FY2013 Feasibility Studies on Joint Crediting Mechanism Projects towards Environmentally Sustainable Cities in Asia

Financial Scheme Development Project for Promoting Energy Saving in Jakarta, Indonesia

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Feasibility Studies on Joint Crediting Mechanism Projects towards Environmentally Sustainable Cities in Asia

Financial Scheme Development Project for Promoting Energy saving in Jakarta, Indonesia

Summary

1. Background and objectives

Indonesia is facing the problem of insufficient supply of energy to meet the increasing demand due to rapid economic growth. Energy supply is tight in Jakarta, which accounts for more than 45% of country's gross domestic product (GDP). On the other hand, fuel and electricity prices have long been suppressed at low levels by government subsidies, resulting in the lack of incentives to proactively conserve energy. In order to alleviate the burden of subsidies on the national budget, the Indonesian government has taken the bold course of reducing the subsidy rate since 2013. In June 2013, prices of regular gasoline and light oil increased by 44% and 22%, respectively. Electricity tariffs have been raised by a few percent on a quarterly basis and have increased by more than 10% on a full-year basis. As a result, interest in energy conservation has been gradually growing.

In Indonesia, the legal framework for energy audits was established in 2009 in the form of a presidential directive in 2009. Under the jurisdiction of the Ministry of Energy and Mineral Resources (ESDM), a large number of energy audits have already been conducted, covering extensive fields ranging from industries to commercial facilities, office buildings and residential houses. There are also other ESDM ministerial orders applicable to commercial buildings, including one concerning temperature setting. However, there have been very few cases of improvement demonstration or implementation of energy conservation, and the greatest obstacle is claimed to be financing. As with other Asian countries, challenges of financing stem from the mindset of the people who give priority to enhancing infrastructure investments for further economic development and enriching with goods of personal preference such as cars based of greater economic capacity over energy conservation. While the use of cars is in an increasingly upward trend in Indonesia, the number of low-cost green cars (LCGCs) is forecast to reach roughly a mere 200,000. Thus, the government has announced support policies to promote the introduction of LCGCs.

It is possible to tap the huge potential of greenhouse gas (GHG) emissions reduction by effectively

utilizing past records of energy audits in Indonesia, identifying the potential of GHG emissions reduction and realizing those reduction projects. Popularization of energy conservation through community-base management is likely to accelerate with the introduction of an energy management system (EMS), an effective tool in facilitating the reduction of energy consumption on the consumer side.

This study explores ways to implement energy saving projects on a large scale with highly efficient low-carbon technologies by looking into the measures to promote energy conservation and financing methods in Indonesia, with the aim of expanding the GHG emissions reduction under the Joint Crediting Mechanism (JCM).

2. Overview and Results of the Study

The contents and the results of the study are as follows.

(1) Review of existing energy auditing results

Under the auspices of ESDM, many energy audits have already been performed, ranging from steel/cement industries to commercial facilities and residential houses. PT. Energy Management Indonesia (EMI), a state-owned energy management enterprise, has conducted a significant number of energy audits on buildings, etc., owned by state enterprises and the Indonesian Ministry of Finance under the ESDM's program, and has a track record of more than 200 auditing reports to date. In this study, energy auditing results conducted by EMI were reviewed and six facilities referred to in Table 1 were selected as a subject of further evaluation in view of the possibility, size, etc., for applying an Energy Service Company (ESCO) business. A visualization device to show energy consumption level was installed to examine at three out of the aforementioned six facilities.

Table 1: Facilities subject to Examination in This Study

No.	Energy-saving diagnosis	Visuali-zation	Facility name	Note
1	○	○	Televisi Republik Indonesia (TVRI)	TVRI is a state-owned enterprise, with two sources of income: one is budget from the government and the other is revenue as an enterprise.
2	○	○	National Library of Indonesia	This is an old building dating back to the Dutch colonial period designated as a cultural legacy, with restrictions on repair work.
3	○	○	Meteorological, Climatological and Geophysical Agency (BMKG)	Renovation is under way. The facility subject to this study is a 12-story building completed in 2010.

4	○		Plaza Centris	This is a building used by the Directorate General of Oil and Gas (MIGAS) of ESDM. Assets are held by the Ministry of Finance. Execution of repair work requires the permission of the ESDM.
5	○		State Ministry of National Development Planning (BAPPENAS)	Assets are held and used by BAPPENAS. This is an old building dating back to the Dutch colonial period designated as a cultural legacy, with restrictions on repair work.
6	○		Ministry of Industry (MOI)	This is an office building completed in 1978 (35 years old). Refrigerating machines, etc., have been replaced with new ones from 2006 to 2008.

(2) Study on energy saving technologies and methods

Technologies were proposed in detail with respect to two facilities. Tables 2 and 3 summarize the description of the proposal made to each facility and the GHG emission reduction volume based on the proposal. Results of this study revealed that it is quite possible to expect saving energy by more than 20%.

Figure 1: TVRI

Figure 2: Plaza Centris

Table 2: Energy saving Technologies Proposed to Plaza Centris and GHG Emission Reduction Volume*

	Energy saving effect (kWh/year)	GHG emission reduction (tCO2/year)	Energy saving effect	
			Compared to existing equipment	Compared to total
(i) Energy saving amount by replacing existing air-conditioning equipment with new unit (multi-split air conditioning system for building updated to latest model)	590,000	430.7	30%	20%
(ii) Energy saving amount by introducing visibility device (with the Building Energy Management System (BEMS) (improving efficiency of routine work using BEMS)	60,000	43.8	3%	2%
Total reduction volume (Estimated)	650,000	474.5	33%	22%

* Emission reduction effect by alternative system power supply. JAMALI grid emission factor in 2011 (0.730tCO2/MWh) was used.

