

**Data Collection Survey on Energy
Efficiency and Conservation**

in

**Central America and
the Caribbean Region**

Final Report

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Abbreviations & Acronyms

AC	Air Conditioner
ACOPROVI	Contractors Associations (DR)
ADOEXPORT	Dominican Republic Exporters Association
AGEXPORT	Guatemala Exporters Association
AIRD	Dominican Republic Industries Association
AMCHAM	American Chamber of Commerce in Guatemala
ANAVI	National Association of Poultry in Guatemala
APEN	Association of Producers and Exporters of Nicaragua
ASONAHORES	Dominican Republic Hotel & Tourism Association
ATL	Appliance Traders Limited (JA)
BAC	Banco de America Central
Bancoldex	Colombian Foreign Trade Bank
B2B	Business to Business
CABEI	Central American Bank for Economic Integration
CAC	Central America and Caribbean
CADIN	Nicaragua Chamber of Industry
CAF	Corporacion Andinade de Fomento
CANATUR	Nicaraguan Chamber of Tourism
CCP	Santo Domingo Chamber of Commerce
CDB	Caribbean Development Bank
CEI	Nicaragua Exporters and Investors Center
CGPL	Centro Guatemalteco de Produccion Mas Limpia (GT)
CIG	Guatemala Chamber of Industry
CNE	National Energy Commission (DR)
CNZF	Nicaragua National Economic Zone Commission
CORE	Co-financing for Renewable Energy and Energy Efficiency
CPmL	Centro de produccion mas limpia de Nicaragua
DB	Development Bank
DBoJ	Development Bank of Jamaica Limited
DEG	Deutsche Investitions-und Entwicklungsgesellschaft mbH
DRGBC	Dominican Republic Green Building Council
EE	Energy efficiency
EIB	European Investment Bank
EPC	Engineering, Procurement and Construction
ESCO	Energy Service Company
FI	Private Financial Institution
GB	Green Building
GE	General Electric (US Company)
GGBC	Guatemala Green Building Council
G2G	Government to Government
HGPS	Hospital General de la Plaza de la Salud (DR)
HIPC	Heavily Indebted Poor Countries
IDB	Inter-American Development Bank
IIC	Inter-American Investment Cooperation
INGUAT	Guatemala Tourism Board
JAMPRO	Jamaica Promotions Agency
JCC	Jamaica Chamber of Commerce
JICA	Japan International Cooperation Agency

JMA	Jamaican Manufacturers Association
JPS	Jamaica Public Service Company Ltd.
JTB	Jamaica Tourist Board
KEMCO	Korea Energy Management Corporation
LAC	Latin America & Caribbean
LED	Light Emitting Diode
LG	Lucky Goldstar (Korean Company)
MEM	Ministry of Energy and Mines (NI,DR)
MSTEM	Ministry of Science Technology Energy and Mining (JA)
NCB	National Commercial Bank (JA)
NCEE	National Commission of Electric Energy (GT)
NET	National Education Trust (JA)
NGBC	Nicaragua Green Building Council
PNESER	National Program of Sustainable Electrification and Renewable Energies (NI)
ODPEM	Office of Disaster Preparedness and Emergency Management
PNEE	National Program for Energy Efficiency
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PV	Photovoltaic
RE	Renewable Energy
SG	Sovereign guaranteed
SME	Small and Medium size Enterprise
SPG	Solar Power Generation
SPV	Special Purpose Vehicle
TA	Technical Assistance
TSL	Two-Step Loan
VRF	Variable Refrigerant Flow

Chapter 1

Background and Summary of Survey Results

Chapter 1 Background and Summary of Survey Results

1.1 Background and Objectives

Growth is associated with greater energy consumption, and during the last decades, Latin America and the Caribbean (LAC) region have come to increase their energy demand. To cope with the energy needs in a programmable timeframe, partly owing to subsidized mechanisms and partly to the investment appetites of the private sector, fossil fueled plants were installed despite of other efforts of promoting renewable energy (hereinafter referred to as “RE”) sources and energy efficiency (hereinafter referred to as “EE”), which LAC countries have a strong potential to develop yet. Meanwhile, global warming is becoming more evident, and there is a stronger need to tame the trend of growing inefficient use of energy and greater use fossil fuel sources, and thus contribute to decelerate climate change. It is especially the case in the Central America and the Caribbean (CAC) region, and there are high expectations for the introduction of RE and promotion of EE as measures to cope with global warming.

Japan International Cooperation Agency (JICA) is the governmental agency providing ODA Loans, Grants, and Technical Cooperation to developing countries, and has entered into strategic relations with the Inter-American Development Bank through the “Co-financing for Renewable Energy and Energy Efficiency” framework (CORE) launched in 2012, opening new public finances for the Central America and Caribbean governments. The CORE has also been expanded in both amount and coverage with its amendments introduced in March 2014.

However, while the CORE scheme opened new financing for post HIPC countries in Central America, as well as greater opportunities for manufacturers in the energy sector, JICA is aware that there still exists a large potential for EE and RE in the region especially in the private sector, which the CORE does not reach out to.

JICA is conscious that it can, together with strategic partnership with an experienced and well reputed international organization, enhance the opportunities for the Japanese private sector regarding excellent EE and RE technology, creating a win-win business environment for both Japan and the region as well as a wider reach out to different needs from the private sector of various countries in the region, in which context, JICA has decided to conduct the Data Collection Survey on Energy Efficiency and Renewable Energy in the CAC Region (hereinafter referred to as “this Survey”) to explore and discuss product options to collaborate with the Inter-American Investment Corporation (IIC) where both organizations could utilize their unique strengths, creating an optimal synergy effect.

The Main objectives of this Survey include the followings:

- a) To confirm EE demand of enterprises, especially small and medium sized enterprises (SMEs) in the CAC region, and to grasp the current status and issues on EE and RE (focusing on solar power generation (hereinafter referred to as “SPG”)),
- b) To study IIC’s current financing and technical assistance mechanisms so as to explore opportunities for possible IIC-JICA strategic synergies, which could contribute to a better business climate of both organizations in pursuing their respective objectives,

- c) To propose an IIC-JICA collaborative loan scheme model, which includes loans and complementing technical assistance (TA) programs, incorporating IIC's technical cooperation strengths in the CAC region and utilizing the competitive EE and RE (SPG) technologies of Japanese manufacturers, and
- d) To propose measures to strengthen the IIC-JICA collaborative technical cooperation model under the IIC-JICA collaborative loan scheme model.

1.2 Summary of This Survey

Before starting the field surveys, the Survey Team had meetings with potential Japanese manufacturers, which provide energy-efficient (EE) equipment for the CAC region. Accordingly, several potential technologies were selected as the candidates of eligible EE technologies. Field surveys were conducted to grasp the market need and the barriers that prevent the usage of these technologies. Reflecting the survey results, a comprehensive solution was proposed to break through these barriers. Finally, in order to effectively realize this solution, prospective contribution measures through IIC-JICA cooperation were investigated.

This report is comprised the following three (3) chapters:

Chapter 1: Background and Summary of This Survey Results

Chapter 2: Survey Methods

Chapter 3: Survey Results

3.1 Current Status and Barriers to Promote EE and SPG in the CAC Region

3.2 EE and RE Policies and Incentive Mechanisms

3.3 Solutions to Solve the Barriers that prevent the promotion of EE and RE in the CAC Region

3.4 Partner for Tackling Issues in EE and SPG Promotion

3.5 Consideration of IIC-JICA Collaboration and Their Contribution Methods for Realizing the Solutions to Issues for Promoting EE and SPG

The summary of this Survey is summarized below:

Firstly, Guatemala, Nicaragua, Dominican Republic and Jamaica deeply depend on fossil energy generation, face high electricity tariffs, which range from 18 US cent/kWh to 38 US cent/kWh¹, and are strongly promoting the use of RE. Since solar radiation in the CAC region is more abundant than those of top SPG leading countries. CAC countries have introduced various kinds of incentive mechanism to promote SPG. The future market of SPG in the CAC region is expected to continue expanding. On the other hand, the largest barrier preventing the usage of SPG in the CAC region is the lack of adequate

¹An average of industry and commercial tariffs.

financing to meet the emerging demand. (The accessible financing sources are quite limited for project implementation.) And, as for accessible financing, it is difficult to secure the target profit because the rate of return is too low.

Secondly, the number of Green Buildings² (hereinafter referred to as “GBs”), including both new and existing buildings, has been increasing in the CAC region, due to the trend to introduce environmentally friendly management and the need to reduce operating costs. GB Councils were established in several CAC countries to promote the construction of GBs. The barriers that prevent the introduction of GBs are: a) lack of awareness-raising on the significance of constructing GBs, b) lack of opportunities to disseminate eligible EE technologies and SPG, which are key technologies for GB construction and c) lack of incentive mechanisms to promote GBs.

Thirdly, it has been confirmed that the reduction of power distribution losses in the CAC region, which amount to 25-40% of total output, remains a big issue that need to be solved. In this context, electricity distribution companies are very eager to adopt anti-tampering metering technology to avoid non-technical power distribution losses. On the other hand, the barriers that prevent the usage of this system in the CAC region is, a) early implementation of pilot project to verify the effectiveness of this system and b) lack of financing for this newly emerging market. (The accessible financial sources are quite limited and offered interest rate is higher for project implementation.) And as for accessible finance, it is difficult to secure the target profit because the offered interest rate is too high.

Fourthly, in Guatemala and Dominican Republic, ESCO (Energy Service Company) and ESCO-alike businesses are becoming popular. The major bottleneck that prevents the dissemination of these businesses is lack of financing. Especially in Guatemala and Jamaica, where finance leases can be treated as expenditures and not included on the balance sheet, leasing is becoming popular among enterprises as a measure to introduce SPG or EE equipment.

Based on the above observations, the following five (5) loan schemes are proposed to break through the above mentioned barriers:

- a) Loan to support mega SPG projects
- b) Loan to support GB projects
- c) Loan to support introduction of anti-tampering metering systems
- d) Loan to support ESCO and ESCO-alike businesses (on-lending through Financial institutions (FIs))
- e) Loan to support finance lease of EE equipment (on-lending through FIs)

In order to materialize the proposed five loan schemes and to contribute to EE promotion in the CAC region, it is recommended that a concessional loan as a source of EE investments and supplementary TA

² Anti-tampering metering system can contribute the reduction of energy loss. In this context it is catalyzed as one of energy conservation technologies.

programs to facilitate EE project formulation will be provided through IIC-JICA collaboration.

As well, in order to effectively establish the IIC-JICA collaborative TA programs, which are to facilitate EE project formulation and to produce a pipeline of EE projects (a list), it is recommended that IIC's existing TA infrastructure should be fully utilized and that JICA should dispatch in-kind consultants to IIC as well as provide a comprehensive TA programs to supplement the limited resources of IIC.

In more concrete terms, it is effective to create comprehensive TA programs, which include activities that would solve the EE project formulation bottlenecks observed in the field surveys such as follows:

- a) Awareness-raising of end-users, enterprises in target sectors and financial institutions by providing data and information through seminars, etc.
- b) Formulation of pilot projects as show-casing (for visualization of successful cases / best practices)
- c) Support for designing and formulating the pipeline projects

Compared with top SPG leading countries, CAC countries have higher electricity tariffs, more abundant sun shine, incentive mechanisms to promote SPG, and larger demand for cooling. The energy savings and financial benefits to be gained from introducing SPG and EE equipment with the adequate support of concessional loan would be quite large.

Thus, through an early formulation of IIC-JICA collaborative loan and TA programs, Japanese EE technologies will be able to contribute to enhance EE in the CAC region.

Chapter 2

Survey Methods

Chapter 2 Survey Methods

(1) Selection of target countries

This Survey is targeted at four countries in the CAC region, namely, Guatemala, Nicaragua, Dominican Republic and Jamaica. These countries were selected based on the following indicators:

- a) Population size and national energy consumption amount
- b) Electricity tariff levels and amount of subsidies for electricity supply industries

Among these four (4) countries, Guatemala (representing Central America), and Dominican Republic (representing Caribbean countries) were selected as the targets of final field survey in March 2014. (See Table 2-1)

Table 2-1 Energy Indicators in the CAC Region

Country	Population (mil.)	Final Energy Consumption (TOE)	Average Tariff (Cent/kWh)	Annual Electricity Subsidy (MM USD)	Electricity Main Sources
Guatemala	15.1	8,730,000	23	128	Oil, Hydro
El Salvador	6.3	3,633,000	17	130	Hydro, Oil, Renewable, Gas
Honduras	7.9	3,970,000	22	350	Oil, Renewable, Hydro
Nicaragua	6.0	1,397,000	24	66	Oil
Dominican Republic	10.3	6,136,000	20	1200	Oil, Gas
Jamaica	2.7	2,358,000	42	0	Oil

Source: Data presented by trainees of participating countries, JICA Seminar on Energy Efficiency and Conservation in Central America and the Caribbean Region for Potential Projects / Programs Development under CORE Scheme, JICA (November 2013)

(2) Workflow

The workflow of the Survey is shown in Figure 2-1. As well, main subjects of each field survey are summarized below. The advantages and significance of JICA's cooperation with IIC as a strategic partner in formulating a collaborative financing program were discussed throughout the Survey period.

Field survey I in October 2013: Discussions were conducted with IIC, and the consensus was made on the main course of action with regard to the future IIC-JICA collaborative loan and TA programs

Field survey II in December 2013: Field surveys in Guatemala and Nicaragua were conducted

Field survey III in January 2014: Field surveys in Dominican Republic and Jamaica as well as interim reporting to IIC were conducted

Field survey IV in March 2014: It is the second field survey for the selected target countries, namely, Guatemala and Dominican Republic; and financial reporting to IIC was conducted. This field survey was initially planned to be conducted in February, but postponed to March due to necessary schedule adjustments.

