuchu Kaigan National Park and the Hayachine Seminal Park, as well as one of world’s three great fishing grounds off the coast of Sanriku. Its growth as a city has been fueled by tourism and fisheries. In recent years, some manufacturing industries have also sprouted here, centered on the production of connectors used as electronic components in mobile phones and computers. Miyako has grown to become the third highest producer of connectors in Japan in terms of shipment value. Overall, Miyako seems to have a well-balanced industrial base for a regional city, consisting of primary and manufacturing industries that make use of the abundant local natural resources, along with industries driven by science and technology.

Table 1. Outline of Miyako City

Item	
Population (as of Aug. 1, 2014)	57,012
Area (as of Oct. 1, 2013)	1,259.89 km ²
Forest area	1,156.77 km ²
Residential area	93.17 km ²

Shipment value of manufactured products* (as of Dec. 31, 2012) * “Middle division” industrial classification	21.8244 billion yen
Turnover as a major national fishing port (FY2012)	86,087 t

3. Damage Caused by the Great East Japan Earthquake

The tsunami caused by the earthquake off the Pacific coast of Tohoku that occurred on March 11, 2011 devastated the Taro district and other urban areas in the coastal region, completely destroying almost all electrical, communications, and other lifeline infrastructure. On top of this, emergency response measures and support for disaster victims proved extremely difficult due to damage to government service vehicles and a lack of fuel. This earthquake disaster made clear the need to provide a means for supplying essential energy in the event of a disaster.

Table 2. Outline of the Great East Japan Earthquake and resulting damage

Item	Total
Date and time of occurrence	Approx. 2:46 p.m., March 11, 2011
Magnitude of earthquake	Magnitude 9.0
Max. seismic intensity in Miyako	5-strong (on Japanese scale of 1 to 7)
Time/height of max. tsunami wave	3:26 p.m./≥8.5 m
Max. run-up height	
• In Koborinai, Taro area	37.9 m
• In Anekichi, Omoe area	40.5 m
Human casualties	
Fatalities	517
Missing persons (*including certified dead)	96
Injured	33
Estimated total damage cost	245.6 billion yen
No. of homes destroyed	9,088
Completely collapsed	5,968
Substantial partial destruction	1,335
Partial destruction	1,174
Somewhat partial destruction	611

4. Reconstructive Urban Development and Energy Policy

The problems with obtaining energy supplies when the disaster struck, as described in the previous section, served as the impetus to launch a renewable energy project utilizing the natural energy resources within the Miyako City area.

As a result, the Miyako City Smart Community Project was clearly positioned as an important reconstruction project in plans such as the Miyako City Great East Japan Earthquake Reconstruction Basic Policy, a basic policy formulated in June 2011 to address the challenges of reconstruction after the Great East Japan Earthquake; The City of Miyako Post-Disaster

Reconstruction Plan [Basic Plan], formulated in October 2011, outlining the basic concepts for reconstruction; and The City of Miyako Post-Disaster Reconstruction Plan [Promotion Plan], finalized in March 2012, defined concrete procedures for implementing the Basic Plan. The project was considered a contributing force to the realization of the goals defined in the reconstruction plans: (1) home and living safety; (2) industrial and economic stimulation; and (3) safe urban planning. As a collaborative project based on the public-private partnership set out in the basic policy, the Miyako City Smart Community Plan was spurred onward by the support of the Agency for Natural Resources and Energy of the Ministry of Economy, Trade and Industry (METI) in FY2011, from the formulation of concrete plans through to the promotion and operation of the project. With this government backing, a “Smart Community Master Plan” was created through a public-private partnership, from initial conception upward. The relationships between the Smart Community Project and related plans are shown in Fig. 1.