Table 3: Energy saving Technologies Proposed to TVRI and GHG Emission Reduction Volume*

	Energy saving effect (kWh/year)	GHG emission reduction effect (tCO2/year)	Energy saving effect	
			Compared to existing equipment	Compared to total
(i) Amount of energy reduced by replacing chiller with new unit	417,000	304.4	30%	15%
(ii) Amount of energy reduced by replacing Air Handling Unit (AHU) fan with new unit and by adopting Variable Air Volume (VAV) outlet	141,000	102.9	40%	5%
(iii) Amount of energy reduced by replacing lighting with LED illumination	239,000	174.5	40%	9%
(iv) Introduction of capacitors	--	--		
Total reduction volume (forecast)	797,000	581.8	--	29%

* Emission reduction calculation used a gid emission factor of JAMALI from 2011 (0.730tCO2/MWh).

In order to encourage the effective use of energy on the consumer side, an EMS was introduced on a trial basis. In Indonesia, even though there are buildings that measure energy usage, they merely identify the daily usage; many buildings fail to identify energy usage in each time zone. To begin with, electricity usage was identified under their respective conditions by making electricity usage

in each time zone, business day/non-business day, etc., “visible” by a monitoring system, and the data was compiled into a database. Findings at the examined facilities are summarized below.

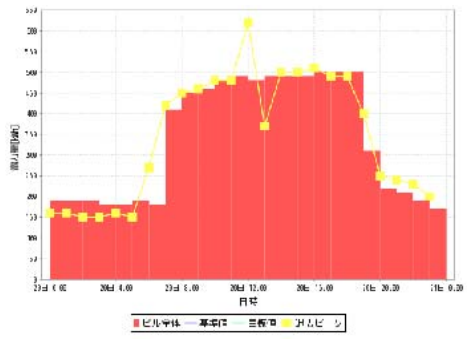

Figure 3: Building A

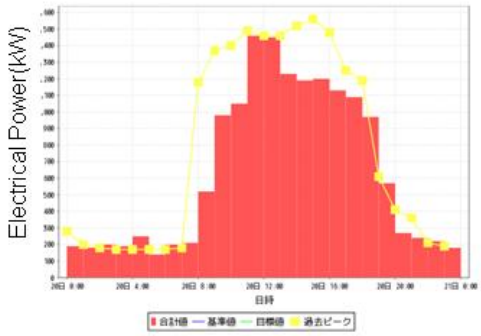

Figure 4: Building B

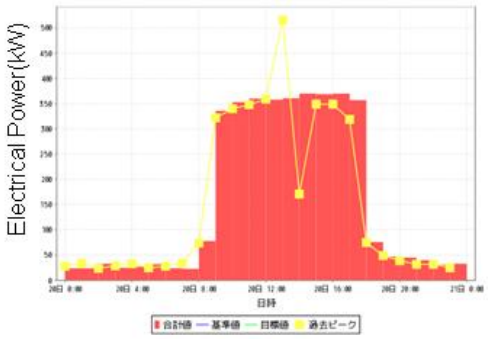

Figure 5: Building C

In Buildings B and C, energy conservation was sought at nighttime, whereas in Building A, nighttime electricity usage was high. Proposals of energy saving measures tailored to their actual conditions were made possible based on the results of monitoring air conditioning and lighting that accounted for a high ratio of electricity consumption on an individual basis.

The energy auditing resulted in revealing that in Indonesia, electricity demand by air-conditioning equipment is much higher than in Japan, and that there is a potential of saving energy (reducing CO2) by replacing air conditioning systems with new units, including heat source equipment. It also revealed that energy saving (CO2 reduction) can be expected from replacing lighting equipment with new units and improving the equipment operation rules, etc.. Implementation of these projects under the JCM scheme is quite promising.

(3) Examination of MRV methodology and estimation of GHG emissions reduction potential

A study was conducted with respect to the MRV methodology for energy saving building projects on a project-by-project basis. In energy conservation in buildings, it is possible to introduce a wide range of technologies. The methodology was studied especially with respect to the following six categories for energy conservation.

- Installation of high efficiency equipment (improvement from existing devices whose energy source is fossil fuel)
- Installation of high efficiency equipment (improvement from existing devices whose energy source is electricity)
- Fuel substitution to highly efficient devices whose energy source is electricity
- Installation of water saving equipment accompanied by heating
- Installation of high efficiency lighting
- Installation of high efficiency building materials and systems (e.g., BEMS)

As a result of this study, it has become evident that the introduction of high efficiency technologies can save energy by more than 20%. While the method of estimating the potential of GHG emissions reduction varies, a simple estimation method can be applied by calculating from the electricity consumption in Jakarta. According to the statistics of PT PLN (Persero), electricity consumption in government office buildings and commercial facilities in 2012 was approximately. 12,600GWh. Assuming that the introduction of high efficiency technologies saves energy by 20%, it would have the effect of reducing CO2 by approximately. 1,830,000 tons. If the same calculation is applied to the industrial sector in Jakarta, the electricity consumption in 2012 was approximately 11,000 GWh, the emissions reduction will be 1,600,000 ton

In regards to eco cars, assuming that 10% of approx. 1 million new four-wheel vehicles sold across Indonesia turn out to be eco cars, CO2 reduction by approx. 340,000 tons can be expected.

(4) Basic study for developing a financial scheme intended to popularize low-carbon/ low-pollution vehicles, etc.