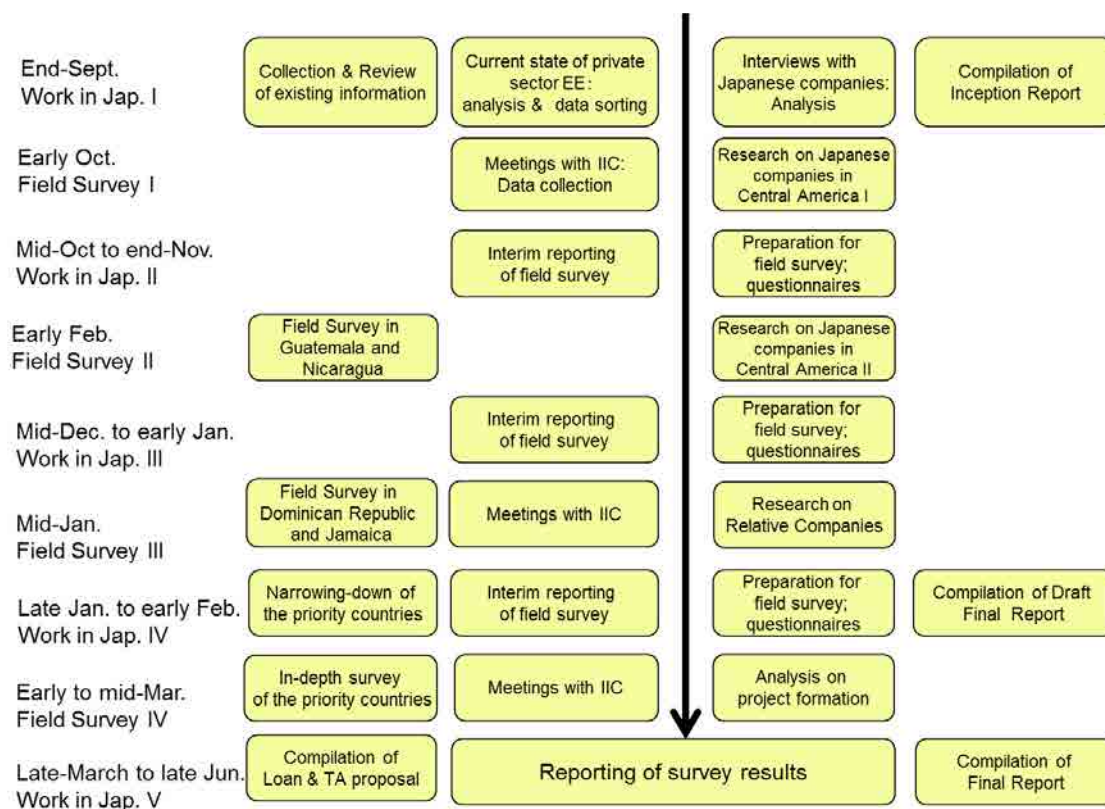


Figure 2-1 Survey Workflow

(3) Survey issues

In the four target countries, JICA Survey Team conducted field surveys and interviewed with relevant enterprises and industrial associations in order to find out the candidates of the IIC-JICA collaborative loan schemes and to propose supplementary TA programs to promote such loan schemes. The main issues discussed included the following:

- a) Current status and barriers that prevent the usage of EE technologies and SPG in major industries, and the feasibility to introduce Japanese eligible technologies
- b) Current status and issues of EE and SPG financing by FIs
- c) Current status of policies and systems to promote EE and RE
- d) Potential EE business operators (ESCOs and others)
- e) Incentive mechanisms to promote EE and SPG
- f) TA need for promoting EE and SPG

And during the Survey period, the following procedural changes were made:

- a) Upon finding that there are already various types of financing scheme available for promoting EE equipment and SPG through the field surveys in December 2013 and January 2014, more detailed survey on these financial schemes was conducted during the field survey in March 2014.
- b) Upon finding the fact that the financial need in USD is so limited in the Dominican Republic and Jamaica during the field survey in January 2014, the field survey in the Dominican Republic in March 2014 was conducted focusing only on those industries such as hotels and exporting industries, which have USD financing needs.
- c) In March 2014, a total of four (4) seminars were held in Guatemala and Dominican Republic with the supports of IIC partner organizations and target sector industrial associations. These seminars not only provided chances for face-to-face meetings between potential end-users / sectors and eligible Japanese EE equipment suppliers, but also enabled effective data collection for this Survey.

(4) Target technologies

Prior to field surveys, JICA Survey Team had conducted several interviews with Japanese potential manufacturers in order to grasp their eligible EE products and their sales structures in the CAC region. And through these interviews, the following technologies were selected, which have the potential to contribute to EE improvement in the CAC region as well as have the strength to penetrate into the CAC markets. As well, the market need for introducing these selected technologies and the bottlenecks that prevent the usage of them in the CAC markets were studied. As a result, JICA Survey Team were able to identify SPG, high-efficient air conditioners (hereinafter referred to as “ACs”) and high efficiency industrial air compressors (for chilling and cooling) and “Eco-cute” (,which is a heat pump chilled and hot water supply equipment) before starting the field survey, while anti-tampering metering system was selected in January 2014 during the field survey upon receiving the information about the attempts of EDM I (a Japanese company) to expand its sales in the CAC region. These technologies were selected according to the reasons elaborated below:

1) SPG

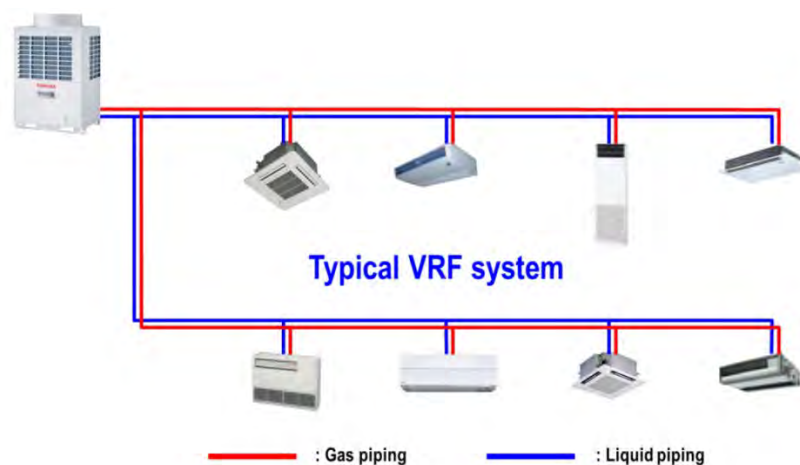
Solar radiation in the CAC region is more abundant than those of top SPG leading countries. And the potential for SPG is assumed to be large in the region. In addition, in order to promote SPG, a systematic approach incorporating design, implementation, and long-term maintenance is needed. In this context, Japanese manufacturers can contribute significantly.

Prominent Japanese manufacturer: Panasonic

2) High-efficient ACs

The most energy consuming equipment in commercial buildings in the CAC region is ACs, and thus the reduction of electricity consumed by ACs is the biggest issue. However, those high-efficient inverter and VRF³ ACs, which are the standard in Japan (see Figure 2-2), are not yet prevalent in the CAC region. There are several Japanese manufacturers currently promoting their products in the region.

Prominent Japanese manufacturers: Panasonic, Toshiba Career, Daikin, Mitsubishi Electric and Fujitsu General



Source: Toshiba Career

Figure 2-2 Outline of VRF Air Conditioner

3) High efficiency industrial air compressors (for chilling and cooling) and Eco-cute (heat pump chilled and hot water supply equipment)

In the CAC region, there are a lot of broiler, beverage, ice making, vegetable freezing and fish freezing factories, which consume lots of hot and chilled water. Only few large factories, however, have so far installed EE equipment in these sectors. It is expected that Japanese high-efficient and non-CFC natural refrigerant technology can contribute to promote EE in these sectors. An outline of high efficiency compressors for chilling and cooling and the mechanism of Eco-cute are described in Figure 2-3 and Figure 2-4, respectively.

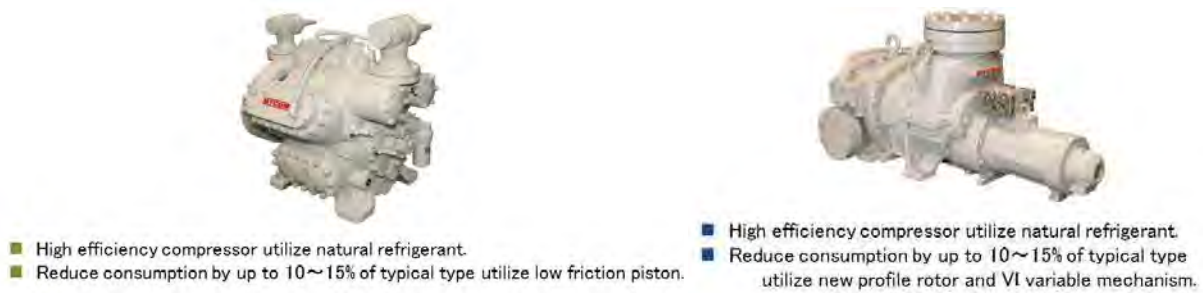
Prominent Japanese manufacturer: MYCOM

i) High efficiency compressors (cooling/freezing)

There are two types high efficiency compressors, namely, reciprocating type (so-called, “M-series”) and screw type (“J-series”). Low friction piston is utilized in M-series, and new profile rotor and automatic variable mechanism are utilized in J-series. Both types of high

³ VRF stands for Variable Refrigerant Flow which is a group operation of inverter ACs

efficiency compressors are approximately 10% more efficient than the conventional ones.



- High efficiency compressor utilize natural refrigerant.
- Reduce consumption by up to 10~15% of typical type utilize low friction piston.

- High efficiency compressor utilize natural refrigerant.
- Reduce consumption by up to 10~15% of typical type utilize new profile rotor and VI variable mechanism.

Reciprocating Compressor (Low Friction Piston)

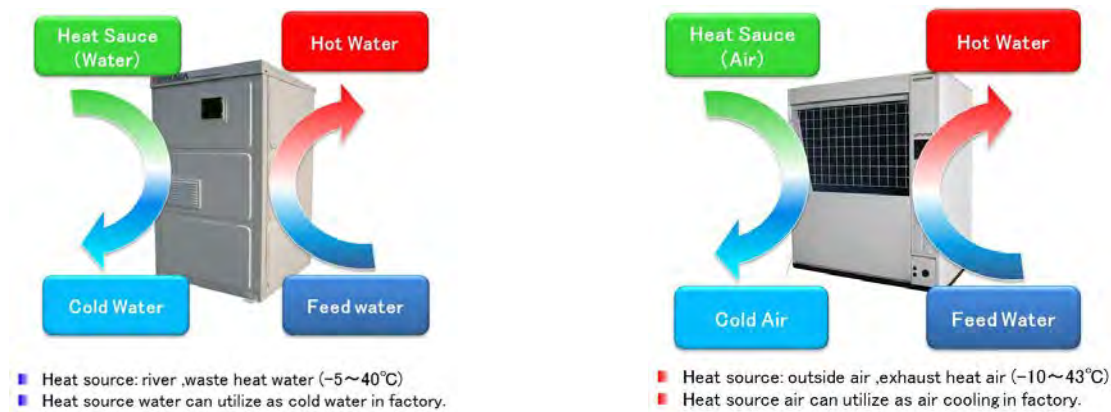
Screw Compressor (New Profile Rotor)

Source: MYCOM

Figure 2-3 Outline of High Efficiency Compressors

ii) Eco-cute (heat pump chilled and hot water supply equipment)

Eco-cute is categorized in two types, namely, water-to-water type and air-to-water type. The water-to-water heat pump utilizes waste heat water from factories or river water as heat sources, while the air-to-water heat pump utilizes exhaust heat air from factories or outdoor air as heat sources. Both types can provide hot water up to 90°C. The payback period of introducing an Eco-cute can be shorter in the CAC region; especially because the outside temperature in the region is stable at near 25°C throughout the year and there exist a huge demand for cooling.



- Heat source: river, waste heat water (-5~40°C)
- Heat source water can utilize as cold water in factory.

- Heat source: outside air, exhaust heat air (-10~43°C)
- Heat source air can utilize as air cooling in factory.

Water to Water Type Eco-cute

Air to Water Type Eco-cute

Source: MYCOM

Figure 2-4 Outline of Eco-cute

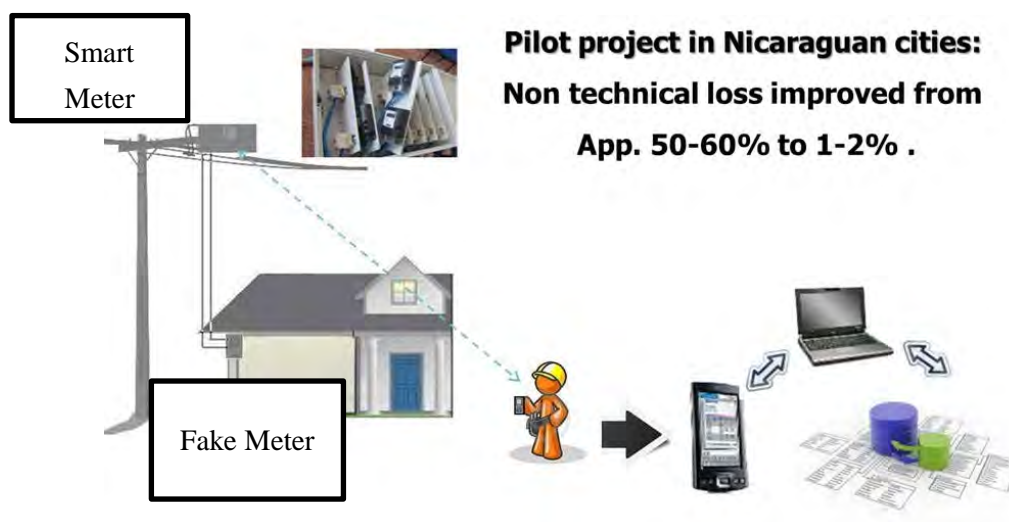
4) Anti-tampering metering system

The reduction of electricity distribution loss in the CAC region, especially non-technical electricity distribution loss, has been a big issue. The contribution of a Japanese company, which is planning to introduce anti-tampering metering system, (which enables non-technical electricity distribution loss reduction) is expected to solve the issue.

Prominent Japanese manufacturers: EDM I

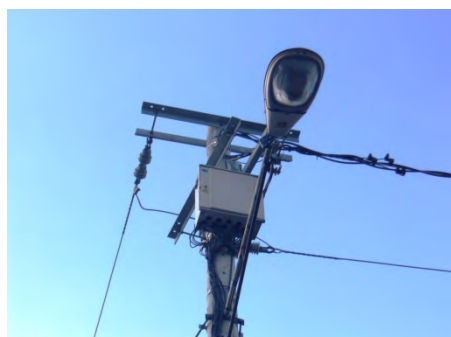
Figures 2-5 and 2-6 show the outline of anti-tampering metering system, which EDM I has been introducing in the CAC region. The main points about this metering system are summarized as follows:

- a) Actual meters are located on the top of utility poles, where it is difficult to access by consumers. Distribution company meter readers collect electricity consumption data remotely.
- b) Consumers can check their consumption data by checking fake meters.
- c) By strengthening remote access system and network software, meter readers eventually become not necessary to collect data.



Source : EDM I

Figure 2-5 Outline of EDM I Anti-tampering Metering System (Pilot Project in Nicaragua)



Smart Meter on Top of the Pole

Source: Photo by JICA Survey Team



Fake Meter of Each Consumer

Figure 2-6 Photos of EDM I Anti-tampering Metering System (Pilot Project in Nicaragua)

(5) Surveyed companies and organizations

Table 2-2 shows the list of surveyed companies and organizations. In the field surveys conducted in Guatemala, Nicaragua, Dominican Republic and Jamaica, JICA Survey Team had conducted a total of ninety one (91) interview meetings, including those with nine (9) banks, eight (8) ESCOs, seven (7) SPG companies, eighteen (18) industrial organizations / associations, seven (7) public sectors, three (3) electricity companies, 29 end-users and seven (7) other stakeholders.

