

The Outline of the JCM FS Description for Bandung FS

Project name: Low Carbon Society Development under Collaboration between Bandung City and City of Kawasaki: Introduction of EV Bus to Commercial Facilities under the JCM

Project participants: Institute for Global Environmental Strategies, Kawasaki City Government
Oriental Consultants Global, Kowa Company Ltd. Tokyo Rectifier Co., Ltd.

1. Project background

The Energy Law No. 30/2007 section Energy Conservation (Article 25) stipulates that energy conservation is the responsibility of all energy users including the Government, the regional government, business entities, and the community. As a derivative regulation of the Energy Law, on 16 November 2009, the Government Regulation No. 70/2009 on Energy Conservation was issued. It is mentioned in the regulation that all users must implement energy conservation in all stages: energy supply, energy business, energy utilization, and conservation of energy resources.

FS description and objective

This feasibility study was conducted in Bandung City to seek ways to reduce GHGs and conduct energy savings. The technology used for this year's feasibility study is an energy management system (EMS) which uses a combination of a DC power supply system, solar panels and energy efficient lightings.

Project location: Bandung City, Indonesia

Indonesian partner(s)

Under the city-to-city collaboration of the two cities of Bandung and Kawasaki, the government of Bandung was exceptionally important to define the project participants in Bandung city. Building owners were approached for possible replacement of their facilities with energy efficient technologies. The involvement of the cities allowed easier access to the building owners and to the government offices.

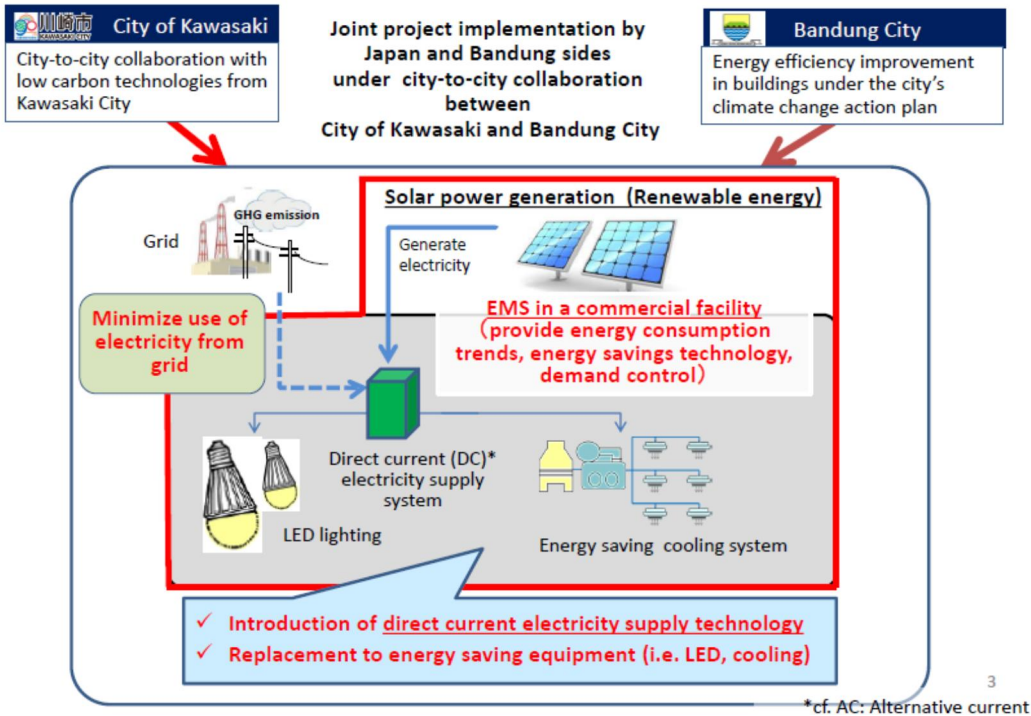
The cities of Bandung and Kawasaki have concluded a Memorandum of Understanding for cooperation in Low Carbon and Sustainable City Development on February 18th 2016 which will enable wider collaboration in the environment field in the future.

Description of the technology and project detail

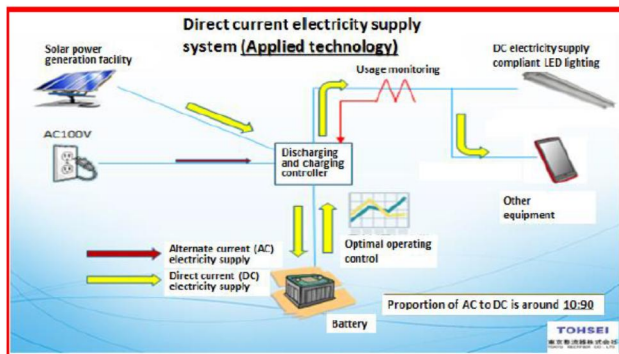
The EMS that is considered is a combination of multiple technologies. The EMS as a system which allows for a reduction of electricity supplied from the grid. The core technology is the DC power supply system for which the key characteristic is to minimize the number of DC/AC and AC/DC conversions of electricity. It is then connected to solar panels and energy efficient appliances (LED, cooling systems, batteries), and if possible storage batteries. The storage

batteries would enable excess electricity generated from the solar panels in the day time to be stored for use in the night time, reducing the amount required to be supplied from the grid.
 → Overall energy saving both at individual equipment and electricity supply system levels