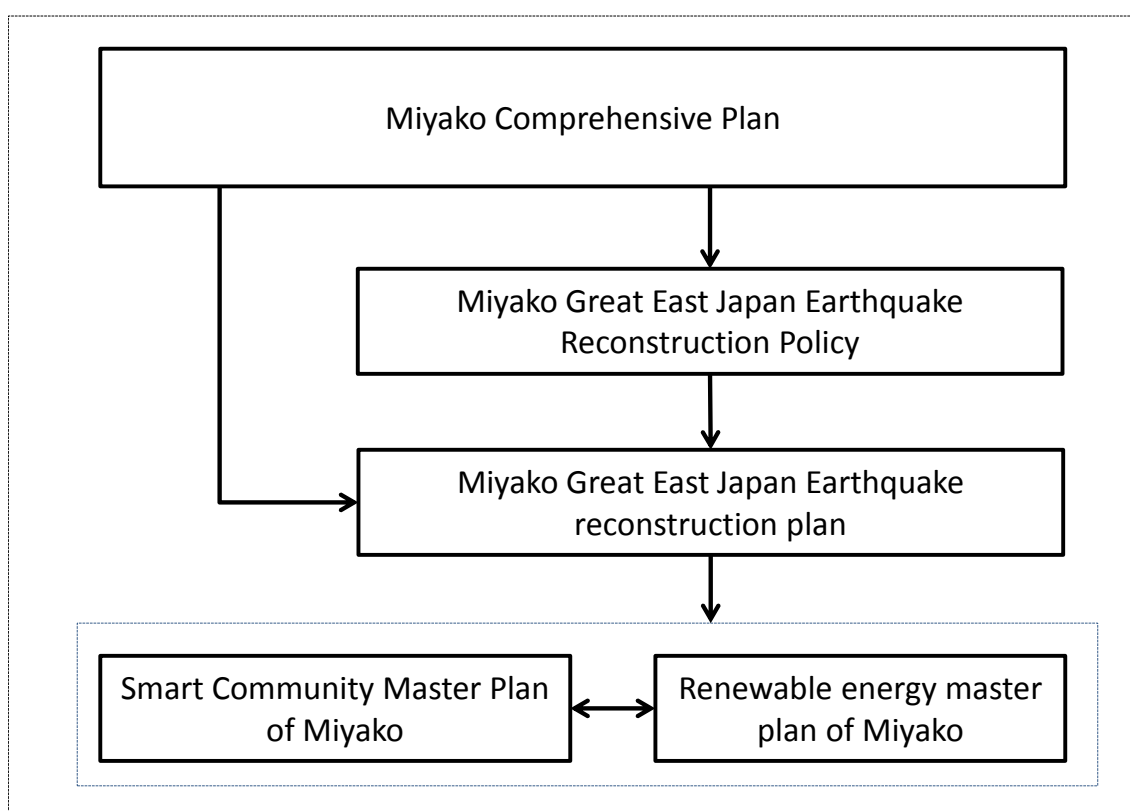


Fig. 1 Relationship between plans for Miyako City

In addition, to carry out the specific measures directed at achieving the goals stated in the Reconstruction Plan with certainty, the Miyako City Renewable Energy Master Plan was formulated as part of a review of the Environment Basic Plan, with the intention of it completely agreeing with the aims of the project partnership.

5. Miyako City Smart Community Project

A “smart community” refers to the concept of ensuring a safe, secure, and comfortable life and forming an environment-friendly community.