In March 2014, with the supports of IIC partner organizations and target sector industrial associations, a total of four (4) seminars were conducted in Guatemala and Dominican Republic. These seminars were conducted to ensure an effective data collection on EE need and issues as well as to provide chances to introduce eligible Japanese EE and SPG technologies. The seminar outline and the names of the host organizations are summarized below. The detailed information of these seminars is summarized in Appendices 3-1 and 3-2.

1) Seminar outline

- a) Presentations by Japanese manufacturers with Q & A sessions:
 - Panasonic (presentation on SPG, inverter and VRF ACs)
 - MYCOM (presentation on high efficiency compressors and “Eco-cute”)
- b) Information exchanges on financing need and barriers that prevent the promotion of EE

2) Host organizations

i) In Guatemala

- a) On 6th March: JICA Survey Team, Guatemala Chamber of Industry (CIG), Guatemala Exporters Association (AGEXPORT) and Centro Guatemalteco de Produccion Mas Limpia (CGPL)
- b) On 7th March: JICA Survey Team and American Chamber of Commerce in Guatemala (AMCHAM)

ii) In Dominican Republic

- a) On 13th March: JICA Survey Team, supported by Santo Domingo Chamber of Commerce (CCP), Ministry of Energy and Mines (MEM) and Dominican Republic Green Building Council (DRGBC)
- b) On 14th March: JICA Survey Team, supported by MEM, Dominican Republic Exporters Association (ADOEXPO) and Dominican Republic Industries Association (AIRD)

Table 2-2 List of Names of Companies and Organization Visited in Each Country

SECTOR	SUB SECTOR	NAME			
		Guatemala	Nicaragua	Dominican Republic	Jamaica
FI	Banks	BAC Guatemala, Banco Industrial, Financiera SUMMA	BAC Nicaragua	Banco BHD Lepn, Banco Ademi	DBJ, Scotia Bank, NCB
	Leasing	GCF Leasing, BAM Leasyng, GREENfinancing			
Distributors/Suppliers		Distelsa, Panasonic Eco Center		SEMA, HI FI, Eco Center	ATL, Eco Center
Industrial Associations	Industrial Associations	CIG, AMCHAM, AGEXPORT, ANAVI	CADIN, APEN, CEI	CCP, AIRD, AMCHAMDR	JCC, JMA
	Hotel/Tourism Associations	INGUAT	CANATUR	ASONAHORES	
	Contractors Associations			ACOPROVI	
Cleaner Center		CGPL	CPmL		
Public Sector Promoters	Ministries			MEM/NPSE	MSTEM
	Utilities	NCEE			JPS
	Investment & Trade Promotion Agencies				JAMPRO
	Other				ODPEM
Distribution Companies		Energuate	Disnotre/Dissur	Edenorte	
ESCO		Capital Network, Estrategias de Inversion, Enernova, Eficiencia Energetica		New Energy, CVA	New Leaf, CARIBBEAN ESCo LTD
Individual Companies	Hotels				Spanish Court
	Poultry	Avicola Villalobos, Avicola Villalobos Suraves			Rosewell Farms (Poultry farm and Cold storage facility)
	Shopping Mall			SAMBIL Mall	
	Hospitals			HGPS	
	Industrial Zone		CNZF(FTZ)	MercaSID	
	Beverages	Cobea (ice), Cereveceria Centro American (beer), Femsa Guatemala, Fersa	AJE Managua, KOLA SHALER, GLACIAL(ice), COMPANIA CEREVECERA (beer), HIELO CELSA(ice), FEMSA, AJE MANAGUA	Tropijugos	
	Storage			Mercafrio, ALFRIDOMSA	
	SPG (EPC)	COBRA	Technosol	FOTONA, ReFeel, Trace , KAYA, WIRSOL	
	SPG (investor)	GREEN/IDC			
	Textile		Rocedes, Gildan		
	Food Processing	BIMBO(bread)	Sukarne		
	Frozen Food	Alimentos Congelados	Central American Fisheries		
	Other		Proteinos Naturals		

Chapter 3

Survey Results

Chapter 3 Survey Results

3.1 Current Status and Barriers to Promote EE and SPG in the CAC Region

3.1.1 Current Status and Barriers to Promote EE and SPG

In this chapter, focusing on technical aspects of EE equipment and SPG, the current status and barriers that prevent the usage of EE technologies in the CAC region are analyzed. The target EE technologies are as follows:

- a) ACs, which are the largest electricity consuming appliances in the business and commercial sectors in the CAC region;
- b) Compressors and chilled / hot water supply equipment, which are typically used in large energy consuming industries, such as food processing, agro and aqua products storage facilities;
- c) SPG;
- d) New construction of Green Buildings (GBs)⁴, which are equipped with EE equipment and SPG; and
- e) Anti-tampering metering system

In addition, this chapter also touches upon the current status and barriers that prevent the application of various financial schemes, which have been applied to promote the introduction of EE equipment and SPG in the CAC region. For instance, ESCO / ESCO-like business finance and finance lease of EE equipment are described in details.

(1) High-efficient ACs

In the CAC region it has been confirmed that about 50% of electricity in business and commercial buildings is consumed by air conditioning⁵. The average COP (Co-efficient of Performance) of the existing ACs remains low ranging from 1.0 to just above 2.0⁶, and high efficient inverter and VRF ACs have not yet been introduced very much. By replacing these existing ACs with higher-efficient inverter / VRF ACs, 40-60% electricity reduction⁷ is expected to be achieved. In another word, by improving the efficiency of ACs for business and commercial buildings in the CAC region, it is expected to reduce 1/2×1/2 ~~of the~~ total electricity consumption of these buildings. The simple payback period of introducing high-efficient ACs is estimated to range around 4-6 years. Thus, the energy and cost reduction benefit gained by introducing high-efficient ACs is assumed to be quite large. However, measurement and quantitative analysis to confirm the benefit have not been conducted yet. As a result, the effectiveness and benefit of introducing high-efficient ACs in the CAC region have not been recognized by end-users and FIs, and

⁴ Green Building: Buildings designed and constructed concerning environmental aspect and natural resources. Evaluation indicators include the introduction of EE and RE technologies.

⁵ Source: This is the common understanding of GB Councils in Guatemala, Nicaragua and Dominican Republic. In Jamaica it has been confirmed that 50% of the total electricity consumption is consumed in air conditioning, 25% in lighting and 10% in OA appliances in a governmental building (of the Office of Disaster Preparedness and Emergency Management / ODPEM) through walk through energy audit.

⁶ In many developing countries, ACs with COP over 3.0 are categorized as high efficient; however, COP of dominant ACs in the CAC region is about 2.0. As well, the COP of the ACs in a junior high school, which was checked by the Survey Team, was as low as 1.0.

⁷ According to the estimation by Panasonic Latin America, expected energy conservation effect by introducing inverter technology in the CAC region is about 50%. And the actual energy conservation ratio by replacing existing ACs with VRF ACs is about 60%, which was recorded at BANCENTRO Managua in February 2014.

accordingly the market penetration rate of high-efficient ACs remains very low at single digit⁸ (whereas in Japan, it is 100%). As for VRF ACs, which are categorized as a group control system of high-efficient ACs, its market penetration rate in the CAC region remains at 1-2%⁹ (whereas in Japan, it is about 50%¹⁰ for middle and large sized buildings). Lack of measurement and verification of the quantitative benefits of high-efficient ACs (thus, lack of effective data) is considered to be the largest barrier that presents the dissemination of high-efficient ACs in the CAC region.

In addition, a) end-users and FIs' lack of access to high-efficient inverter ACs and VRFs and their manufacturers and b) difficulty for FIs to formulate financing mechanism to promote the introduction of EE equipment by end-users (since the price of each EE equipment is relatively small and thus the transaction cost per loan deemed relatively high), are also barriers that prevent the promotion of high-efficient ACs.

Prominent Japanese companies in promoting high-efficient ACs in the CAC region include:

For inverter split type ACs: Panasonic (share 20%: No.1), Toshiba Career, Fujitsu General and Mitsubishi Electric

In the area of inverter split type ACs, one of the competitors of Japanese companies is LG (Korea). It is difficult to avoid the market penetration by LG, but Japanese inverter technology and product prices are equally or more competitive to those of LG's.

For VRF ACs, Panasonic (which is currently expanding its product lineup), Toshiba Career (with over 100 exterior units imported annually in the Dominican Republic) and Daikin

One of the competitors of Japanese companies in VRF market is also LG (Korea), which entered the CAC market earlier than Japanese manufacturers; and therefore LG currently boasts the highest market share (at about 50%) in the CAC region. In order to compete with LG products and promote the introduction of Japanese VRFs in the market, more active promotion of Japanese products is needed, including the sharing of actual data on financial benefits of introducing Japanese technologies.

(2) High efficiency compressors (for chilling and cooling) and chilled and hot water supply system

As typical energy consuming industrial sub-sectors, following seven (7) sub-sectors were selected: brewery, chicken processing, beverages, milk processing, ice making, vegetable freezing and fish freezing. And for these sub-sectors, current status and barriers that prevent the usage of EE technologies were surveyed. Through the surveys conducted for 20 factories, it was confirmed that: a) only one factory had installed high efficiency compressors (while it is the standard equipment in Japan), b) no factory had installed high efficiency chilled and hot water supply system (Eco-cute). The simple payback period of introducing high efficiency equipment was estimated to

⁸ Source: Panasonic and Toshiba Career

⁹ Source: Panasonic and Toshiba Career

¹⁰ Source: Daikin

be around 3-7 years. The energy and cost reduction benefits thus gained was assumed to be quite large. The barriers that prevent the usage of EE technologies in the CAC region are summarized as follows:

- a) End-users / FIs' lack of access to these high efficiency equipment and their manufacturers.
- b) Lack of measurement and verification of the quantitative benefits (i.e. energy saving amount) of high efficiency air compressors (thus, there is no actual data available to share successful cases)
- c) Lack of low interest financial sources for SMEs to cover relatively high upfront investment costs of these high efficiency equipment
- d) Difficulty for FIs to formulate financing mechanism to promote the introduction of these EE equipment for end-users, since each equipment price is relatively small and accordingly the transaction cost per loan deemed relatively high.

Japanese company, which is currently promoting high efficiency compressors and chilled and hot water supply system ("Eco-cute") in the CAC region, is MYCOM. Its competitors are Johnson Control (USA) and GEA (EU). Although MYCOM has larger experiences in the Central American region than the other two companies, its sales performance and public recognition is limited in Caribbean countries. Therefore, it is necessary to increase opportunities to introduce these Japanese products and their energy efficiency to end-users in these countries.

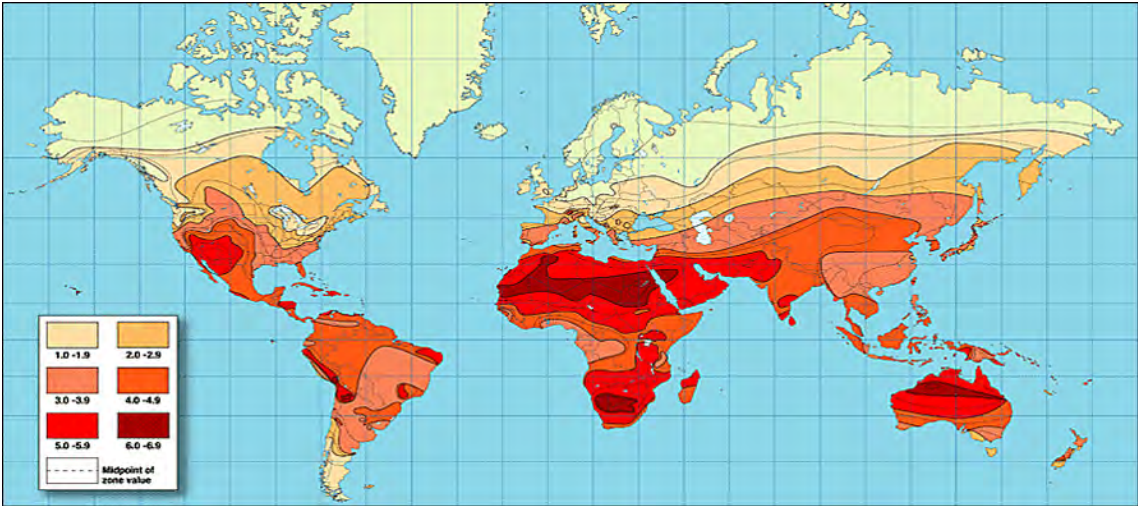
(3) SPG

The amounts of daily solar radiations in Guatemala (Guatemala City), Nicaragua (Managua), Dominican Republic (Santo Domingo) and Jamaica (Kingston) far exceed (30 to 100%) those of top SPG leading countries, such as Germany (Berlin), China (Beijing), Japan (Tokyo) and the U.S.A., which render them suitable for SPG. (See Table 3-1 and Figure 3-1) Besides, electricity tariffs are higher and incentive mechanisms to promote SPG have already been installed in the four countries. (Details are to be mentioned later.) As a result of this, the simple payback period for investing in SPG will be relatively shorter at around 3-7 years in the CAC region.

Table 3-1 Comparison of Solar Radiation by Country (1)

Country/City	Solar radiation kWh/m ² /day
Guatemala/Guatemala City	4.9
Dominican Republic/Santo Domingo	4.9
Nicaragua/ Managua	5.2
Jamaica/Kingston	5.7
Germany/Berlin	2.6
China/Beijing	4.2
Japan/Tokyo	3.7
USA/New York	3.7

Source: GAISMA, "Insolation" (<http://www.gaisma.com/en/dir/001-continent.html>)



Source: Four Peaks Technologies, “Solar in-Depth” (2011)

Figure 3-1 Comparison of Solar Radiation Amount (2)

Under such favorable conditions in the CAC region, there are a lot of mega SPG projects in the pipeline; and financing need is increasing accordingly. Panasonic Latin America has several SPG projects in the pipeline in the Central and South America, and the total size of which amounts to approximately 400 MW as of end-2013. The currently perceived barriers that prevent the dissemination of SPG include the below:

- a) Lack of objective information necessary for FIs and investors on economic benefit of SPG projects and
- b) Difficulty to secure financing for these projects and resulting delays in their implementation.

A Japanese company which has been promoting SPG in the CAC region is Panasonic. And the competitors in this field include Yingli (China) and many other EU and US companies. Nevertheless, Panasonic SPG system has a competitive advantage over competitors’ products in term of their long-term quality, warrantee and prices.

(4) Constructing GB projects¹¹

The trend to construct environmentally friendly buildings (GBs) started in the 1990s, and is accelerating with the growing awareness of global climate change and energy issues. Various kinds of evaluation tool for GBs have been developed and operated worldwide; and many of them have a built-in third-party certification mechanism. These tools are utilized to improve companies’ social and environmental images as well as to increase the value of their assets. International GB assessment tools include the Leadership in Energy and Environmental Design (LEED), which has been developed in the USA and became widely used around the world¹², the Comprehensive

¹¹ In the CAC region, sizes of buildings are comparatively smaller and the average investment size for EE retrofitting amounts only to tens of thousands of USD. Therefore, the first target of GB loans should be limited to new constructions, which need larger investment than retrofitting. EE retrofitting will be dealt with under the ESCO loan scheme.