As income in Indonesia has exceeded the level deemed to boost purchasing power (i.e., USD3,000) in conjunction with economic growth, automobile purchases by individuals are increasing rapidly. In 2013, the Indonesian government promulgated the “Low Cost Green Car (LCGC)” rule to promote the dissemination of low-price eco cars. This is a policy to exempt luxury-goods sales tax (so-called luxury tax) for gasoline-fueled cars and diesel-fueled cars with an engine capacity of up

to 1,200cc and 1,500cc, respectively, fuel efficiency of 20km/L or higher, and a base selling price of IDR95 million (approx. JPY900,000). However, it is not a rule that is applied uniformly to all eco cars (environmentally-friendly cars) in that luxury tax is merely discounted in cases where biofuel engines, hybrid engines, Compressed Natural Gas (CNG) engines or other such technologies are used.

As a result of a series of interviews, assistance to leasing companies was found to be effective to facilitate the dissemination of non-LCGC eco cars. It Is deemed to be effective in practice to apply a similar scheme as the Eco-Lease Promotion Project of Japan (formal name: Eco-Lease Promotion Project for Households and Corporations) in Japan, where the government subsidizes leasing companies via a operational organization. In Indonesia, where there are allegedly almost 200 financing companies, reliability in practice can be ensured by narrowing down companies eligible for the scheme to those that have a certain business size.

(5) Recommendation of policies on ESCO financing energy efficiency projects

In order to examine the financing scheme for promoting energy conservation, the current state and issues of energy saving policies in Indonesia were identified. The Indonesian government provides a wide range of support measures to push ahead with climate change-related projects, including tax breaks and funding assistance, and aids from developed countries, international agencies, etc.. The government is also seeking to make energy saving projects more widespread by increasing the budget to ESDM and subsidizing local governments. In addition, the Ministry of Finance is currently contemplating in introducing a new fund (facility) to private financial institutions so that they can provide low interest-loans to energy efficiency projects. However, energy saving projects have not taken hold in Indonesia as yet. In this study, financing methods for promoting energy saving projects were examined for government and state-owned enterprises on one hand and those to the private sector on the other hand.

For government and state-owned enterprises, it is deemed preferable to open a tender for ESCO businesses together with the procurement of energy efficiency equipment in the same manner as the “Osaka method”, whereby model ESCO projects started with local government buildings for the purpose of promoting ESCO businesses in Japan. This idea was thus proposed to ESDM. For private companies, a proposal similar to the interest subsidization project for promoting green financing implemented by the Japanese Ministry of Environment was made, in which local financial institutions in Indonesia would provide low-interest leases or loans to ESCO projects by leveraging the interest paid to local financial institutions by a fund.

Looking ahead, further studies will be conducted for the purpose of developing a financing scheme in more specific terms that may adapt not only to Jakarta but also to other major cities in Indonesia and may grasp the energy saving potentials in both the public and private sectors.

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1. Background and objectives

Indonesia is facing the problem of insufficient supply of energy to meet the increasing demand due to rapid economic growth. Energy supply is tight in Jakarta, which accounts for more than 45% of country's gross domestic product (GDP). On the other hand, fuel and electricity prices have long been suppressed at low levels by government subsidies, resulting in the lack of incentives to proactively conserve energy. In order to alleviate the burden of subsidies on the national budget, the Indonesian government has taken the bold course of reducing the subsidy rate since 2013. In June 2013, prices of regular gasoline and light oil increased by 44% and 22%, respectively. Electricity tariffs have been raised by a few percent on a quarterly basis and have increased by more than 10% on a full-year basis. As a result, interest in energy conservation has been gradually growing.

In Indonesia, the legal framework for energy audits was established in the form of a presidential directive in 2009. Under the jurisdiction of the Ministry of Energy and Mineral Resources (ESDM), many energy audits have already been conducted, ranging from industries to commercial facilities, office buildings and residential houses. For commercial buildings, an ESDM's ministerial decree on temperature settings, etc., does exist; however, there have been few cases of actual implementation of energy saving projects, for which the biggest obstacle is claimed to be financing. The challenge of financing is the same as in other Asian countries that it stems from the mindset of the people who give priority to enhancing infrastructure investments for further economic development and enriching with goods of personal preference such as cars based of greater economic capacity over energy conservation. However, in Indonesia, where automobiles are becoming more and more prevalent at the trend level, the number of Low Cost Green Cars (LCGCs) is expected to be only around 200,000. Thus, the government has announced support policies to promote the introduction of LCGCs.

It is possible to tap the huge potential of greenhouse gas (GHG) emissions reduction by effectively utilizing past records of energy audits in Indonesia, identifying the potential of GHG emissions reduction and realizing those reduction projects. Popularization of energy conservation through community-base management is likely to accelerate with the introduction of an energy management system (EMS), an effective tool in facilitating the reduction of energy consumption on the consumer side.

This study explores ways to implement energy-saving projects on a large scale with highly efficient low-carbon technologies by looking into the measures to promote energy conservation and financing methods in Indonesia, with the aim of expanding the GHG emissions reduction under the Joint

Crediting Mechanism (JCM).