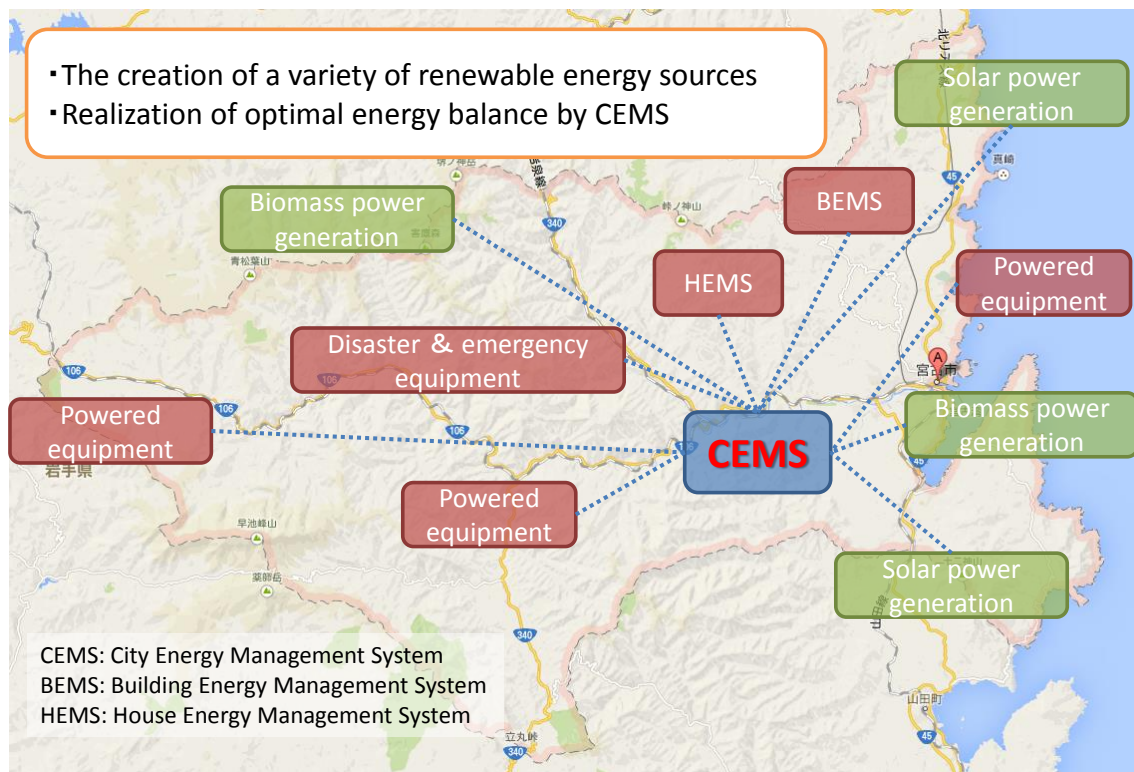


Fig. 2 Positioning of plan in Miyako City

(1) The concept of smart communities

To take the first step toward reconstruction, the principal objectives, based on the concept of “providing added value to the people of the community,” are (1) developing a model for local production/consumption of renewable energy that establishes an optimal balance between supply and demand; (2) developing a sustainable and highly viable business model; (3) improving disaster prevention and preparedness; and (4) restoring and improving land health.

(2) Outline of the project

The Miyako Smart Community Project aims to develop a means for the effective utilization of renewable energy based on local resources and a model of local production/consumption, and to ensure a supply of clean energy that is resistant to disaster. It also aims to achieve a balance between energy supply and demand that is efficient and without waste, and at developing economically sustainable businesses. Through the creation of new businesses that utilize clean energy, the project plans to establish local ventures and initiatives and to develop a “virtuous cycle” business model (See Fig. 2).

(3) Outline of project guidelines and individual projects and implementation of core projects

In order to achieve a renewable energy self-sufficiency rate of 30% by FY2019, Miyako City has established its own power generation business and is developing autonomous distributed-style energy facilities. It is also examining the launch of a new, local electric power supply program based on a renewable energy business model, and the development of a Miyako City-wide energy management system (see CEMS below), as well as the idea of fostering local

industry, thereby stimulating the local economy.

Note that all the businesses that are currently planned are to be headed by private companies. These private interests will be responsible for the entire development of the enterprise, from planning and launching the business to full-scale operational management. However, the Miyako City government will be involved in the ventures as project partners by collaborating and cooperating with the private entrepreneurs or by providing land. Outlines of the individual projects of the Miyako City Smart Community Project are provided below.

(1) Community Energy Management System (CEMS)

This is a system designed to efficiently and effectively utilize energy over the whole of the community. The goal of this project is to establish a local production/consumption energy system by effectively harnessing the various types of renewable energy available within the Miyako City area including solar, biomass, and hydroelectric power, and supplying it to consumers in the same area.

(2) Business Energy Management System (BEMS)

This is a system designed to utilize energy efficiently through the adoption of energy-saving equipment by consumers (e.g., public and private facilities). The goal of this project is to improve the efficiency of facility operation by enabling facility managers to easily and readily monitor the state of their overall energy consumption (by making this information visible), for the purpose of adjusting the balance between energy supply and demand and effecting restrictions in collaboration with the CEMS.

(3) ESCO-type services

This is a system targeted to households aimed at achieving more efficient energy utilization through the introduction of a home energy management system (HEMS). The goal of this project is to use the visualization of electric power consumption to provide information that can support efforts from raising awareness about efficient energy consumption to promoting a behavioral change toward energy saving. In addition, in cooperation with CEMS, it serves to establish a mutual aid system for emergency situations covering the whole area by setting up a communications function for requesting that consumers save energy when the power supply system is under strain. Furthermore, in the future, a system will be built that will enable uninterrupted energy across the whole area, even in emergencies, based on the introduction of energy-charge systems that vary the price of electricity to reflect the demand at particular times and the planned addition of features that provide automatic control when the power supply is under strain.