¹² LEED, which was developed in the USA in 1998, is a GB assessment indicator to increase asset values.

Assessment System for Building Environmental Efficiency (CASBEE)¹³ of Japan and the Building Research Establishment Environmental Assessment Method (BREEAM¹⁴) of the UK.

LEED is utilized as a means to increase the value of assets especially for commercial buildings in the USA. However, the expense needed to acquire a LEED certificate is high at around USD 3,000. It is often the case that the owners of GBs acquire GB certificates as indicators to improve their buildings' asset value, (which should exceed the amount of certification fees,) based on their environmentally-friendly and high-quality building structures.

CASBEE, which has been adopted by many municipalities in Japan, is closely linked with the Japanese Energy Conservation Law; and therefore it has to be customized when applying abroad.

In many countries in the CAC region, it has been confirmed that the acquired number of LEED certificate for office and commercial buildings has been increasing. And in parallel, financial need for GBs construction (with investment size of USD 1-5 million / building) is also increasing.

In Guatemala, Nicaragua and Dominican Republic, GB Councils were established in order to promote GBs and to raise awareness on GB concepts. Through the meetings with the Chairman of Guatemala GBC and the President of Dominican Republic GBC, the following barriers that prevent the introduction of GBs were pointed out:

- a) Due to human resource restrictions (with only three full-time workers per GBC), activities of the two GBCs are limited to monthly regular meetings, seminars and related activities. So far, not enough services are provided by GBCs in Guatemala and Dominican Republic for promoting GB constructions; the economic benefit and social significance of GBs should be spread more and necessary support should be provided to facilitate the acquisition of GB certificates.
- b) LEED is becoming introduced in the CAC region; however, since the expense to acquire LEED certificate is too expensive, GBCs would like to develop simpler and less costly assessment tool than LEED which is better aligned with the CAC context.
- c) Lack of incentive mechanisms (such as long term low interest loans) to promote GBs

(5) Anti-tampering metering system

In many CAC countries, reduction of electricity distribution loss, which currently varies from 20 to 40% of total electricity supply amount, is becoming a big issue. And as an eligible countermeasure to solve this problem, the need to apply anti-tampering metering system has been confirmed very high through interviews with the relevant distribution companies. As the common procedures to introduce anti-tampering metering system, the establishment of a pilot project is needed prior to the commencement of a full-fledged project. In order to effectively promote the application of this system in each country, electricity distribution companies, with which JICA Survey Team had

¹³ CASBEE was developed in Japan in 2004. It is a GB assessment indicator applicable to any types of buildings.

¹⁴ BREEAM, which was developed in UK in 1990, is widely used in EU countries.

interviews, had clearly pointed out that: a) early implementation of pilot projects and verification of their results and b) securing low interest loan to cover the costs of full-fledged project (since companies' access to financing sources are limited and those available finance are expensive) are the two biggest issues that need to be solved. (As for the details, see 3.1.2, "Current Status and Barriers by Country")

Japanese company, which is promoting anti-tampering metering system in the CAC region, is EDM. There are several competitors in this field including YPP (Korea). Yet they cannot match the prices and services provided by EDM in terms of the accuracy of meter reading and the flexibility in future system expansion.

As the common factor affecting all the above mentioned technologies, end-users in the CAC region are not eager to share their success experiences with other companies in order to keep a competitive edge in comparison to their peers in the same sector. At the same time, once the success experiences are recognized, companies are quick to follow suit. According to these human traits in the CAC region, it is possible to promote EE technologies in a relatively short period of time by disclosing and sharing the data of success cases (with the initiative of each sector).

(6) EE promotion financing methods

In all the four survey target countries, namely, Guatemala, Nicaragua, Dominican Republic and Jamaica, electricity prices are high and the need for energy cost reduction is already felt strongly especially among the medium to large customers of FIs. Several FIs have started providing EE promotion financing in order to support SPG and EE equipment investments. (See Appendix 2 for the details)

With regards to SMEs, on the other hand, the burdens of high energy costs are being felt, but not enough to motivate them to introduce EE equipment through bank loans or leasing. There are SMEs, which received energy audits with the support from donor agencies (CABEI, IDB/IIC, etc.) and industrial associations. However, when it comes to the implementation of EE improvement measures proposed by those audits, SMEs are inclined to resort only to those measures (with 0-2 years payback), which can be implemented either non-costs or low-cost (i.e. can be funded by their own funds). Thus, in order to promote EE investments among SMEs, the following support is needed: a) EE awareness raising (through provision of information on success cases, and by simplifying access to EE equipment and their manufacturers) as well as b) EE investment incentives (through formulation of preferential laws and regulations), such as provision of concessional loans.

In the area of RE power generation for which preferential laws and regulations have been already installed in the CAC regions, many enterprises (such as leasing companies, ESCOs, appliance distributors, etc.) are starting their projects. Therefore, in order to promote EE in the CAC region, it is considered effective to more widely apply the only-partially adopted EE investment incentives, such as tax benefit and low interest loans (which will be discussed in the following sections).

In the CAC region, although still at the emerging stage, there are several full-fledged ESCOs starting

to provide services. The common features witnessed among these ESCOs are the fact that each of them, despite the types of industries, belongs to a group company, which has high credibility as well as an access to a huge customer base. In every case, ESCOs have been established, with strong supports of their parent companies, for the purpose of attending to the EE improvement need of the parent companies and their existing customers. Another feature of these ESCOs is that they are targeting at relatively large sized ESCO projects of financially sound customers. In order to promote ESCO projects among the medium sized projects and end-users, issues such as the following need to be tackled: a) lack of a risk guarantee scheme to mitigate ESCO business risks and b) limited financing available for ESCO projects, while interest rates are high for accessible financing (,which render ESCO business less profitable).

As regards to the lease financing scheme, in Guatemala, where there are tax benefits, some leasing companies have started providing finance lease for the promotion of EE equipment and SPG in the past 1-2 years. (See BOX 1: article for advantages of leasing). In Guatemala, only less than 5% of total equipment purchases by enterprises are through leases,¹⁵ among which only 1% is for EE equipment. Therefore, there still is a huge market potential in EE equipment leasing in the years to come.

In the CAC region, as mentioned previously, there are various types of EE promotion financing schemes emerging as in the forms of ESCO / ESCO-alike businesses (see BOX 2 article) and leases. Some common features of these financing schemes can be summarized as follows:

- a) Financial schemes provided by FIs (banks, leasing companies, ESCOs, etc.) impose no additional financial burden on customers, the meaning of which is that the total expenses of the financial scheme will not exceed the current energy costs borne by the customers.
- b) FIs are formulating financial schemes collateralizing on the credibility of the existing customers, which will complement the risk of financing ESCO / ESCO-alike projects with no performance guarantees attached.

In ESCO / ESCO-alike businesses as well as in EE equipment leasing, FIs (banks, leasing companies, ESCOs, etc.), which provide financing assume that their investment costs will be collected from the cash flow to be generated from the concerned energy saving projects. Nevertheless, in the CAC region, it is not common for any FIs to provide financing for cash-flow based projects (i.e. project finance), and in case they must involve in project finance, FIs generally require additional collateral from the borrower. Given such financial environment in the CAC region, it is most understandable that the emerging ESCO / ESCO-alike businesses as well as EE equipment leasing are initially promoting EE investments among their existing customers with strong financial standing.

Among the four survey target countries, JICA Survey Team had specifically had meetings in Guatemala and the Dominican Republic with FIs (banks, leasing companies and ESCOs), which are engaged in EE promotion financing. The below is the list of issues raised by these FIs for further

¹⁵ The share of lease in total equipment purchases by enterprises: 31% in USA, 8.7% in Japan and around 10% in EU.

promoting EE financing:

- a) FIs have less chanced to have an access to EE equipment and meet their manufacturers.
- b) End-users do not understand the economic benefit of purchasing EE equipment.
- c) Lack of success cases (show cases)
- d) Low technical levels applied to energy audits, which will determine success / failure of project implementation.
- e) Limited access to adequate financing (acquiring long-term low interest loan is difficult). And accessible financing sources are expensive and short in maturity, (which render their businesses less profitable)
- f) End-users and FIs have low levels of EE awareness (due largely to lack of correct information), despite the fact that end-users are cost conscious about their rising electricity bills.

BOX 1: What are the advantages of leasing?

There are various advantages to leasing (see Table 3-2), it is especially beneficial for SMEs, which are financially fragile and not fit for bank loans. Leasing will provide such SMEs with an effective tool to raise funds for introducing new facilities by not purchasing (thus off-balancing) assets therewith preserve their cash reserves (through the reduction of lease expenses from the taxable income) and thereby save bank lines of credit (for other purposes).

Table 3-2 Benefits of Leasing to Lessee

	In case of purchase	In case of lease
Expense	Amount of purchase	Fixed lease payment
Asset entry (ownership)	Required (On-balance sheet)	Not required in countries where book entry of leasing payments are allowed as rent expenses) (Off-balance sheet)
Depreciation	Required	Not required
Book entry as expenses (cash burden)	In case of declining balance depreciation, the asset is depreciated more quickly at the beginning of its useful life, therewith puts bigger cash burden at the initial stage of investment.	Leasing payment is monthly fixed. Thus the amount of book entry of leasing expense is fixed monthly (which contributes to leveling-off of cash burden)
Bank lines of credit/own funds	Required	Not required (Bank lines of credit and own funds can be saved for other purposes)
Terms & conditions	Appraisal of business performance in the past 2-3 years: (Collaterals required)	Appraisal of business performance in the past 6 months: (Collaterals not required)

Technology obsolescence of facilities/ equipment	There are risks of technology obsolescence of the assets.	Compared to purchases, the risk of technology obsolescence can be eased (by setting the leasing term shorter than the useful life of the assets, thus enabling accelerated depreciation of the assets).
Cash flow management	<p><u>More difficult cash flow management</u></p> <ul style="list-style-type: none"> ▪ Larger cash outflow at the purchase of the assets ▪ Larger cash set aside for depreciation at the earlier stage ▪ Interest rate on a bank loan varies according to the market. ▪ Higher burden on administrative duties (including fund procurement, accounting, insurance, tax and asset management) 	<p><u>Easier cash flow management</u></p> <ul style="list-style-type: none"> ▪ Fixed annual amount of cash outflow ▪ The journal entry of expense is made at the fixed amount equal to each lease payment amount. ▪ Lease payment amount is fixed all through the lease period irrespective of inflation changes ▪ Less administrative duties required

There are two types of leasing arrangement, namely, operating lease and finance lease. The former is a lease agreement, in which the ownership of an asset is NOT transferred to the lessee and stays with the owner of the asset i.e. lessor, while the latter is a lease agreement, in which ownership of an asset is transferred to the lessee from the lessor at the end of the leasing period. For instance, operating lease arrangement is suitable for vehicles, which are highly versatile assets that can be traded at the secondary market whereby their future fair market values can be estimated. In operating lease, leasing company (lessor) can offer favorable prices for lessee to use the leased assets during the leasing period since the future value of the assets at the secondary market (i.e. residual values) is not included to the total amount of lease payments.

On the other hand, each leasing arrangement of high energy efficiency equipment to the industrial sector customers is mostly custom-made, since they have no secondary markets. In such a case, in a finance leasing arrangement, leasing company (lessor) will fix monthly lease payments and leasing term according to the customer's (lessee's) requests, at the same time, require the lessee to purchase the assets at the completion of the leasing term. In cases, where it is not possible to collect total investment costs related to the leased assets during the said leasing term, the residual values of the assets must be either paid in a single lump-sum by the lessee at the completion of the lease contract or leasing term will be extended.

BOX 2: What are ESCO and ESCO-alike businesses?

ESCO (Energy Service Company) business is a comprehensive energy-saving services (including provision of energy-saving solutions, instalment of EE equipment, maintenance and operation of installed equipment) provided by an ESCO, which engages in a performance based contract with a client firm guaranteeing certain level of energy efficiency (EE) improvements (i.e. reduction of energy consumption and/or costs) and, in return, receives remuneration out of thus achieved energy savings.

The source of payments to such ESCO services derives from the energy-savings achieved, and the total payment amount will be arranged so as not to exceed the client's current total energy bill.

There are two major types of models in ESCO business: a) the guaranteed savings model (see Figure 3-2) in which ESCOs provide clients with performance guarantees, but no financing; and b) the shared savings model (see Figure 3-3), in which ESCOs provide performance guarantees as well as financing. As for the former, clients themselves procure funds from banks based on their credibility and make repayments out of energy cost savings. And for the latter, energy cost savings will be split between the client and ESCO based on a pre-determined rate. There are also cases where ESCOs are in alliance with banks and leasing companies.

There also exists ESCO-alike businesses, to which no one provides performance guarantees, but financial institutions (,such as banks, leasing companies and ESCOs) agree to provide financing based

on cash flow expected to be generated from their energy-saving projects. In an ESCO-alike project, a client firm may enjoy an advantage of introducing EE equipment without any additional financial burden, but at the same time, unlike an ordinary ESCO business, it will have no risk hedge against underperformance due to incidents, such as electricity price falls which make it impossible to achieve expected energy cost reductions.

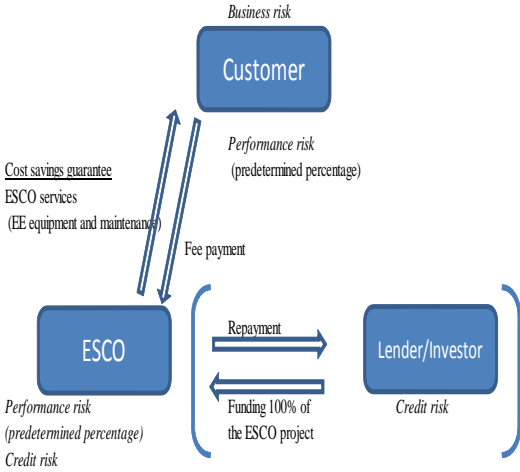


Figure 3-2 ESCO Shared Savings Scheme

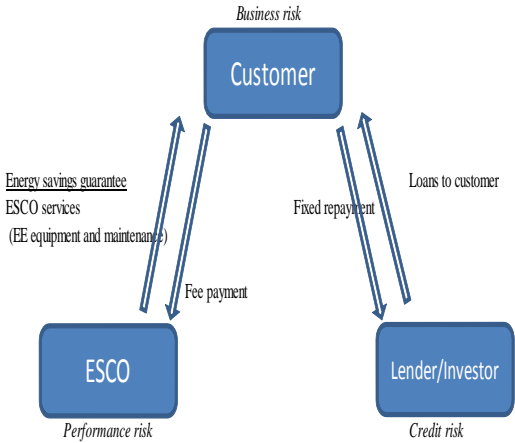


Figure 3-3 ESCO Guaranteed Savings Scheme

3.1.2 Current Status and Barriers by Country

(1) Guatemala

1) EE promotion financing methods

With relatively high electricity prices (at around 10-23 US cent/kWh) for commercial and industrial facilities, electricity end-users have strong need to reduce energy costs. There are several EE promotion financing methods (including ESCO / ESCO-alike businesses and leasing), which are starting up in Guatemala. In the following paragraphs, their current status and the barriers that prevent the promotion of each EE financing method are discussed.

i) A case of an independent leasing company collaborating with a bank (see Figure 3-4)

GCF Leasing in Guatemala promotes SPG and EE equipment finance leases. It proposes financial scheme to a bank which, upon agreement, finances the proposed leasing project. It procures funds from banks based on customers’ creditworthiness. The role of GCF Leasing is to structure a finance lease scheme reflecting its customer’s needs, negotiate with banks, order machineries and equipment, handle leasing transactions and paperwork for the customer until the end of the leasing term. In this financial scheme, the bank with which the customer currently has transactions will pay in a lump sum the total payments to EE machineries and equipment suppliers as well as the total remuneration for the leasing company. The bank acquires the ownership of the leased property as collateral. The maximum leasing term that can be structured by GCF Leasing is currently limited to 7 years, despite the fact that there is an increasing number of projects which require 10-year leasing term (such as 1-1.5 MW SPG project with total investment of around USD 2 million). Currently, access to adequate financing is limited; and

accessible financing is higher in prices and shorter in maturity (rendering the business less profitable). If GCF Leasing can secure over 10-year long-term low interest rate financing, it can further stimulate the demand for EE equipment leasing.