2. Overview of the Study

The content of this study is primarily as follows:

Table 1: Contents of the study

Project activity item	Overview
(1) Reviewing existing energy auditing reports	・Review the energy auditing results conducted by PT. Energy Management Indonesia (EMI) ・Study energy-saving potentials (quantities of GHG emissions reduction) of facilities, companies, etc., affiliated with the Indonesian government
(2) Study on energy saving technologies and methods	・Conduct energy auditing at selected public buildings and state-owned enterprises in order to provide energy saving solutions Examine energy-efficiency technology and an energy management system (EMS) to be introduced to facilities, companies, etc., affiliated with the Indonesian government as part of community-based energy management ・Review energy saving potentials for some energy-intensive industries
(3) Development of MRV methodologies and estimation of GHG emissions reduction potentials	・Examine MRV methodologies required for the project through consultations with the Indonesian side ・Based on the results of the reviews of the existing energy auditing reports and applicable energy-efficient equipment, estimate GHG emissions reduction potentials to be achieved by government-affiliated facilities, companies, etc., in Jakarta when introducing energy-efficiency technologies
(4) Basic study for developing a financial scheme intended to popularize low-carbon/low-pollution vehicles, etc.	・Review the current market development of low-carbon/low-pollution vehicles, etc., in Indonesia ・Conduct a basic study for examining environmental standards associated with low-carbon/low-pollution vehicles, etc., through consultations with Japanese and Indonesian parties concerned ・Examine financial schemes to promote the market diffusion of low-carbon, low pollutant vehicles
(5) Policy recommendation for financing energy efficiency projects	・Review the current energy-related policies and identify issues for promoting ESCO business ・Study preceding cases in emerging countries in Asia ・Analyze policy recommendations and issues ・Organize workshops

The image of the community-based energy management is shown in Figure 1, and the study implementation framework is shown in Figure 2.

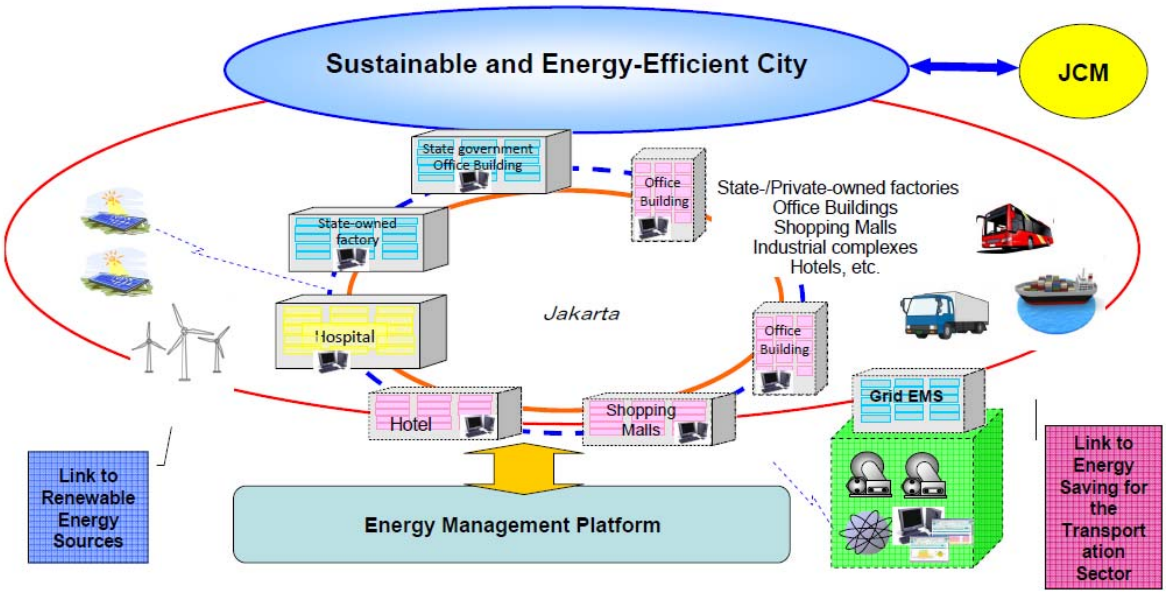

Figure 1: Image of the Community-Based Energy Management System

The study will be implemented by a consortium of Japanese experts with support from both Indonesian and Japanese governments, as shown in Figure 2.

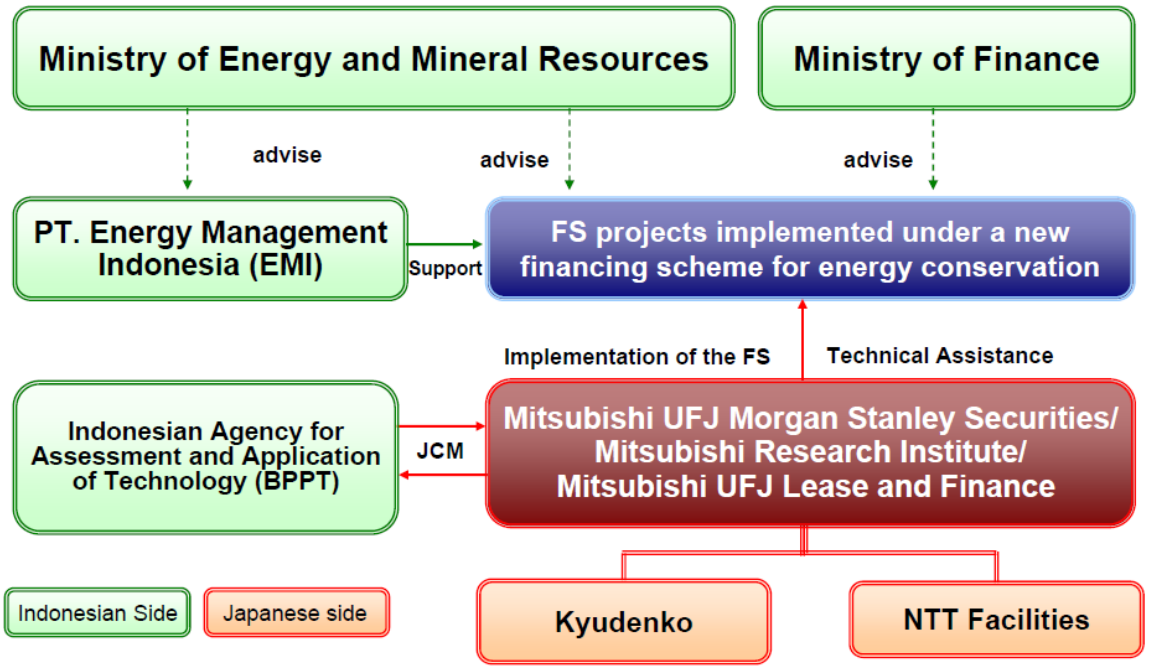

Figure 2: Study implementation framework

The study was conducted from June 2013 and March 2014, and the study report was shared with the Indonesian government and private sector during the workshop jointly organized by ESDM and JICA Indonesia Office.