(4) Power generation facility

This is a project to establish electric power facilities that use the wealth of renewable energy resources available in the area, such as solar, biomass and hydroelectric energy. The goal of this project is to improve the health of disaster-affected land by locating large-scale solar power generation facilities mainly on inundated tracts of land. Another objective is to develop renewable energy projects suited to the characteristics of the locality by developing biomass power generation that will utilize the forest resources available on over 90% of the local land area.

(5) Plant factories

This project will establish solar powered plant factories run in collaboration with CEMS that make effective use of the electric power, heat, and carbon dioxide gas from cogeneration facilities. The goal of this initiative is to improve the health of land by locating facilities on inundated tracts of land as reflected in the Reconstruction Plan. It is hoped that these facilities will also revitalize the community through human resource development in collaboration with universities and companies.

(6) Cogeneration

For the time being, cogeneration is being considered for use with plant factories, but the main goal of this project is to achieve trigeneration in order to supply electric power, heat, and carbon dioxide gas through collaboration with CEMS. Various other systems are being considered for the future, such as channeling waste heat from biomass power generation through underground pipes to roads to improve the efficiency of snow removal and to provide warm water to private facilities and households.

(7) Car sharing

Car sharing services will be provided by means of plug-in hybrid vehicles and ultra-compact cars. The goal of this project is to enable tourists to get around locally during normal hours, as well for local inhabitants to get around in their daily lives. This effort, combined with the utilization of external power output facilities, will allow the supply of electricity for emergency response bases.

(8) Power supply facilities

Power supply facilities will be established for recharging electric vehicles. They are intended to help address the problem of ensuring continued energy to an emergency response base in the event of a disaster by establishing facilities to provide an emergency power supply in the vicinity of the main emergency response bases.

(9) Storage facilities

These are designed to work in collaboration with CEMS as a means for appropriate and uninterrupted operation of electricity storage and supply facilities, and for use as electric power sources in the event of electric power demand peaks or power blackouts. In this project, they will be used as distributed infrastructure power supplies that can be operated appropriately at times of emergency.

(4) Project implementation system

To implement this project, a conference was held between Miyako City representatives and 18 private companies (Table 3) with the additional presence of the Tohoku Bureau of METI, the Iwate Regional Bureau of Reconstruction (of the Japanese government's Reconstruction Agency), and Iwate Prefecture, all in the capacity of observers, and Prof. Hitoshi Tanaka of Tohoku University, as a project advisor. The meeting served to formulate a project plan from ideas and concepts. In December 2012, the project received the authorization of METI's Agency for Natural Resources and Energy. To date, four special purpose companies (SPCs) have been set up to aid in project development and efforts are underway to prepare a framework for project implementation.

Table 3. Miyako City Smart Community Study Framework

Summary				Role
Prof. Hitoshi Tanaka, Tohoku University				<ul style="list-style-type: none">• Study the optimal energy plan•Study the cogeneration facility development project
Project principals	Nippon Telegraph and Telephone (NTT) Data Corporation			<ul style="list-style-type: none">• Overall project implementation• Study finance and project principals
	JDC Corporation			<ul style="list-style-type: none">• Construction and process management of selected facilities
	Ennet Corporation			<ul style="list-style-type: none">• Operation of Community Energy Management System (CEMS)
	Miyako City			<ul style="list-style-type: none">• Coordination with the Reconstruction Plan• Local adjustments
Project supporters	NTT			<ul style="list-style-type: none">• Liaison support between NTT Group companies
	Asia Air Survey Co., Ltd.			<ul style="list-style-type: none">• Process management• Survey renewable energy potential
	Mitsubishi Research Institute, Inc.			<ul style="list-style-type: none">• Study smart community trends• Storage facility construction project
	Teijin Limited			<ul style="list-style-type: none">• Plant factory construction project• Ultra compact cars
	The Bank of Iwate, Ltd.			<ul style="list-style-type: none">• Project finance• Introductions to local companies
	Miyako Chamber of Commerce and Industry			<ul style="list-style-type: none">• Coordination with local concerned companies
	TMI Associates			<ul style="list-style-type: none">• Study the setup of project investors• Legal advice
	Tokyo Electric Power Services Co., Ltd.			<ul style="list-style-type: none">• Design of renewable energy facilities• Collaboration with electric power providers
	Panasonic System Networks Co., Ltd.			<ul style="list-style-type: none">• Study CEMS• Electric power generation facilities construction project
	Northern Iwate Transportation, Inc.			<ul style="list-style-type: none">• Car sharing• Ultra compact cars
	NTT East, Iwate Branch			<ul style="list-style-type: none">• Study of intracity networks
METI				<ul style="list-style-type: none">• Observers
Reconstruction Agency				
Iwate Prefecture				