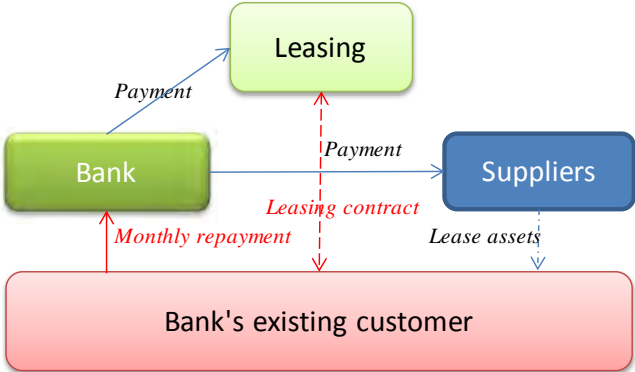


Figure 3-4 A Case of an Independent Leasing Company Cooperating with a Bank

ii) A case of leasing division of a bank collaborating with an electrical appliances distributor (see Figure 3-5)

BAM, one of Guatemala’s major private banks, has established in October 2013 the leasing division (BAM Leasyng), which specializes in EE and SPG equipment leasing. BAM, utilizing its customer base, has been promoting the introduction of SPG and EE equipment among its creditworthy customers. The bank applies a sales & lease back method, in which the bank buys the leasing property purchased by the customer and leases it to the customer. In this finance scheme, appliances distributor can get its payment in a lump sum from the bank. As for the distributors, with which BAM chooses to collaborate, the bank certifies distributors based on the criteria that they deal with the world’s highest standard (i.e. the top ten) EE equipment. The kind of EE equipment BAM Leasyng currently deals with is limited to high efficiency lighting (LED) and SPG. In order to further expand its EE equipment leasing business, following issues have to be overcome: a) lack of contacts with EE equipment and its manufacturers which are necessary to expand EE equipment leasing business and b) the difficulty to find long-term low interest rate financing. With regards to the leasing term, it has been limited to five years until the last October when the Bank has allowed it to be extended to 8 years. This has contributed to the sales promotion of EE equipment leases. As the second phase of EE equipment promotion, BAM currently has a plan to offer additional loans (not a lease) for the introduction of SPG to existing mortgage loan customers. In March 2014 alone, approximately 1MW of SPG was thus introduced, and BAM expects the demand will expand in the years to come. BAM considers it is possible to further stimulate the demand, if it can acquire the funding longer than the currently available 8 years.

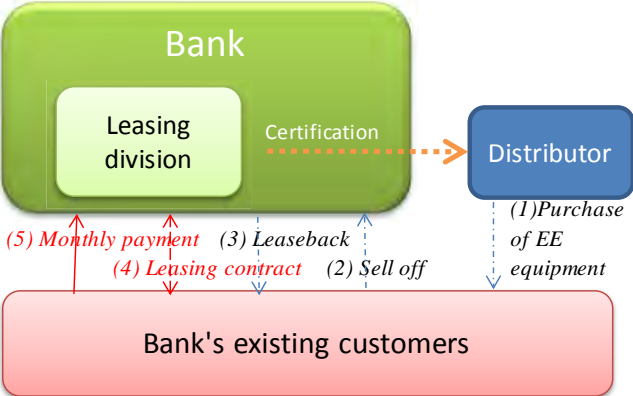


Figure 3-5 A Case of a Bank’s Leasing Division Collaborating with Appliance Distributors

iii) A case of an appliance distributor collaborating with a bank (see Figure 3-6)

Distelsa, the largest electrical appliances distributor in Guatemala (its shops are known as MAX), has been promoting SPG to the existing mortgage loan customers of the Banco Industrial, one of Distelsa’s affiliated companies. It has implemented a successful pilot project, in which the customer who had agreed to introduce SPG was granted an extension to his / her mortgage loan term in order to cover the additional cost of investments. And appliances distributor is able to receive its payments in a lump sum. Distelsa plans next to promote SPG among the industrial sector (B2B). Those B2B projects already in the pipeline amount to a total of approximately 11 MW in terms of SPG capacity (which is equivalent to about USD 23 million, provided that investment costs of 1 MW SPG equals to USD 2 million). A rough estimation of the total capital demand for such B2B business is around USD 500 million for the following five years. And the fund procurement is one big issue to be tackled at the moment. Access to an adequate financing (long-term low interest rate loans) is limited and those available financing is higher in prices and shorter in maturity (which render the business less profitable). As well, there is a strong tendency in Guatemala that one successful case can trigger peers to follow suit. Therefore, presenting one good example per industrial subsector is the most effective way to promote EE among industries. And the lack of such success cases is considered as the big issue at the moment.

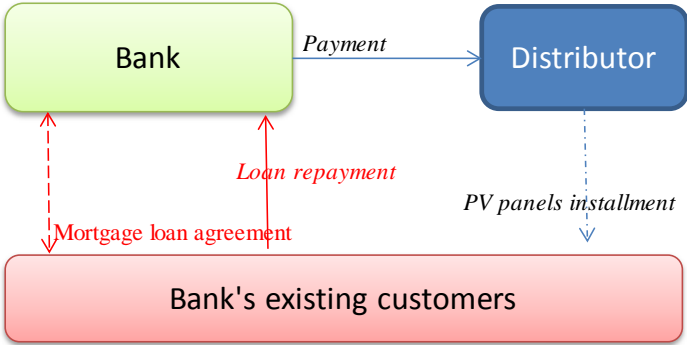


Figure 3-6 A Case of an Appliance Distributor Collaborating with a Bank

iv) A case of leasing company collaborating with its group companies (see Figure 3-7)

GREEN Financing, which is a leasing subsidiary of IDC, a major developer in Guatemala, has been collaborating with the engineering division of the parent company as well as utilizing the huge customer base of the parent company. GREEN Financing leases out EE equipment (including SPG) which it purchases in a batch out of its own funds. Monthly purchases of GREEN Financing include one container of 500 solar panels (equivalent of 126 kW, USD 85,000-95,000), one container of solar heaters (worth USD 50,000) as well as one container of boilers for solar heaters (worth USD 50,000), which altogether amount to USD 2.2 million a year. The company has used its own funds to purchase leasing properties in the past, but is currently discussing the possibility of fund procurement from FIs in response to the increasing demand. The biggest issue at the moment is to find low-interest funding sources which would fit the project formulation process. GREEN Financing currently has in the pipeline approximately four hundreds (400) SPG projects (a total of 75-80 MW in installed capacity) for industrial, commercial and residential sectors.

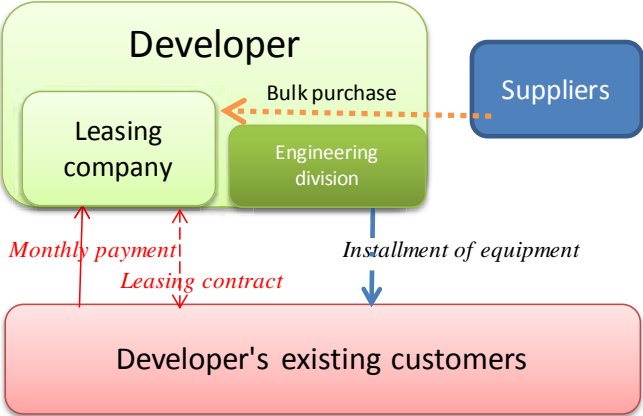


Figure 3-7 A Case of a Leasing Company Collaborating with its Group Companies

v) A case of division of grand energy consuming company implementing ESCO business
 Enernova, an energy business subsidiary of Cementos Progreso, a major cement company in

Guatemala, currently provides ESCO services based on guaranteed savings scheme to large energy consuming cement and other industries (where energy costs consists more than 50% of total expenses). Enernova offers ESCO services focusing on not-so-complicated EE technologies, (such as replacement of motors and compressors as well as insulation), utilizing a huge customer base of the Group companies including a power marketer, Electronova. ESCO projects are financed by customers based on their own credibility. In 2014, Cementos Progreso plans to launch an ESCO subsidiary called Econova. The company currently offers ESCO services mainly to its clients in large energy consuming sectors, (such as cement, iron & steel and plastics) and to those in the commercial sector, funded by its affiliated Financiera San Miguel, which receives back-financing of the Central American Bank for Economic Integration (CABEI). Access to adequate financing is limited but in order to expand its ESCO business, one big issue is to find alternative sources of funding.

vi) A case of division of energy sector conglomerate implementing ESCO business

In August 2013, OEG, a major Guatemalan conglomerate with an emphasis on energy sector, has established a 100% subsidiary Eficiencia Energetica to provide a full-fledged ESCO services. Eficiencia Energetica currently provides ESCO services in alliance with other nine OEG group companies (such as those in AC manufacturing, industrial automation, motor manufacturing) as well as with those suppliers under strategic partnership contracts. Eficiencia Energetica offers ESCO services based on shared savings scheme, in which an ESCO will procure funds, install & maintain EE equipment, and recover investments from generated energy savings. Eficiencia Energetica focusses on making proposals and implementing relatively large sized ESCO projects for those financially sound customers selected from among the Group companies' huge customer base. There are twenty three (23) EE and SPG projects in the pipeline for industries and hotels, and securing financing for these projects is the major issue at the moment.

Table 3-3 is the list of FIs and enterprises in Guatemala that currently provide energy efficiency promotion finance, and Table 3-4 is the list of enterprises and agencies that provide support to enterprises and FIs promoting EE activities.

Table 3-3 FIs and Enterprises Providing EE Promotion Finance (Guatemala)

Name of Enterprises & FIs	Outline of ESCO / ESCO-alike Businesses
Enernova (ESCO)	Energy business unit of the Cementos Progreso, a major cement company in Guatemala. Conducts guaranteed savings type ESCO businesses. Plans to establish Econova, an ESCO, in March 2014.
Eficiencia Energetica (100% Subsidiary of ESCO / OEG)	As an ESCO established in 2013, it provides ESCO services based on performance contract, taking advantage of a huge customer base of the OEG Group companies covering all industrial sectors.

Name of Enterprises & FIs	Outline of ESCO / ESCO-like Businesses
Capital Network (ESCO)	It conducts energy efficiency consultations, and utilizes leasing companies to provide finance for ESCO projects.
MAX / Distelsa (Major Electrical Appliances Distributor in Guatemala)	As a Panasonic distributor in Guatemala, it promotes instalments of SPG for the household and industrial sectors.
GCF Leasing (Independent Leasing company)	GCF Leasing promotes SPG and EE equipment finance leases. It proposes financial scheme to a bank which, upon agreement, finances the proposed leasing project.
BAM Leasyng (FI's Leasing Division / a Division of the BAM)	In 2013, BAM Leasyng started SPG and EE equipment leases. In 2014 as the second phase, BAM plans to promote additional loans for SPG investments among the bank's mortgage loan customers.
Financiera SUMMA (Private Bank)	Financiera SUMMA provides financing for EE finance lease projects after conducting appraisals of the proposal submitted by a leasing company. The bank can also provide agency services in conducting preliminary eligibility screening of borrowers, credit management, trust fund management, etc. for other institutions.
GREEN (SPG Subsidiary of Energy Sector Developer & Consulting Company)	GREEN has already installed around 3000 small-sized SPG for the household sector. As a result of the public tender held in 2013, GREEN won 5 MW SPG project, a 15-year PPA, located in the Eastern part of the Guatemala City.
GREEN Financing	It is a leasing subsidiary derived from the business of the GREEN engineering, which is one of the subsidiaries of GREEN. The company provides SPG, water heaters, etc. to the household, industrial and commercial sectors.

Table 3-4 Enterprises and Agencies Promoting EE (Guatemala)

Name of Enterprises and Organizations	Activities
Energy Efficiency Alliance Alternatives Platform (EE platform)	EE platform to enhance cooperation among industrial, government and academic sectors, which is under preparation by Energua, an energy consulting company, with the support from National Energy Efficiency Commission (NCEE). The platform is expected to promote the government's EE policies including the enactment of Energy Efficiency Law, as well as to facilitate active information sharing which will enhance private sector EE investments.
AMCHAM (American Chamber of Commerce in Guatemala)	Due to rising electricity prices and based on the benefits provided by DRG rule of the General Electricity Law, SPG projects are increasing dramatically in both the household and industrial sectors. EE motivation is increasing among AMCHAM member companies. It expects to see further promotion of EE investments through expanded financing sources and technical assistance.
AGEXPORT (Guatemala Exporters Association)	High energy costs have been big burdens on exporting companies. Thus AGEXPORT member companies (in textiles, plastics, glass, cement, food processing and frozen food sectors) have strong interests in EE from the viewpoint of energy cost reductions.
CIG (Guatemala Chamber of Industries)	Strongly promoting EE activities among the 170 selected large energy consuming companies with above-100 kW electricity supply contract, as a definition). (These companies are mainly in food processing, beverages and plastics manufacturing industries.)

Name of Enterprises and Organizations	Activities
CGPL (Guatemala Cleaner Production Center)	Currently conducting walk through energy audits (takes 1-2 days per audit) targeted at the selected 50 SMEs in cooperation with IIC/GREENPYME Program.
ESTRATEGIAS DE INVERSION (EE Consultant)	It conducts preliminary energy audits of ESCO projects and provides EE improvement proposals. The company has conducted preliminary audits and submitted EE improvement proposals for buildings owned by EGGSA, Guatemala's major electricity distribution company.
INGUAT (Guatemala Tourism Board)	It is promoting the introduction of quality control standards to all hotels in Guatemala. In parallel with the training program held for this, INGUAT is willing to support the idea of promoting its members to participate in the future EE program, when it is established.
ZAMORANO (Educational Agency)	In 2014, it has started providing EE seminars in Guatemala. It focuses on awareness rising.