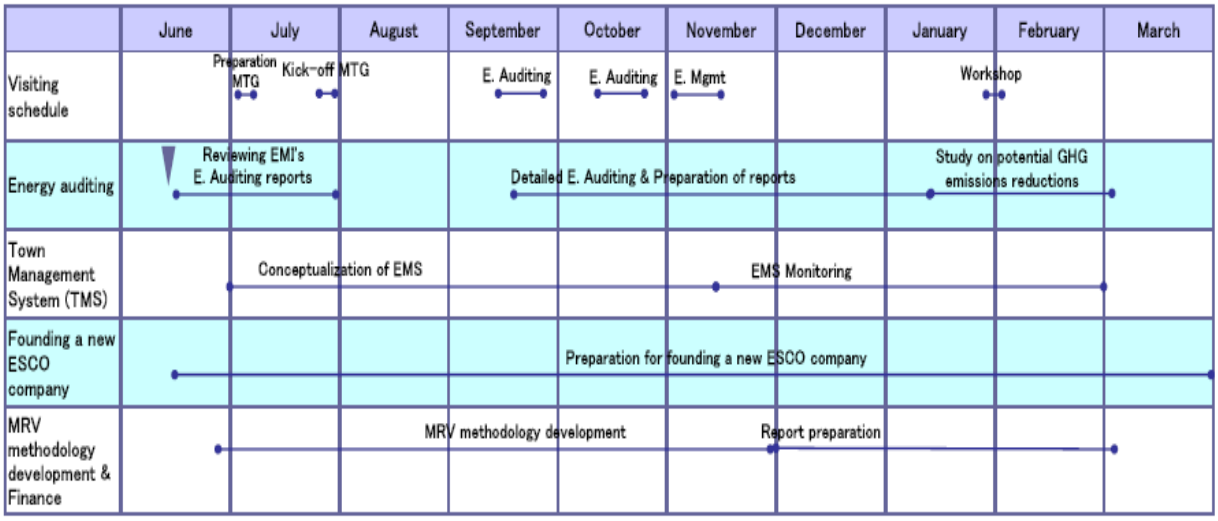

Figure 3: Schedule for this year

3. Study Findings

(1) Reviewing existing energy auditing reports

Under the auspices of ESDM, many energy audits have already been performed, ranging from steel/cement industries to commercial facilities and residential houses. PT. Energy Management Indonesia (EMI), a state-owned energy management enterprise, has conducted a significant number of energy audits on buildings, etc., owned by state enterprises and the Indonesian Ministry of Finance under the ESDM's program, and has a track record of more than 200 auditing reports to date. In this study, energy auditing results conducted by EMI were reviewed and six facilities referred to in Table 1 were selected as a subject of further evaluation in view of the possibility, size, etc., for applying an Energy Service Company (ESCO) business. A visualization device to show energy consumption level was installed to examine at three out of the aforementioned six facilities.

Table 1: Facilities subject to Examination in This Study

No.	Energy-saving diagnosis	Visualization	Facility name	Note
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3	○	○	Meteorological, Climatological and Geophysical Agency (BMKG)	Renovation is under way. The facility subject to this study is a 12-story building completed in 2010.
4	○		Plaza Centris	This is a building used by the Directorate General of Oil and Gas (MIGAS) of ESDM. Assets are held by the Ministry of Finance. Execution of repair work requires the permission of the ESDM.
5	○		State Ministry of National Development Planning (BAPPENAS)	Assets are held and used by BAPPENAS. This is an old building dating back to the Dutch colonial period designated as a cultural legacy, with restrictions on repair work.
6	○		Ministry of Industry (MOI)	This is an office building completed in 1978 (35 years old). Refrigerating machines, etc., have been replaced with new ones from 2006 to 2008.

(2) Study on energy saving technologies and methods

Technologies were proposed in detail with respect to two facilities. Tables 2 and 3 summarize the description of the proposal made to each facility and the GHG emission reduction volume based on the proposal. Results of this study revealed that it is quite possible to expect saving energy by more than 20%.

Figure 4: TVRI

Figure 5: Plaza Centris

Table 2: Energy saving Technologies Proposed to Plaza Centris and GHG Emission Reduction Volume*

	Energy saving effect (kWh/year)	GHG emission reduction (tCO2/year)	Energy saving effect	
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Total reduction volume (Estimated)	650,000	474.5	33%	22%

* Emission reduction effect by alternative system power supply. JAMALI grid emission factor in 2011 (0.730tCO2/MWh) was used.