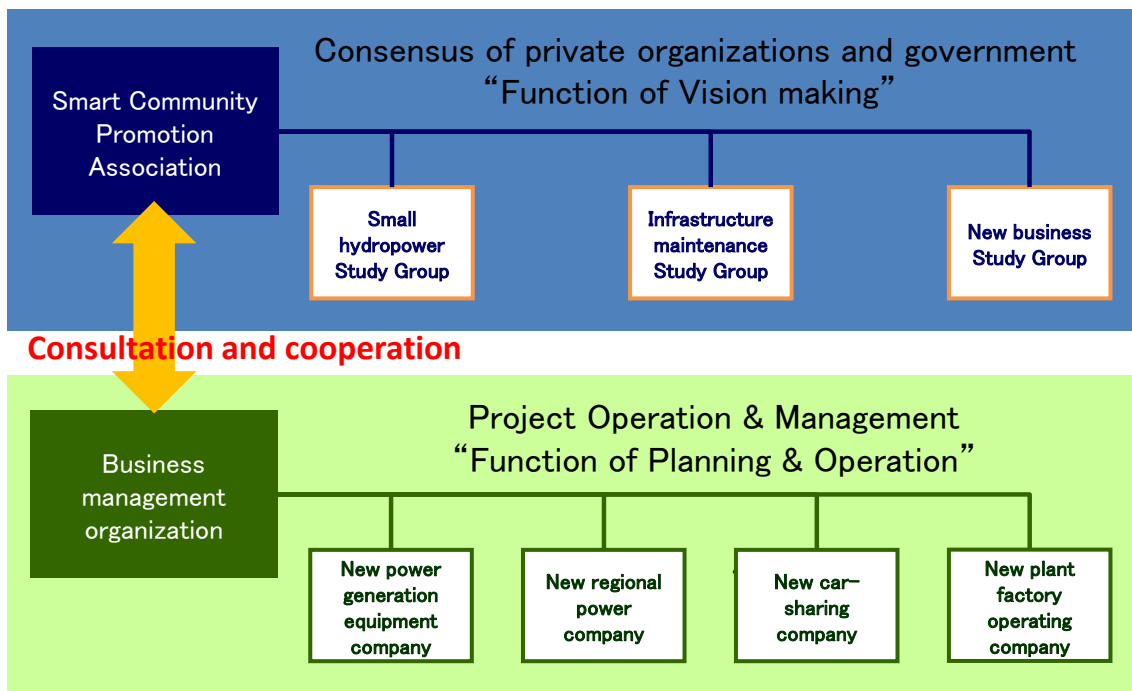


Fig. 3 Miyako City Smart Community Promotion Consultative Meeting

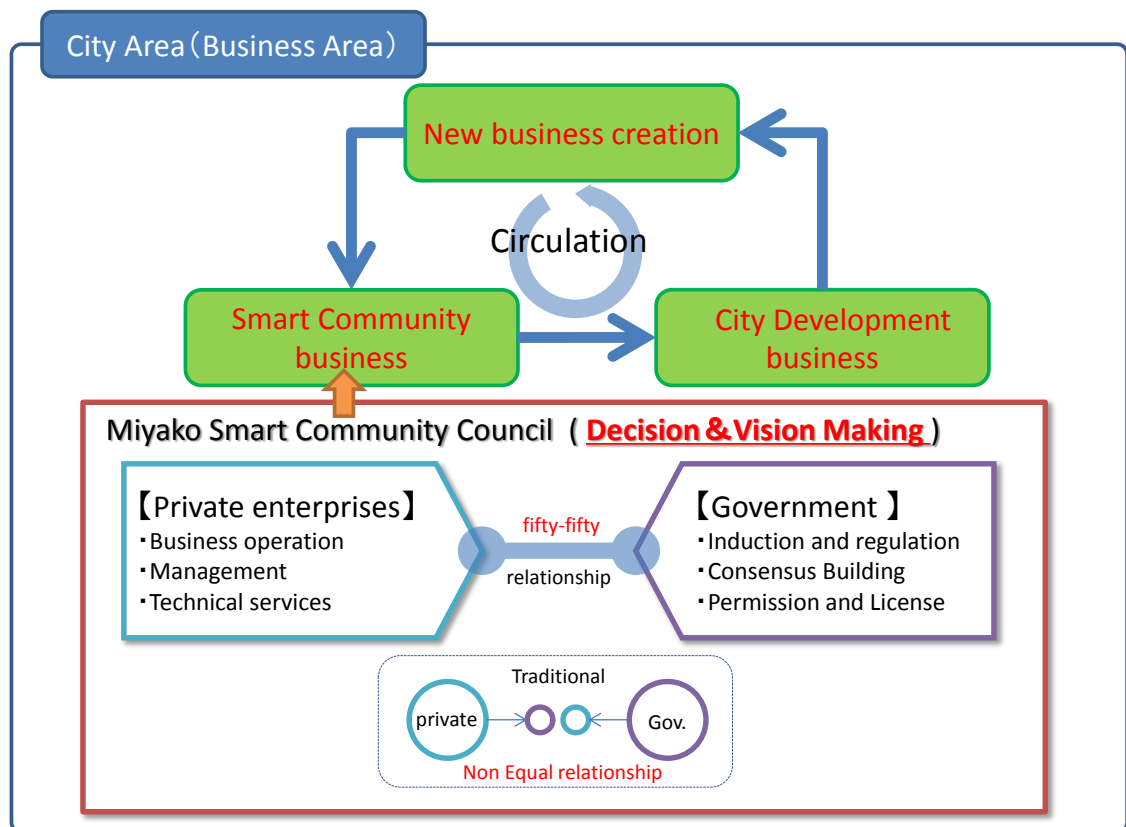


Fig. 4 Public-private partnership model

One of the features of this project that merits special mention is that by aiming to ensure adequate communication with a variety of stakeholders at all stages, from establishing a

common vision for Miyako City's future to formulating the project plan, both the government and private investors more than fully understand their own roles. Their appropriate and timely responses have served to make the project model more and more precise with the result being that the project has now reached the implementation stage. It is fair to say that bank loans to private investors also played a significant role by guaranteeing involvement in the reconstruction project following the Great East Japan Earthquake (See Fig. 3).

In FY2013 the Miyako City Smart Community Implementation Consultative Meeting was held for the first time with the purpose of executing the Miyako City Smart Community Master Plan. Four new SPCs participated from the outset, at the review panel stage, thereby accelerating the development of the project. Three study groups were formed at the meeting and work began on examining the new project principals and business model (See Fig. 4).

6. Features of the Project

The following three features convey the novelty of the Miyako City Smart Community Project.

(1) Social significance

The Miyako City Smart Community Project provided an environment that made it relatively easy to reach a consensus between all interested parties because it was geared from the outset to solve specific problems identified after the Great East Japan Earthquake and the massive damage it caused the area, and also because there was a conscious realization of the need to overcome the tragedy that affected everyone in Miyako City. It is also noteworthy that since the project could be linked to statutory government plans amongst other things, the roles of the government and private companies in the project were clear to the general public—also in part because the Miyako Smart Community Master Plan was created out of a public-private partnership from the Post-Disaster Reconstruction Plan in the form of an action plan.

(2) Consultation with interested parties at the time of project conception

The Miyako City Smart Community Project was not developed in a top-down manner from the government. Rather, from the project's inception, the people of the community and private companies took a primary role. It was a project borne out of "negotiation and mutual understanding" wherein project creation and development and division of roles were decided through substantial consultation with the government before being put into practice. Accordingly, the project is quite different from a conventional urban development project where the government dominates the process and creation of the plan. In this case, since all parties with a stake in the project participated in the formulation of the plan in collaboration with the government, a mutual understanding was reached early on; therefore, consensus on the adjustments and compromises needed to implement the plan was reached in advance, and this helped to create a smooth environment for project development with relatively little need for adjustments at the time of implementation.