Overview of project activities



Overview of Direct current electricity supply technology

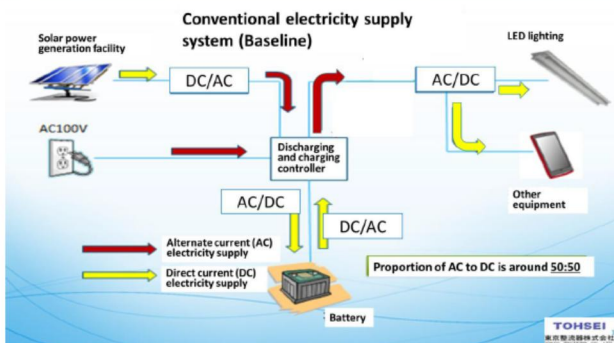


Direct current electricity supply system with EMS and solar power generation

i.e. Electricity supply from solar power generation panels to energy saving equipment with minimized number of DC/AC and AC/DC conversion in system (Electricity supply with minimized electricity loss)

- LED lighting
- Cooling system
- Battery

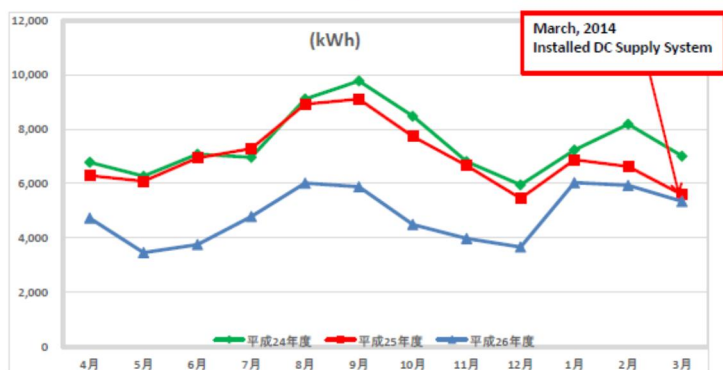
→ Overall energy saving both at individual equipment and electricity supply system levels



Projects on direct current electricity supply in Japan

Project example <BANK OFFICE>

Comparison of Annual Electric Consumption at YACHIYO BANK, NOBORITO BRANCH



電気使用量	April	May	June	July	August	September	October	November	December	January	February	March	Total	Last Year Comparison
2012 - 2013	6,780	6,289	7,077	6,962	8,104	9,768	8,474	6,804	5,948	7,232	8,178	7,008	89,602	
2013 - 2014	6,294	6,089	6,936	7,295	8,915	9,104	7,727	6,654	5,452	6,871	6,622	5,592	83,542	7%
2014 - 2015	4,731	3,462	3,758	4,788	6,014	5,882	4,494	3,977	3,667	6,032	5,932	5,342	58,074	30%
2015 - 2016														

The project started out with a walkthrough research for energy saving options and analyzed information on energy consumption. Six buildings were covered and addressed with actual site surveys.

Regulation(s) and policy(ies) related to the project

Since 2012, the regional government of West Java started to implement the actions on energy conservation. As a response to Ministerial decree (MEMR) No. 13 year 2012 on electricity-saving and Ministerial decree (MEMR) No. 15 year 2012 on ground-water-saving, the governor of West Java issued instructions on energy conservation in electricity and water subsectors. Under that regulation, the regional government targeted a 20% saving in electricity and 10% saving in water use.

According to Indonesia's national KEN policy implemented by MEMR in 2014. The target for oil, natural gas, coal and renewable energy distribution within the energy mix was defined and renewables will be over 23 % in 2025, and 31% in 2050.

According to the RUPTL 2011-2020 implemented by PLN in 2011, solar based power generated will increase to 7GW by 2020.