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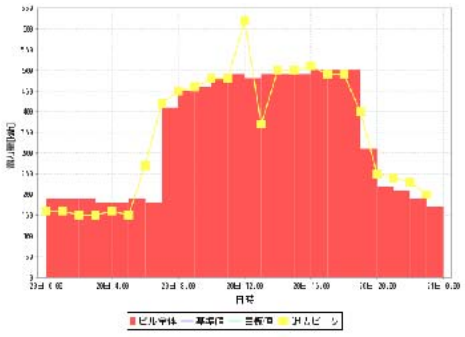


Figure 6: Building A

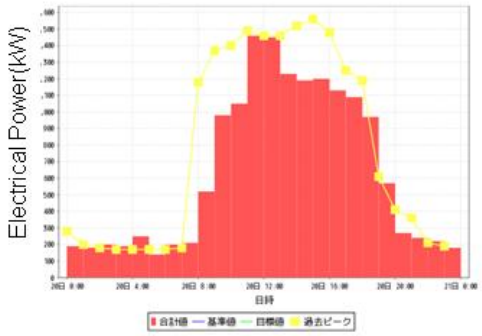


Figure 7: Building B

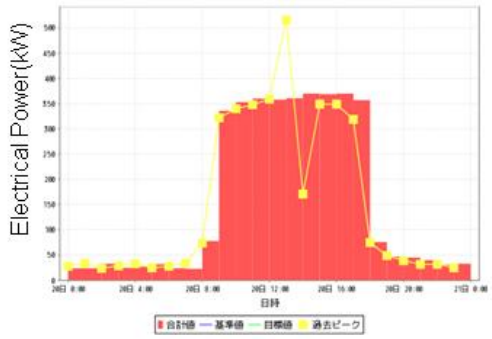


Figure 8: Building C

In Buildings B and C, energy conservation was sought at nighttime, whereas in Building A, nighttime electricity usage was high. Proposals of energy saving measures tailored to their actual conditions were made possible based on the results of monitoring air conditioning and lighting that accounted for a high ratio of electricity consumption on an individual basis.

The energy auditing resulted in revealing that in Indonesia, electricity demand by air-conditioning equipment is much higher than in Japan, and that there is a potential of saving energy (reducing CO2) by replacing air conditioning systems with new units, including heat source equipment. It also revealed that energy saving (CO2 reduction) can be expected from replacing lighting equipment with new units and improving the equipment operation rules, etc.. Implementation of these projects under the JCM scheme is quite promising.

(3) Development of MRV methodologies and estimation of GHG emissions reduction potentials

A study was conducted with respect to the MRV methodology for energy saving building projects on a project-by-project basis. In energy conservation in buildings, it is possible to introduce a wide range of technologies. The methodology was studied especially with respect to the following six categories for energy conservation.

- Installation of high efficiency equipment (improvement from existing devices whose energy source is fossil fuel)
- Installation of high efficiency equipment (improvement from existing devices whose energy source is electricity)
- Fuel substitution to highly efficient devices whose energy source is electricity
- Installation of water saving equipment accompanied by heating
- Installation of high efficiency lighting
- Installation of high efficiency building materials and systems (e.g., BEMS)

Though formula for individual components differs, the methodology is as below:

$$RE_y = \sum_{j=1}^{n} EC_{REF,j,y} \times EF_{CO2,ELEC,y} + \sum_{j=1}^{n} FC_{REF,j,y} \times EF_{CO2,FUEL,y} \qquad (3)$$

Parameter		Description
RE_y	=	Reference emissions in year *y* (tCO_2/y)
$EC_{REF,j,y}$	=	Electricity consumed in year *y* by existing equipment and/or system corresponding to a measure *j* introduced by the project activity in the reference scenario (kWh/y).
$EF_{CO2,ELEC,y}$	=	Emission factor of grid supplying electricity to the existing facility in the reference scenario (tCO_2/kWh). Official value or calculated value in accordance with the CDM Tool to calculate emission factor for an electricity system is used.
$FC_{REF,j,y}$	=	Fossil fuel *i* consumed in year *y* by existing equipment and/or system corresponding to a measure *j* introduced by the project activity in the reference scenario (L/y).
$EF_{CO2,FUEL,y}$	=	Emission factor of fossil fuel i (tCO2/L). Official value or a default value based on 2006 IPCC Guidelines for National Greenhouse Gas Inventories is used.

$$PE_y = \sum_{j=1}^{6} EC_{PJ,j,y} \times EF_{CO2,ELEC,y} + \sum_{j=1}^{6} FC_{PJ,j,y} \times EF_{CO2,FUEL,y} \qquad (4)$$

Parameter		Description
PE_y	=	Project emissions in year *y* (tCO_2/y)
$EC_{PJ,j,y}$	=	Electricity consumed in year *y* by equipment and/or system installed under the project activity corresponding to a measure *j* introduced by the project activity in the reference scenario (kWh/y).
$EF_{CO2,ELEC,y}$	=	Emission factor of grid supplying electricity to the facility where high efficiency

		equipment and/or systems are installed under the project activity (tCO2/kWh).
$FC_{PJ,jy}$	=	Fossil fuel *i* consumed in year *y* the facility where high efficiency equipment and/or systems are installed under the project activity corresponding to a measure *j* introduced by the project activity in the reference scenario (L/y).
$EF_{CO2,FUEL,y}$	=	Emission factor of fossil fuel *i* (tCO2/L). Official value or a default value based on 2006 IPCC Guidelines for National Greenhouse Gas Inventories is used.

As a result of this study, it has become evident that the introduction of high efficiency technologies can save energy by more than 20%. While the method of estimating the potential of GHG emissions reduction varies, a simple estimation method can be applied by calculating from the electricity consumption in Jakarta. According to the statistics of PT PLN (Persero), electricity consumption in government office buildings and commercial facilities in 2012 was approximately. 12,600GWh. Assuming that the introduction of high efficiency technologies saves energy by 20%, it would have the effect of reducing CO2 by approximately. 1,830,000 tons (see Figure 9). If the same calculation is applied to the industrial sector in Jakarta, the electricity consumption in 2012 was approximately 11,000 GWh, the emissions reduction will be 1,600,000 ton (see Figure 10).