In addition, at the time of implementation, a consultative meeting was organized to ensure a framework enabling prompt confirmation during project implementation.

(3) Securing appropriate financing

To date, financing has generally been secured in Japan by means of so-called corporate

financing, based on the trustworthiness of the company seeking finance. Recently, however, a new method of securing finance known as project financing, which aims at distributing the risk of a project, is gaining ground even in Japan. Project financing is likely to be adopted in a variety of sectors in the coming years, such as Japanese-style private finance initiatives (a method for tapping private-sector vitality for social infrastructure development) and wholesale and retail power generation projects, as well as for tourism and leisure facilities, new kinds of environmentally related projects such as wind power generation and waste recycling, and even for projects for renovation of existing developments.

With project financing, it is not the business proprietor undertaking the project that borrows money, but rather a special purpose company set up to execute the project; this company takes out the necessary loans independently. The only kind of collateral offered for guaranteeing loans are the revenues generated by the project and the assets of the project; no debt guarantee is required of the parent company or companies (non-recourse financing).

The predominant financing method employed for this project is a new one that supports the reconstruction project while reducing the project risks. The companies involved in construction of the Miyako City Smart Community Project represent a wide range of professional competencies, including lawyers, banks, manufacturers, general contractors, consultants, think tanks, and electric power utilities, and the financing framework was strengthened so that the various business risks can be discharged in the best possible way.

7. Conclusion

This paper focused on an urban development reconstruction project in Miyako City in Iwate Prefecture, which was severely damaged after the earthquake off the Pacific coast of Tohoku. We reported the case study of an urban development project undertaken as a newly attempted public-private partnership and examined the features of the venture partnership.

The Miyako Smart Community Project is an urban development project that utilizes the investment capital of private-sector companies and ensures robust urban administration by the city in the event of a disaster to provide a good balance between interests.

In other words, this project can be described as an initiative that, while led primarily by private-sector investors, clearly indicates the public benefits, such as improved disaster preparedness, economic stimulus, and job creation, and thereby ensures close mutual cooperation. Below is a brief discussion of the concept needed for future urban development projects.

(1) Urban vision

In the towns and cities we live in, urban activities are managed through complex interactions between several groups. The Great East Japan Earthquake has forced us to rethink our concept of urban vision. It is clearly necessary to introduce urban development policies that take energy measures into account when creating comprehensive plans and urban planning master plans, which have traditionally been represented by the operating and urban development policies of local and regional governments. The vulnerability of our energy supply systems was clearly revealed in the emergency that followed the Great East Japan Earthquake.

Any urban vision in modern Japan requires a credible response to the challenges of a shrinking population and aging society. It appears necessary to link the vision of reconstruction

to maintenance, operation and renewal based on the selection and concentration of social infrastructure built during the country's period of high-economic growth. It is necessary to work out an urban development policy that considers energy and communications infrastructure based on a careful examination of an urban vision for the next generation.

(2) Community management strategy

Community management is an effort to achieve stated goals utilizing the resources within the region, such as land, money, goods, and the knowledge and wisdom of the people in the community. It is a form of management from a far-sighted and future-oriented perspective, and it must emphasize efficiency over the long term. For this reason, it is essential that government, citizens, and private companies each play roles appropriate to their strengths; unilateral relationships in which parties merely take or receive orders from each other make no sense. The original ideal of community management is that private companies should be regarded as part of civilian society, and firmly be made to both make project proposals and meet the responsibilities associated with executing the projects they propose.

The collection and circulation of a community's management resources—people, information, goods, money, and services—amongst the people living in the community is a vitally important part of ensuring a well-oiled local economy. A system for circulating or recycling resources between citizens will become indispensable to the economy of the community as a new kind of distribution system. If we use a system that can achieve a citizen-led, government-participatory style of urban development in the future, the path that a city should take with respect to urban management should become clear.

Learning from the lessons of the recent Great East Japan Earthquake, the urban development of the future will involve the government and private-sector companies establishing projects that incorporate ideas devised by residents of the region in question into their specific plans. It may be safe to assume that this kind of project formulation will allow methods of executing a project confidently, from securing finance to operation and management, to lead to new infrastructure maintenance, management and renewal projects.

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