2) Technical aspect and EE potential

This section deals with the current status and issues as well as the energy / cost-saving potential of the following EE equipment: high-efficient ACs, high efficiency compressors, “Eco-cute,” SPG, new construction of GBs and anti-tampering metering system

i) High-efficient ACs

In Guatemala it has been confirmed that about 50% of electricity in business and commercial buildings is consumed in air conditioning. The existing ACs' average COP remains as low as about 2.0¹⁶, and high-efficient inverter and VRF ACs have not been implemented very much. Japanese and Korean manufacturers are gradually shifting their sales policy to introduce high-efficient ACs, with COP over 3 inverter split type and/or VRF type. However market structure has not been changed. Lack of measurement and verification of the quantitative benefit of high-efficient ACs (i.e. lack of data) is considered to be the largest barrier to prevent dissemination of high-efficient ACs.

Additionally, lack of end-users' access to high-efficient ACs and their manufacturers is also a barrier that prevent the promotion of high-efficient ACs.

In EE seminars held in March 2014 in Guatemala City, it was also confirmed that almost all participants, including industrial associations, end-users, ESCOs, FIs and consultants, were not aware of the concept / meaning of “inverter” and/or “VRF,” which are the key technologies of high-efficient ACs.

According to the estimation results, the amounts of annual electricity consumption and energy cost of one thousand (1,000) hotels under INGUAT were 13,000 MWh and USD 2.4 million, respectively. The financial need for the implementation of these projects was estimated to be

¹⁶ In many developing countries, ACs with COP over 3.0 are categorized as high efficient. Besides COP of dominant ACs in CAC region is about 2.0, and especially COP of the ACs in a junior high school, which was checked by the Survey Team, is quite low as 1.0.

about USD 15.0 million¹⁷. (Expected simple payback years: 6.3 years¹⁸)

ACs are used in not only hotels but also in office and commercial buildings: therefore the nation-wide energy and cost reduction potential by introducing high-efficient ACs is supposed to be several times larger than the above estimated values.

ii) High efficiency compressors and Eco-cute

The trial calculation¹⁹ was conducted on the amounts of energy savings and cost reductions in case of installing MAYCOM high efficiency compressors and Eco-cute in Guatemala. The calculation was conducted in the 7 subsectors (namely, brewery, broiler, beverage, dairy, ice making, vegetable freezing and fish freezing industries). Cooling and freezing sectors, which were the main industries that use compressors, had huge amount of electricity consumption and huge peak demand: and the ratio of electricity consumption of compressors in the peak demand was around 60-85%. Although the energy efficiency improvement ratio of high efficiency compressors is relatively low at around 10%, the cost reduction impact was larger due to its large market size. Therefore, the estimated amounts of energy consumption reduction and energy cost reduction are 26,200 MWh and USD 4.7 million, respectively. Additionally, the necessary initial cost was estimated to be USD 32.5 million. (Simple payback period is 6.2 years²⁰.) (See Figure 3-8.) As for Eco-cute, the trial calculation was conducted in the case of installing a double bundle type heat pump. Based on its result, the reduced amounts of electricity consumptions and energy costs were more than 60% due to large fuel consumption reductions, despite the increases in electricity consumptions. Nevertheless, the amounts of energy consumption²¹ and cost reductions of Eco-cute were smaller than those of compressors, due to its smaller target market. Thus, the estimated amounts of annual energy consumptions and cost reductions were 55,600 MWh and USD 2.3 million, respectively: and the total financial demand was estimated to be USD 37.5 million. (Simple payback period is around 3.2-3.3 years²².) (See Figure 3-9.)

Considering the domestic companies' bank borrowing ratio in Guatemala, the financing need is estimated to be about 20% of the above mentioned figures: (i.e. USD 32.5 million for compressors and, USD 7.5 million for Eco-cute). As described before, the barriers that prevent the introduction of high efficiency compressors and Eco-cute are: a) end-users' lack of information on the success cases (i.e. the benefits of introducing high efficiency compressors and Eco-cute) and b) lack of access to low-interest loans that can mitigate the burden of relatively

¹⁷ Conditions of calculation: EE ration by converting into high efficient ACs is set at 50%, Price of high efficient ACs is set at USD 1,200/kW (from hearing), Average electricity capacity of hotels is set at 50 kW (hearing from INGUAT), and 50% of this amount is consumed in ACs (from hearing) , Hotel occupancy ratio is set at 60% (hearing from INGUAT), Operation ratio of ACs is set 20% , Electricity price is set at 18 US cent/kWh.

¹⁸ An average lifetime of air conditioners is 10-15 years. They can be used over 15 years with suitable maintenance.

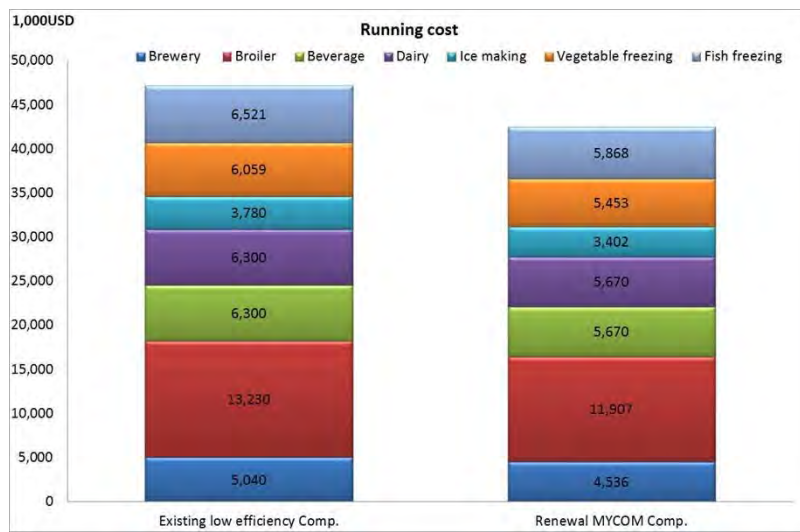
¹⁹ Conditions for estimation: electricity tariff: 18 US cent/kWh, energy efficiency rate of compressors: 10%, Fuel type: A heavy oil, fuel :fuel price: 60 US cent/L, efficiency of existing boilers: 70% , annual operation hours: 8,40 h, Eco-cute: COP 3.5

²⁰ An average life time of industrial compressors is 30-40 years.

²¹ By introducing Eco-cute, electricity consumption increases a little. Besides fuel consumption decreases dramatically. Here thermal unit is converted in MWh (1 kWh = 860 kcal)

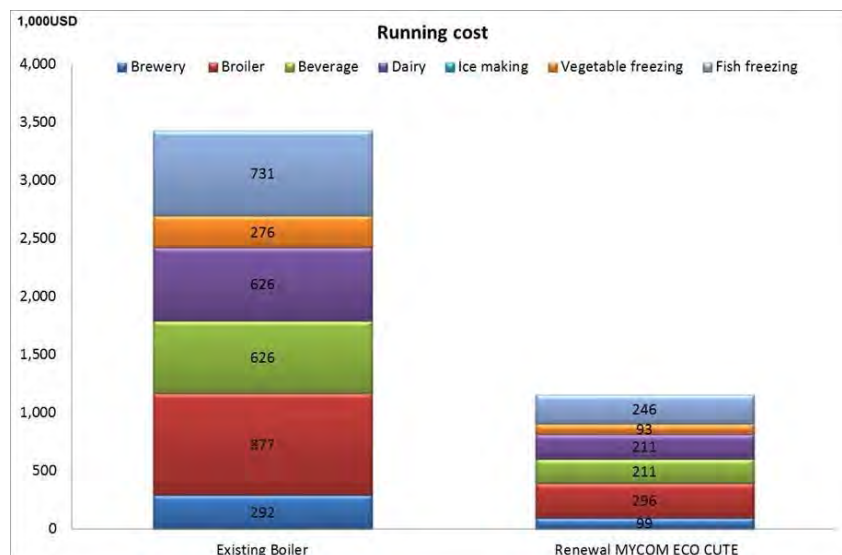
²² An average lifetime of Eco-cute is 15 years. They can be used over 15 years with suitable maintenance.

high investment costs for SMEs.



Source: JICA Survey Team

Figure 3-8 Running Cost Reduction by Introducing High Efficiency Compressor in Guatemala



Source: JICA Survey Team

Figure 3-9 Running Cost Reduction by Introducing Eco-cute in Guatemala

iii) SPG

In Guatemala NCEE arranged a tender of 5 MW mega SPG in 2013. And a joint venture of IDC (domestic) and COBRA (Spain) got the first contract right. And by utilizing the tax benefit mechanism (to be described in details later), several-kW to hundreds-kW sized SPG projects have been introduced through leasing scheme. Distelsa, which is a distribution company of Panasonic, has pipeline projects of 2.5 MW in food industry, 2 MW in pharmacy industry and 7 MW in shopping mall: total USD 23 million financing need in 2015. And according to Distelsa, within five (5) years about 800MW SPG will be introduced in Guatemala. And this figure is far

below than the estimated SPG potential of 3,000 MW²³, so the trend to introduce SPG will be sure to continue for several years.

It becomes a strong incentive to promote SPG in Guatemala that a) up to 5 MW net metering system can be applied and b) tax incentives for renewable energy. And the trend to implement mega SPG in both public and private sectors is expected to continue for at least several years. On the other hand, the largest barrier that prevents the promotion of mega SPG is lack of suitable financing sources. All of the suppliers of mega SPG projects feel difficulty to access and secure low interest financial sources.

As described above, seeing moderately in Guatemala, it is expected to implement 500 MW (USD 1,000 million investments) mega SPG projects within several years. And FOTONA (Spain), Refeel (Italy), Wirsol (Germany) and KAYA (USA) SPG integrators are starting their business in these countries, so the finance needed to be prepared by local investors is assumed to be one fifth (1/5) of the total. The names and outlines of organizations formulating mega SPG projects are summarized in Table 3-5.

Table 3-5 Names and Outlines of Organizations Formulating Mega SPG Projects (Guatemala)

Organizations	Outline
NCEE	Arranger of Governmental tender in 2013
IDC	Winner of Governmental tender in 2013 (5MW), jointly with Spanish company. IDC would like to expand its investment in mega SPG.
COBRA	Spanish EPC company for SPG, which is taking a role of EPC in the Governmental tender in 2013. It is interested in applying Panasonic technology. It also has a lot of information about the pipeline mega SPG projects in Guatemala.
Distelsa	Distributor of Panasonic in Guatemala. It has several mega SPG pipeline projects.

iv) Green building construction

In Guatemala GB Council has been established, and it is acting to promote GBs conducting and awareness-raising for them with limited human resources. Eight (8) LEED certificate GBs have been constructed in Guatemala recently: three (3) for new construction and five (5) for retrofitting. According to a moderate estimation, it is expected that in several years in Guatemala about five (5) new GBs will be constructed (with a total financing need of about USD 20 million, or an average USD 4 million/building). Assuming that 50% of the total costs will be locally financed, the ratio of domestic financial need as 50%, domestic financing needs will be around USD 10 million. The names and outlines of organizations formulating GB new construction projects are summarized in Table 3-6. (According to INGUAT, the number of new construction of hotels is as low as 0-1 case/year recently)

²³ Estimation by Panasonic Latin America

Table 3-6 Names and Outlines of Organizations Formulating GB Projects (Guatemala)

Name of Organizations	Outline
Guatemala Green Building Council	NGO to promote GBs and raise awareness in Guatemala.
INGUAT	Governmental organization to manage 3,000 registered hotels in Guatemala

As described before the barriers that prevent the introduction of GBs are as follows:

- a) The importance and meanings to conducting GBs are not recognized clearly by end-users (building owners.) And the support to formulate GBs is not sufficient.
- b) Lack of more simple and less costly GB evaluation tool than LEED, which meets Guatemalan climate and building size
- c) Lack of low interest rate financing mechanism to promote GBs

- v) Anti-tampering metering system

Energuate, a distribution company in Guatemala, expressed a strong interest for introducing anti-tampering metering system to reduce existing non-technical loss (over 10%). In Guatemala, however, the remote telecommunication frequency band, which was applied in Nicaragua, cannot be applied. Therefore, an alternative telecommunication technology has to be investigated. The issue that need to be tackled include: (a) finding an alternative remote metering technologies, (b) earlier formulation of pilot project and technical verification and (c) securing long-term low interest financing for the implementation of full-fledged projects. Expected financing need in Guatemala for introducing metering system is summarized in Table 3-7²⁴.

Table 3-7 Financing Need for Anti-tampering Metering System (Guatemala)

Distribution Company Name	Potential Users/5 years	Financing Need (USD mil.)
Energuate	100,000	15

- vi) Cost and benefit analysis

Focusing on high-efficient ACs, high efficiency compressors, Eco-cute, mega SPG, new construction of GBs and anti-tampering metering system, cost-benefit analyses was conducted for the 20 years since the installation of EE equipment. For the trial calculation, the comparison was made between the total investment costs (by local enterprises) and benefits (i.e. total cost reduction realized through decreased electricity consumption for 20 years). As for GBs, it was

²⁴ Estimation by EDMI

assumed that the share of investment costs of ACs and SPG in total construction costs is 30%²⁵.

The result of calculation is shown in Table 3-8. The differences between the figures under Cost Reduction (the column on the far right) and Investment (second column from the left) are the estimated 20-year benefits for local enterprises. The larger figures imply bigger economic benefits. The figures under Project Size column show the expected numbers of EE equipment to be installed. As for Eco-cute, the negative figures under Electricity Consumption represent the increase in electricity consumption after introduction, while it had significantly reduced fuel consumptions. In Guatemala, the cumulative sum of 20-year benefits for introducing mega SPG amounts to about USD 430 million, while those of the other EE equipment are about USD 350 million, which includes the not so large benefits of GBs. (If estimation will be done for the useful life of GBs, for instance 50 years, this benefits will become larger.)

As shown in the table, the cost reduction benefits to be gained by the introduction of EE technologies are estimated to be quite large. Therefore, it is highly anticipated that the solutions to break through the barriers that prevent the promotion of these EE technologies will be implemented as early as possible.