GHG reduction potentials for government-related facilities (Jakarta)

CO2 emission reduction	=	Electricity consumption by government-related facilities in Jakarta	×	Energy Savings	×	Grid emission factor
0.166 MtCO2/yr		(1,141,910MWh/yr)*		(20%)**		(0.730tCO$_2$/MWh)***

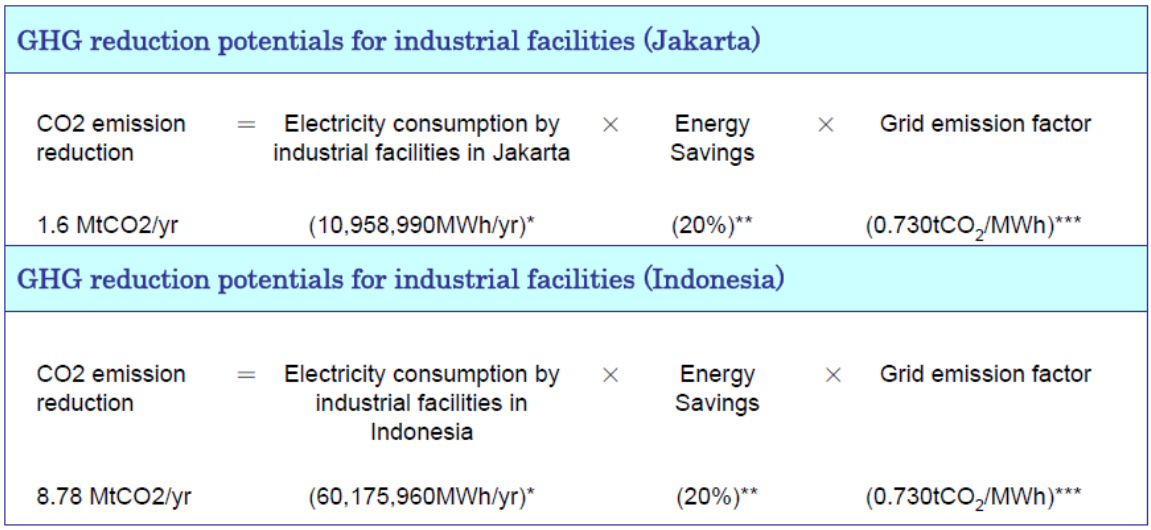
GHG reduction potentials for commercial facilities (Jakarta)

CO2 emission reduction	=	Electricity consumption by commercial facilities in Jakarta *	×	Energy Savings	×	Grid emission factor
1.67 MtCO2/yr		(11,455,100MWh/yr)*		(20%)**		(0.730tCO$_2$/MWh)***

*PLN's statistics (2012) Data for Tangerang City is included.
**Assuming that there will be on average 20% of the energy savings at least with electricity consumption.
***Grid emission factor of JAMALI grid available from the DNPI website.

Sources : Prepared by the Study Team using PLN (2013), DNPI (2011), etc.

Figure 9: GHG reduction potentials for public and commercial buildings and facilities in Jakarta



*PLN's statistics (2012) Data for Tangerang City is included.
**Assuming that there will be on average 20% of the energy savings at least with electricity consumption.
***Grid emission factor of JAMALI grid available from the DNPI website.

Sources : Prepared by the Study Team using PLN (2013), DNPI (2011), etc.

Figure 10: GHG reduction potentials for the industrial sector in Jakarta

In regards to eco cars, assuming that 10% of approx. 1 million new four-wheel vehicles sold across Indonesia turn out to be eco cars, CO2 reduction by approx. 340,000 tons can be expected (see Figure 11).

Annual travelling distance	20,000	Km
Fuel economy (normal type)	7.69	Km/L
Fuel consumption	2,600	L
Fuel economy improvement rate	50%	
Fuel economy (low carbon cars)	15.38	Km/L
Fuel consumption by low carbon cars	1,300	L
Fuel savings	1,300	L
Total number of cars	100,000	Cars
Total fuel savings	130,000	kL
Emission factor	2.60	T-CO2/kL
Total emission reductions	337,000	T-CO2

Figure 11: GHG reduction potentials for eco cars

(4) Basic study for developing a financial scheme intended to popularize low-carbon/ low-pollution vehicles, etc.

As income in Indonesia has exceeded the level deemed to boost purchasing power (i.e., USD3,000) in conjunction with economic growth, automobile purchases by individuals are increasing rapidly. In 2013, the Indonesian government promulgated the "Low Cost Green Car (LCGC)" rule to promote the dissemination of low-price eco cars. This is a policy to exempt luxury-goods sales tax (so-called luxury tax) for gasoline-fueled cars and diesel-fueled cars with an engine capacity of up to 1,200cc and 1,500cc, respectively, fuel efficiency of 20km/L or higher, and a base selling price of IDR95 million (approx. JPY900,000). However, it is not a rule that is applied uniformly to all eco cars (environmentally-friendly cars) in that luxury tax is merely discounted in cases where biofuel engines, hybrid engines, Compressed Natural Gas (CNG) engines or other such technologies are used.

As a result of a series of interviews, assistance to leasing companies was found to be effective to facilitate the dissemination of non-LCGC eco cars. It Is deemed to be effective in practice to apply a similar scheme as the Eco-Lease Promotion Project of Japan (formal name: Eco-Lease Promotion Project for Households and Corporations) in Japan, where the government subsidizes leasing companies via a operational organization. In Indonesia, where there are allegedly almost 200 financing companies, reliability in practice can be ensured by narrowing down companies eligible for the scheme to those that have a certain business size.