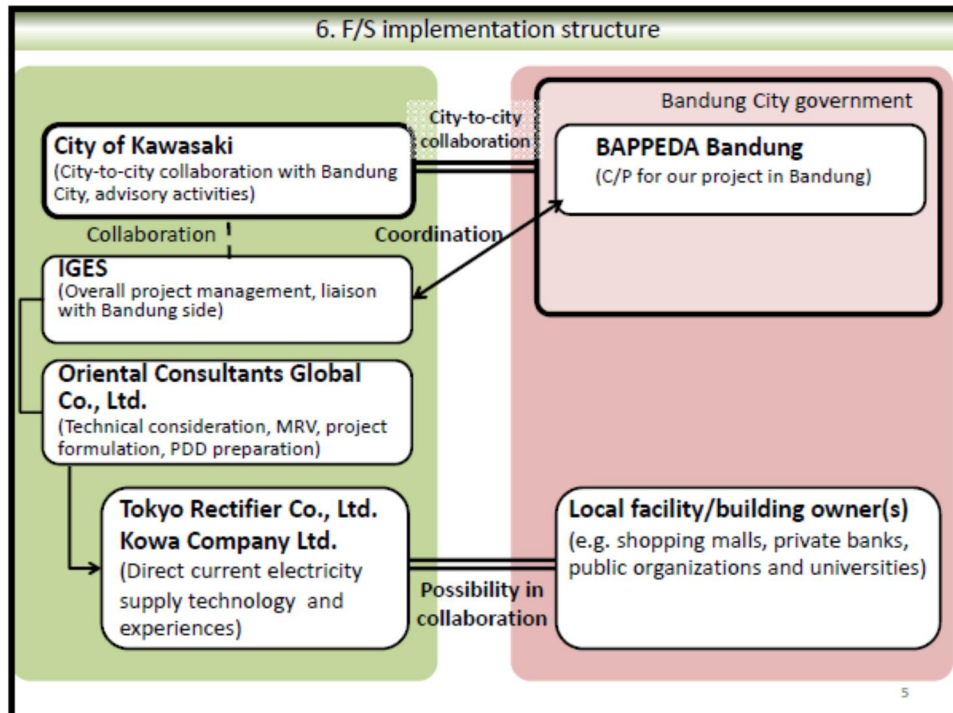
The EMS will contribute to Indonesia's National Policies referred to above.

Furthermore, the city government under the orders of the Mayor shows insights in possibly having all new infrastructure should certified as "green buildings" when applying for the "Izin Mendirikan Bangunan (IMB)" (city building certification)

Also in relation to renewables energy, the Finance Ministry implements tax and customs law (2010 PMK.011-21) and gives benefits to renewable deployment - Tax depreciation for 30% of the

investment amount, shorter depreciation period for assets, no customs, preferential tax treatment, etc.

Role of each participant



a Electricity consumption and GHG emissions reduction

Site name	Estimated electricity consumption reduction amount Estimated GHG emissions reduction amount
1. Hotel	176,916kWh/year 144t-CO2/year
2. Textile manufacturer	1,303,900kWh/year 1,061t-CO2/year
3. Bank	176,916kWh/year 144t-CO2/year
4. University	134,730kWh/year 120.6t-CO2/year
5. Manufacturer	100,800kWh/year (Provisional) 82t-CO2/year (Provisional)
6. Manufacturer	89,740 or 100,800 kWh/year 73 or 82 t-CO2/year

b MRV methodology and monitoring

The MRV methodology was developed using multiple existing methodologies for each specific technology: Direct current system; LED lightings; and Air-conditioning. The Guidelines for developing proposed methodologies were consulted.

Research result of MRV methodology

<Methodology>

With reference to the Joint Crediting Mechanism Guidelines for Developing Proposed Methodology (JCM_ID_GL_PM_ver01.0) a draft MRV methodology was developed.

- **Direct current supply system:**

MN_AM001 Installation of energy-saving transmission lines in the Mongolian Grid

- **LED lightings**

ID_AM005 Installation of LED lighting for groceries

- **Air-conditioning:**

ID A004 Installation of Inverter-Type Air Conditioning System for Cooling for Grocery Store (Ver 1.0)

<Eligibility Criteria>

Number	Criteria
Criterion 1	The direct current supply systems and a solar power generator will be used
Criterion 2	Power supplied by the solar power generator will be used as the alternative for grid-based electricity
Criterion 3	Electricity consumed, watts, ampere and consumed length of time, electricity consumed by the lighting fixtures and the air-conditioners, electricity purchased from the grid, and the solar power generator are all factors that can be monitored using the energy management system

<Reference scenario>

A system using the conventional distribution switchboard as an alternative for the Direct Current Supply System, non energy efficient appliances and no solar power generator.

Capacity building to the host country

February 17th – 19th 2016

Nine representatives including the Bandung Mayor mission attend Kawasaki hosted event

- Kawasaki International Eco-Tech Fair 2016 (Feb 18th 2016)
- Kawasaki Asia-Pacific Eco-Business Forum (Feb 18th 2016)
- Information exchange “energy savings initiatives by the government” (Feb 17th 2016)
- Information exchange “public private partnerships for hydrogen energy” (Feb 17th 2016)
- Site visit to energy management system installed site (Feb 17th 2016)

Proposed implementation schedule and next steps

Bandung and Kawasaki City have signed an MOU on low carbon and sustainable city development which will expand the current collaboration. (Feb 18th 2016)

Am looking for the next source of funding for implementation of the projects as a result of this Feasibility Study