Table 3-8 Cost and Benefit Analysis by Technology (Guatemala)

	Investment (USD mil.)	Project Size	Benefit in 20 years		
			Electricity Consumption (MWh)	Fuel Consumption (MWh) 60cent/L fuel oil A	Cost Reduction (USD mil.) 18cent/kWh
Air Conditioner	37.5	37,500units	986,000		177.0
Industrial Compressor for Chilling & Cooling	32.5	32,000kW	525,000		94.5
Double-bundle Eco-cute	7.5	2,000kW	-128,000	1,241,000	45.5
Solar Generation	200.0	100MW	3,500,000		630.0
Green Building	10.0	5,000m2* 2-3projects	56,000		10.1
Smart Metering	15.0	100,000points	500,000		90.0

Note: The share of domestic suppliers in total mega SPG is assumed to be 20%. For industrial compressors and Eco-cute, it is assumed that 20% of total project costs will be procured from banks. The AC market potential for the entire business and commercial sector is (rather conservatively) estimated to be 5 times larger than that of the hotel sector; and the share of the domestic suppliers and distributors is assumed to be about 50%. (In Japan, the electricity consumption of the entire business and commercial sector is over 10 times larger than that of the hotel industry)

(2) Nicaragua

1) EE promotion financing methods

In Nicaragua, electricity prices for commercial and industrial facilities are higher (at 20-30 US cent/kWh) compared with those of Guatemala, and thus the need to cut energy costs is just as strong here as it is in Guatemala. Nevertheless, Nicaragua lacks financing programs and incentives to promote EE. For instance, a) lease financing is not quite developed due to low

²⁵ Source: According to "Cost Management for Building Works" by The Building Surveyor's Institute of Japan, 31.2% for middle sized buildings, 28.0% for large sized buildings.

financial incentives, b) SIBOIF, Nicaragua’s FIs regulating authority, forbids private FIs to provide below-market-rate loans and c) ESCO / ESCO-alike businesses are not yet witnessed in the country. Therefore, the biggest issue in Nicaragua is to formulate financial policies, which will provide incentives to promote EE in the country. As for SPG, there are only limited cases of small scale SPG (ranging from 200 W to tens-kW), which received short-term financing from FIs. The establishment of laws and regulations as well as formulation of incentives programs to promote the introduction of EE and SPG is needed as the first step. In addition to this, there are following impediments that render difficult the introduction of EE and SPG in this country: a) end-users as well as FIs do not understand quantitative benefits of the introduction of EE and SPG, b) end-users and FIs have very limited access to manufacturers which provide those equipment and c) successful examples which can become showcases are not yet formulated and shared.

Table 3-9 shows the list of enterprises which promotes SPG and sales of EE equipment. Table 3-10 shows the list of those enterprises and agencies, which are willing to support EE business promotion.

Table 3-9 Enterprises Promoting EE Equipment Sales and SPG (Nicaragua)

Name of Enterprises	Overview of ESCO / ESCO-alike Activities
Alliance Traders Limited (ATL) (One of the Major Home Electrical Appliance Distributors in Nicaragua)	As a Panasonic distributor, ATL sells ACs, SPG system and EE equipment. ATL Group covers a wide variety of businesses including hotels (the Sandals Resort) and car sales (ATL Automotive).
Tecnosol (Solar power Generation / EPC)	Technosol sells and installs SPG and water heaters, especially for the household sector. Acquired 80% market share of SPG in Nicaragua.

Table 3-10 Enterprises and Agencies Promoting EE (Nicaragua)

Name of Enterprises and Organizations	Activities
CANATUR (Nicaraguan Chamber of Tourism)	It promotes energy cost reduction through the introduction of SPG to hotels (by granting “Sustainability Award”).
CPmL (Nicaragua Cleaner Production Center)	Conducts energy consumption measurements, energy audits and provides solutions for both private and public sector entities.
APEN (Association of Producers and Exporters of Nicaragua)	APEN has been an agent of IIC / FINPYME (ExportPlus). As well, it cooperates with IIC / GREENPYME Program in EE awareness raising (“sensitization”).
CEI (Nicaragua Exporters and Investors Center)	CEI has been receiving an increasing number of requests from its main clients (namely, SMEs and farmers) for EE projects. CEI requests strongly for the establishment of the Development & Competitiveness Fund, which would provide support to increase competitiveness of small entrepreneurs through productivity improvements, targeting at grand energy consuming businesses (including dairy products, agricultural products such as roots & tubers, coffees, staple grains such as maize & beans and shrimps).

2) Technical aspect

In Nicaragua, just as same as in the case of Guatemala, it is estimated that the energy reduction effects by introducing high-efficient ACs, high efficiency compressors and Eco-cute are 50%, 10% and 60%, respectively. (The quantitative amount of energy savings is about 1/3 or 1/2 of those of Guatemala).

The followings are the barriers that prevent the usage of EE technologies:

- a) Lack of measurement and verification of the quantitative benefits (i.e. energy savings and cost reduction effect) of high-efficient ACs (For end-users, there is no objective data available to decide the purchase of these products)
- b) Lack of effective financing schemes such as ESCO and leasing to promote EE equipment
- c) Lack of legal and financial incentive mechanisms to promote EE

In Nicaragua, Tecnosol (which has 80% market share) and several other EPC contractors have been installing a total of 2-3 MW/year, ranging from 200 W to tens-kW small SPG projects. Net metering program (through this program generated electricity can be sold directly to the grid) has not yet been applied in Nicaragua; and therefore, mega SPG projects are expected to be implemented after the establishment of net metering program in 2014. It has been confirmed that there are several pipeline mega SPG projects (with sizes just below 1MW) in the textile and Tabaco factories in the free trade zones (FTZs).

From the interviews conducted at FTZ, the administration personnel as well as many companies located in FTZ had the misunderstanding that it would take about 20 years to recover the investment costs of SPG. To clear this misunderstanding, it is especially important to distribute the accurate data and information on the benefit of introducing SPG. As well, availability of long-term low-interest loans will also facilitate the formulation of such projects. The names and outlines of organizations currently formulating mega SPG projects are summarized in Table 3-11.

Table 3-11 Names and Outlines of Organizations Formulating Mega SPG Projects (Nicaragua)

Name of Organizations	Outline
CNZF (State Committee for Free Trade Zone)	A government organization, which promotes investments in the free trade zone. Majority of the companies is foreign owned, but domestic and joint venture capitals are also included. Reduction of high energy costs has been a big issue for CNZF; and there are several companies currently conducting feasibility studies to introduce mega SPG.
Panasonic	The company currently has several SPG projects (1MW) in the pipeline.

Same as Guatemala GB Councils has been established in Nicaragua, and it is acting to promote GBs and raise awareness for it with limited human resources. And several LEED certificate GBs have been constructed or planned in Guatemala recently. Additionally in Nicaragua about 20

new hotels were constructed in 2013 and this new construction trend will be assumed to continue for several years. And Nicaraguan Chamber of Tourism²⁶ (CANATUR) has an award program named “Sustainability Award” to promote EE and SPG and raise awareness for them. (Investment: USD 1-2 million/hotel)

As a moderate estimation, it is supposed that within several years in Nicaragua about five (5) new GBs are to be constructed (Total about USD 20 million, average USD 4 million financing need). Assuming the ratio of domestic financial need as 50%, then domestic financial need is estimated to be USD 10 million. The names and outlines of organizations formulating GB new construction projects are summarized in Table 3-12.

Table 3-12 Names and Outlines of Organizations Formulating GB Projects (Nicaragua)

Name of Organizations	Outline
Nicaragua Green Building Council	NGO to promote GBs and raise awareness in Nicaragua.
CANATUR	Association to manage 570 registered hotels (60%). Annually 20 new hotel construction. Award system to promote EE and SPG.

As described before the barriers that prevent the introduction of GBs are as follows:

- a) The importance and meanings to conduct GBs are not recognized clearly by end-users (building owners.) And the support to formulate GBs is not sufficient
- b) Lack of more simple and less costly GB evaluation tool than LEED, which meets Nicaraguan climate and building size.
- c) Lack of low interest rate financing mechanism to promote GBs

In Nicaragua a pilot project of anti-tampering metering system has been completed successfully and a full-fledged project is expected to be implemented in the near future. The issue to be solved to introduce metering system is securing low interest loan to meet its implementation schedule. Expected financing need by for metering system is summarized in Table 3-13²⁷.

Table 3-13 Financial Need for Metering System (Nicaragua)

Distribution Company Name	Potential Users/5 years	Financing Need (USD mil.)
Disnorte Dissur	100,000	10

²⁶ CANATUR: the number of registered hotels is 570 as of July 2013

²⁷ Estimation by EDM I

(3) Dominican Republic

1) EE promotion financing methods

Electricity prices for commercial and industrial facilities are high (at around 20 US cent/kWh), and thus the need to introduce EE measures to reduce energy costs is just as strong in the Dominican Republic as in other survey target countries. In this section, we will introduce some EE promotion financing schemes (ESCO / ESCO-alike businesses and lease) emerging in the market and also touch upon some issues that need to be solved in order for these emerging businesses to further expansion in the future.

- i) A case of an independent ESCO collaborating with appliances distributors' and investors (see Figure 3-10)

New Energy Dominicana, an energy sector consulting company in the Dominican Republic, is currently preparing to establish an independent ESCO. As an independent ESCO, newly established ESCO plans to first strengthen its credibility by accepting equity participation by major private banks as well as investment funds (funded by several international organizations) and therewith procure debt financing from other sources. The new ESCO will not provide performance guarantees, but intends to formulate an ESCO-alike scheme, in which it collaborates with an highly respected EE equipment supplier (such as Panasonic), which can provide long-term warranty for hedging the technical risk. New Energy Dominicana plans to formulate an ESCO-alike scheme, in which a special purpose vehicle (SPV) will be established per customer (i.e. ESCO project). And its parent company (namely, ESCO) will transfer property (e.g. SPG system) to SPV, which will utilize the property as collateral to procure funds from investors. And the sources of income to repay investors and cover the investment costs will be the energy cost savings to be generated from each ESCO project. For instance, ESCO will borrow the rooftop of a shopping mall (of a customer) and install a SPG system, and will collect the investment costs by selling the power generated from the system installed in the customer site. The supplier of the SPG systems can get paid in a lump sum in this scheme. New Energy Dominicana has already got over 8 MW SPG projects in the pipeline, and SPG demand is expected to increase in the years to come. For the time being, the company's project formation is centered mainly on SPG projects applying Panasonic systems, and the issue at the present moment is to find low-interest financing for these projects.

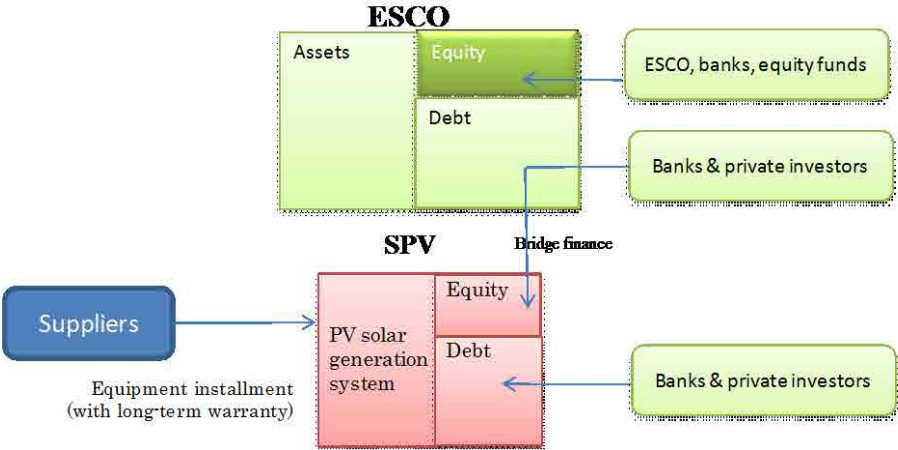


Figure 3-10 A Case of an Independent ESCO Collaborating with Appliance Distributors and Investors

ii) A case of a bank signing a strategic alliance with appliance distributors (see Figure 3-11)

Banco Ademi, a major SME bank in the Dominican Republic, has some successful track record in promoting EE equipment (such as solar water heaters and inverter batteries) among its customers by signing strategic alliances with the appliance distributors and providing financing for the customers’ installment purchases. At the same time, the bank has been negotiating with EIB in order to acquire a low-interest medium-to-long term financing (equivalent of EUR 15 million, 5-year maturity at 5% in USD, 9-10% in Dominican Republic Pesos (DOP)) in order to promote SPG among SMEs. In either case, appliance distributors are able to receive their payments in a lump sum from the Bank. In the years ahead, Banco Ademi plans to continue promoting the use of EE equipment and SPG systems among SMEs, and therefore seeks over 5-year low-interest funding (for a total of USD 10 million at 5% in USD or 9-10% in DOP). In order to promote and expand this kind of financing, some issues need to be solved including the following: a) lack of chances for the Bank to have business matchmaking with EE equipment and their manufacturers and b) acquiring medium-to-long-term financing. And it is also important to consider: c) implementation of pilot projects and provision of seminars to introduce and share the results with SMEs. As for the needed funding, Banco Ademi may procure around 20% of the total needed amount in USD considering the fact that the Bank currently provides loans in USD to approximately 30% of its total customers.

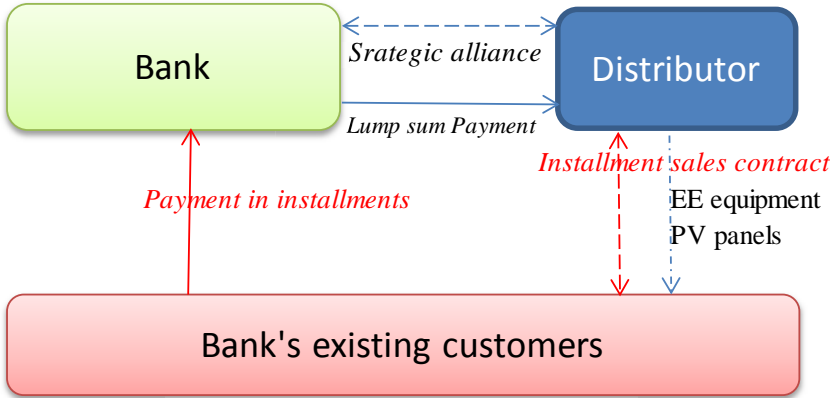


Figure 3-11 A Case of a Bank Signing a Strategic Alliance with Appliance Distributors

iii) A division of an EPC contractor implementing ESCO services

CVA Group, which implements a wide range of businesses from construction, financing to trading, is currently preparing to establish an ESCO as its 100% subsidiary. The company is planning to initially focus on proposals of high-efficient lightings and ACs targeting at those customers (hospitals, shopping malls and hotels), with whom CVA has already accumulated knowledge and expertise. As for the funding, the company will utilize the credit lines, which have been granted from banks to CVA Group. Shared savings scheme will be provided. The company currently has several hotels, hospitals and shopping mall projects in the pipeline, and acquiring low interest funding is the issue at the moment.

Table 3-14 shows the list of enterprises and FIs which are either providing or preparing to provide EE promotion financing in the Dominican Republic. As well, Table 3-15 shows the list of agencies which support those enterprises and FIs EE business promotion. One thing to keep in mind is the fact that in the Dominican Republic, except for hotels and exporting industries, borrowing needs are strong mainly in local currency (DOP) not in USD. As well, since private banks are restricted only to lend USD to those enterprises, which earn USD, their lending targets will be limited.

Table 3-14 Enterprises and FIs Promoting EE Finance (Dominican Republic)

Name of Enterprises and FIs	Overview of ESCO / ESCO-alike Businesses
Banco BHD Leon (Private bank)	The bank provides loans to EE equipment and SPG projects. It is considering to enter into ESCO business
Banco Ademi (Major SME Bank in Dominican Republic)	In order to promote the introduction of EE equipment for SMEs, the bank signs strategic alliance agreement with several EE equipment manufacturers so as to finance installment sales of their products.