(5) Policy recommendation for financing energy efficiency projects

In order to examine the financing scheme for promoting energy conservation, the current state and issues of energy saving policies in Indonesia were identified. The Indonesian government provides a wide range of support measures to push ahead with climate change-related projects, including tax breaks and funding assistance, and aids from developed countries, international agencies, etc.. The government is also seeking to make energy saving projects more widespread by increasing the budget to ESDM and subsidizing local governments. In addition, the Ministry of Finance is currently contemplating in introducing a new fund (facility) to private financial institutions so that they can provide low interest-loans to energy efficiency projects. However, energy saving projects have not taken hold in Indonesia as yet. In this study, financing methods for promoting energy saving projects were examined for government and state-owned enterprises on one hand and those to the private sector on the other hand.

For government and state-owned enterprises, it is deemed preferable to open a tender for ESCO businesses together with the procurement of energy efficiency equipment in the same manner as the "Osaka method", whereby model ESCO projects started with local government buildings for the purpose of promoting ESCO businesses in Japan. This idea was thus proposed to ESDM. For private companies, a proposal similar to the interest subsidization project for promoting green financing implemented by the Japanese Ministry of Environment was made, in which local financial institutions in Indonesia would provide low-interest leases or loans to ESCO projects by leveraging the interest paid to local financial institutions by a fund.

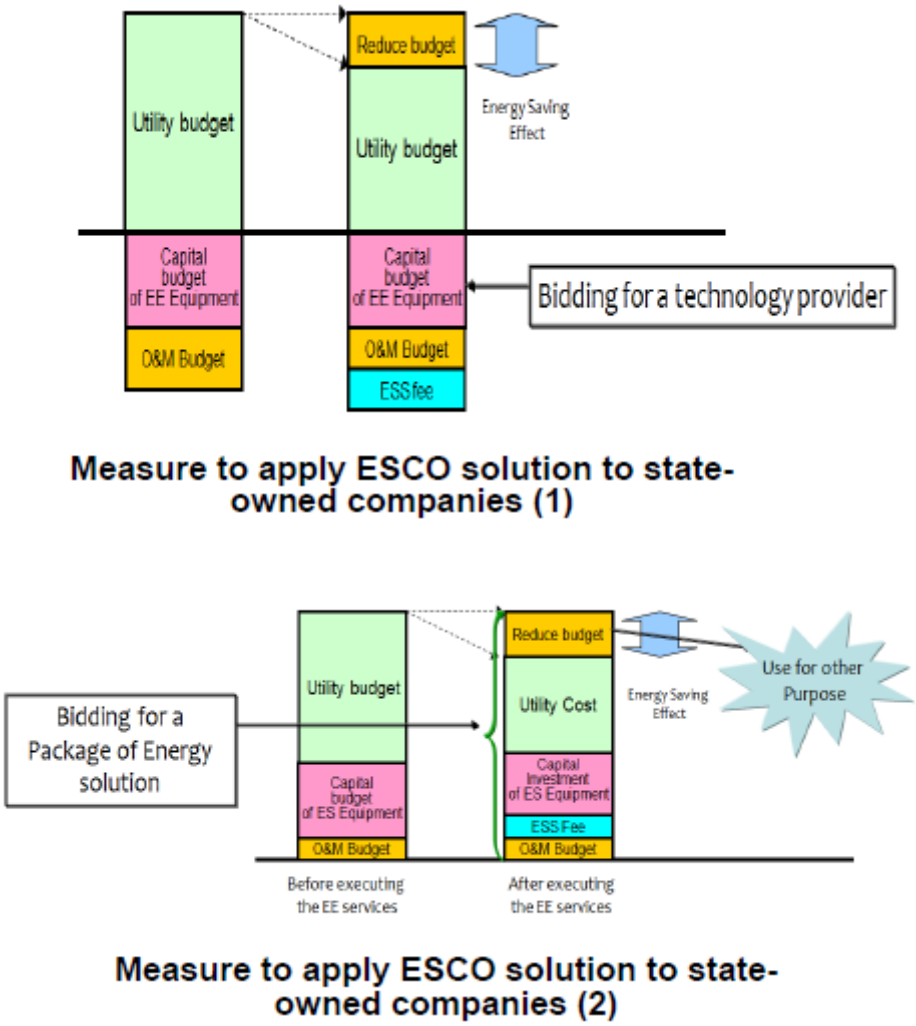


Figure 12: Measure to apply ESCO solutions to state-owned companies

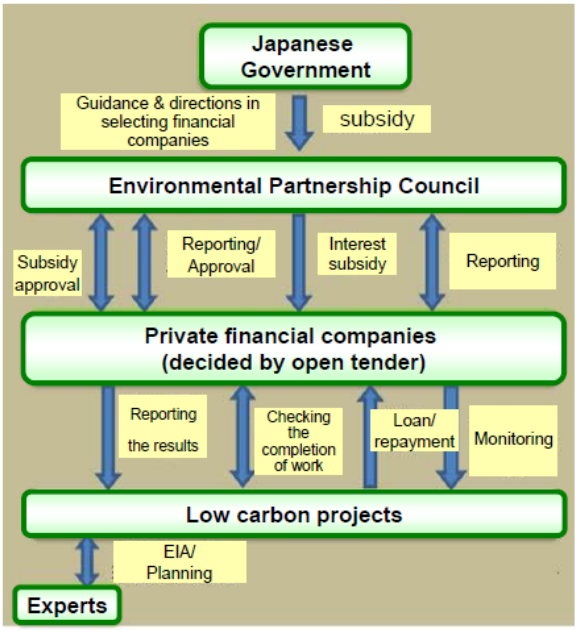


Figure 13: Japan's green finance program

Looking ahead, further studies will be conducted for the purpose of developing a financing scheme in more specific terms that may adapt not only to Jakarta but also to other major cities in Indonesia and may grasp the energy saving potentials in both the public and private sectors.

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