Name of Enterprises and FIs	Overview of ESCO / ESCO-alike Businesses
New Energy Dominicana (Energy sector consulting company)	It is preparing the establishment of an ESCO. The company plans to establish a special purpose vehicle for each client's project to which the parent company (i.e. ESCO) transfers assets based on which SPV can procure funding from investors. Investment costs of each project will be paid back by the energy cost savings generated from the project.
CVA (Constructora Vistazul (Developer of Commercial Buildings and Houses / Construction Company)	CVA started supplying EE lighting (such as LED lamps) since 2 years ago. The company is currently preparing to establish an ESCO which aims to provide ESCO under the shared savings model targeting at the commercial sector buildings including hospitals, hotels and shopping malls.
Hi-Fi (Major Household Electrical Appliances Distributor in Dominican Republic)	Hi-Fi promotes a variety of EE equipment, and is also a distributor of Panasonic SPG.
SEMA (Household Electrical Appliances Distributor)	It is a Panasonic distributor as well as the owner of Panasonic Eco Center (opened in 2013) located in a shopping mall. It promotes sales of inverter ACs and SPG.
CRISFER (House Construction Company)	Its CEO is the first person, who had implemented the country's first SPG project (involving 300 apartments). The company also constructs SPG on the common area on the premises of group housing. CRISFER is interested in SPG and EE equipment of Japanese manufacturers.

Table 3-15 Agencies Providing Supports for EE Projects (Dominican Republic)

Name of Organizations	Activities
CCP (Santo Domingo Chamber of Commerce) (All enterprises in the country are registered members)	CCP plans to promote EE especially of its SME members (by holding EE awareness raising seminars, etc.). It is currently considering becoming the executing agency of UNEP's Cleaner Production Center initiative in the Dominican Republic.
AIRD (Dominican Republic Industries Association) (The largest industrial association in the Dominican Republic)	AIRD is promoting EE since 5-7 years ago. At end-2013, it has held an energy audit project in which 10 plastics sector companies went through energy audits, some of which also implemented EE improvements based on the result of audits.
ADOEXPO (Dominican Republic Exporters Association)	ADOEXPO is supportive in promoting EE among the member countries.
AMCHAM DR (American Chamber of Commerce in Dominican Republic)	Its Energy Committee has been promoting clean energy. AMCHAM DR may contribute to EE awareness rising of SMEs by utilizing its nation-wide network, its communication devices, and by holding seminars to its members.
ASONAHORES (Dominican Republic Hotel & Tourism Association)	It is exploring ways to reduce wasteful energy use (especially AC) in the hotel sector. Since the average guestroom occupancy rate is as high as 95% for the hotel industry, its EE potential is high. MARKETING DIRECTOR is the mediator between hotels and suppliers / distributors of electrical appliances.
ACOPROVI (Contractors Association)	Over 300 companies including all major contractors have its membership. The president of ACOPROVI is the CEO of CRISFER (contractor) who is strongly EE conscious.

Name of Organizations	Activities
Green Building Council	GB Association extends its network across the twenty LAC countries, and holds annual meeting. As part of GB proliferation activities, the Council provides trainings on ASHRAE and LEED.

2) Technical aspect

i) High-efficient ACs

In Dominican Republic it has been confirmed that about 50% of electricity in business and commercial buildings is consumed by ACs and the intensity of cooling energy demand of buildings is supposed to be larger than that in Guatemala. The existing ACs' average COP remains as low as about 2.0²⁸, and high-efficient inverter and VRF ACs have not been introduced very much. Japanese and Korean manufacturers are gradually shifting their sales policy to introduce high-efficient ACs, with COP over 3.0 inverter split type and/or VRF type. However, market structure has not been changed. Lack of measurement and verification of the quantitative benefits of introducing high-efficient ACs (i.e. lack of data) in a hot and humid climate in Dominican Republic is the largest barrier that prevents the dissemination of high-efficient ACs.

Additionally, lack of end-users' access to high-efficient ACs and their manufacturers is also a barrier that prevent the promotion of high-efficient ACs.

In the EE seminars held in March 2014 in Santo Domingo, it has been also confirmed that almost all participants, including industrial associations, end-users, ESCOs, FIs and consultants, were not aware of the concept / meaning of "inverter" and/or "VRF", which are the key technologies of high-efficient ACs.

In Dominican Republic 90% hotels are owned by foreign investors, and in the north east region there are several dozens of Boutique hotels with below 100 rooms owned by domestic investors. They are conscious for energy and cost reduction of ACs and environmental management. ASONAHORES²⁹ is especially aware of the importance of EE improvement of ACs. And by the enactment of Incentive Law 195-13 (Amendment of Incentive Law 158-01/2001, incl. import tax exemption for hotel industry), it is expected that the introduction of EE equipment will be able to spread nation-wide. On the other hand ASONAHORES mentioned that the barriers that prevent the promotion of EE equipment for hotel industry are as follows:

- a) A lot of hotels have less knowledge about eligible EE equipment
- b) Measurement and verification of the quantitative benefits of introducing high-efficient ACs have not yet been conducted (i.e. lack of data).

The result of estimation of the reductions in electricity consumptions and costs in Boutique hotels under ASONAHORES is as follows: Annual electricity consumption saving is estimated to be

²⁸ In many developing countries, ACs with COP over 3.0 are categorized as high-efficient. Besides COP of dominant ACs in CAC region is about 2.0, and especially COP of ACs in a junior high school, which was checked by JICA Survey Team, is quite low as 1.0.

²⁹ ASONAHORES: Registered hotels are 85% of the total. Total number of beds in hotels is 55,500 in Nicaragua. Domestic hotels are comparatively small with 10-15 rooms, and about 30 domestic hotels have over 30 rooms.

5,800 MWh and cost reduction USD 0.9 million respectively. The financing need for the introduction of these projects is about USD 3.3 million.³⁰ (Expected simple payback period: 3.8 years³¹)

ACs are used in not only hotels but also in office and commercial buildings: therefore the nation-wide energy and cost reduction potential by introducing high-efficient ACs is supposed to be several times larger than the above estimated values.

ii) High efficiency compressors and Eco-cute

The trial calculation³² was conducted on the amounts of energy savings and energy cost reductions in the case of installing the MAYCOM high efficiency compressors and Eco-cute in Dominican Republic. The calculation was conducted in the 7 sub-sectors (brewery, broiler, beverage, dairy, ice making, vegetable freezing and fish freezing industries).

Cooling and freezing sectors, which were the main industries that use compressors, had huge amounts of electricity consumptions and peak electricity demands: and the ratio of electricity consumption of compressors in the peak electricity demand was around 60-85%. Although the energy efficiency improvement ratio of compressors was relatively small at around 10%: the cost reduction impact was larger, due to its large market size. Thus, the estimated amounts of annual electricity consumption reduction and energy cost reduction were 20,000 MWh and USD 4.0 million, respectively. Additionally, the necessary initial costs were estimated to be USD 24.7 million. (Simple payback period is around 6.2-6.9 years³³.) (See Figure 3-12)

As for Eco-cute, the trial estimation was conducted in the case of installing a double bundle type heat pump. Based on its result, the reduced amounts of electricity consumptions and costs were more than 60 %: due to large fuel consumption reductions, despite the increases in electricity consumptions. However, the amounts of annual energy consumptions³⁴ and cost reductions of Eco-cute were smaller than those of the compressors' due to its smaller target market: and the estimated results were 47,200 MWh and USD 1.8 million, respectively. The necessary initial costs were estimated to be USD 28.8 million. (Simple payback periods are around 3.2-3.3 years³⁵.) (See Figure 3-13)

Considering the domestic companies' bank borrowing ratios in Dominican Republic, the financing need was estimated to be about 10%³⁶ of above mentioned figures: USD 12.3 million for compressors, USD 2.9 million for Eco-cute. As described before, the barriers that prevent

³⁰ Conditions of calculation: EE ration by converting into high-efficient ACs is set at 50%, Price of high-efficient ACs is set at USD 1,200 /kW (from hearing), An average electricity capacity of a bed is set at 1kW (from surveys), Hotel occupancy ratio is set at 80% (hearing from ASONAHORES), Operation ratio of ACs is set 30% (50% larger than Guatemala, because of hot and humid climate condition), Electricity price is set at 20 US cent/kWh.

³¹ An average life time of ACs is 10- 15 years, and with a suitable maintenance they can be operated longer

³² Conditions for estimation: electricity tariff: 18 US cent/kWh, energy efficiency rate of compressors: 10%, Fuel type: A heavy oil, fuel :fuel price: 60 US cent/L, efficiency of existing boilers: 70% , annual operation hours: 8.40 hours, Eco-cute: COP 3.5

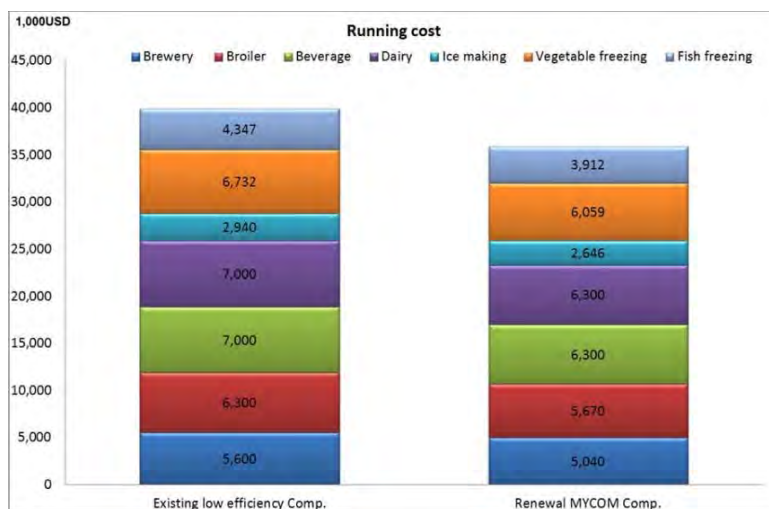
³³ An average life time of industrial compressors is 30-40 years

³⁴ By introducing Eco-cute, electricity consumption increases a little. Besides fuel consumption decreases dramatically. Here thermal unit is converted in MWh (1 kWh = 860 kcal)

³⁵ An average lifetime of Eco-cute is 15 years. They can be used over 15 years with suitable maintenance.

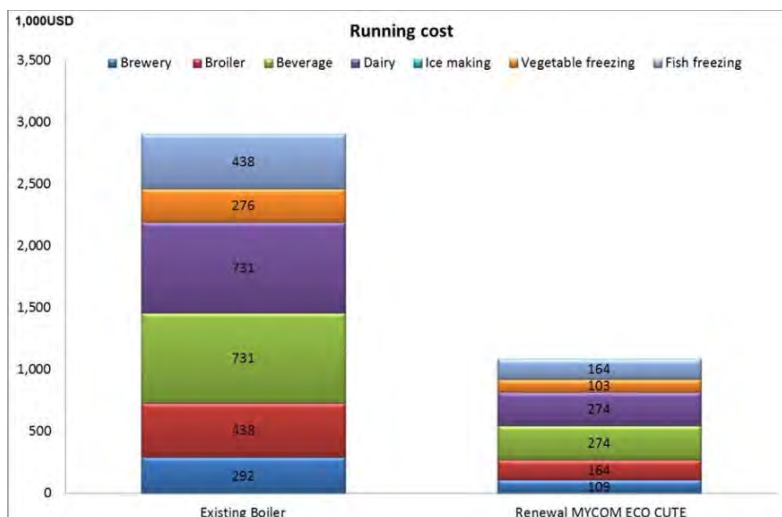
³⁶ The need of USD financing is limited, therefore domestic companies' financial need is assumed to be lower than case of Guatemala (here set at 1/2 of Guatemala: 10%)

the usage of high efficiency compressors and Eco-cute are: a) end-users’ lack of information on success cases (i.e. the benefits of introducing high efficiency compressors and Eco-cute) and b) lack of access to low-interest loans that can mitigate the burden of relatively high investment costs for SMEs.



Source: JICA Survey Team

Figure 3-12 Running Cost Reduction by Introducing High Efficient Compressors in Dominican Republic



Source: JICA Survey Team

Figure 3-13 Running Cost Reduction by Introducing Eco-cute in Dominican Republic

iii) SPG

In Dominican Republic meetings with five (5) SPG companies were conducted. And it has been confirmed that there are a lot of small sized projects at around 10-50 kW for industrial sectors.

Additionally with large incentives for implementing SPG³⁷, several mega SPG (about 1 MW) projects for industrial and commercial sectors will be planned to be introduced in 2014-2015. And within five (5) years about 20 MW mega SPG (USD 40 million financing need) will be introduced in Nicaragua. And FOTONA (Spain), Refeel (Italy), Wirsol (Germany) and KAYA (USA) SPG integrators are starting their business in these countries, so the financing need to be prepared by local investors is assumed to be one fifth (1/5) of the total.

On the other hand the largest barrier that prevents the promotion of mega SPG is lack of suitable financing sources. The names and outlines of organizations formulating mega SPG projects are summarized in Table 3-16.

Table 3-16 Names and Outlines of Organizations Formulating Mega SPG Projects (Dominican Republic)

Name of Organizations	Outline
Trace	Local EPC company of SPG, which has the largest share in Dominican Republic. It has a lot of pipeline SPG projects.
New Energy	Local ESCO alike company, which is focusing to implement SPG from hundreds kW to 1.5MW. It has two PPA contracts for SPG.

iv) GB

In Dominican Republic GB Council has been established, and it is acting to promote GBs and awareness-raising for it with limited human resources. And several LEED certificate GBs have been constructed in Guatemala recently. As a moderate estimation it is supposed that in several years in Dominican Republic about five (5) new GBs will be constructed (Total about USD 20 million, average USD 4 million financing need). Assuming the ratio of domestic financial need as 50%, then domestic financing need is estimated to be USD 10 million. The names and outlines of organizations formulating GB new construction projects are summarized in Table 3-17.

Table 3-17 Names and Outlines of Organizations Formulating GB Projects (Dominican Republic)

Name of Organizations	Outline
Dominican Republic Green Building Council	NGO to promote GBs and raise awareness in Dominican Republic.
ASONAHORES	Association to manage 85 % hotels in Dominican republic (55,500 beds). About 10% hotels ate domestic. Having need to cost reduction by EE.

³⁷ Import tax exemption for solar panels, 40% income tax reduction for investment for RE generation (excluding labor cost) and up to 1.5MW net-metering program

As described before the barriers that prevent the introduction of GBs are as follows:

- a) The importance and meanings to conduct GBs are not recognized clearly by end-users (building owners). And the support to formulate GBs is not sufficient.
- b) Lack of more simple and less costly GB evaluation tool than LEED, which meets Dominican Republic climate and building size.
- c) Lack of low interest rate financing mechanism to promote GBs

- v) Anti-tampering metering system

Edenorte, a distribution company in Guatemala, expressed a strong interest for introducing anti-tampering metering system. In Dominican Republic, the remote telecommunication frequency band, which was applied in Nicaragua, cannot be applied. And another telecommunication technology has being investigated. And after fixing TOR of remote telecommunication technology, a pilot project and a full-fledged project will be implemented step by step.

Expected financing need for anti-tampering metering system in Dominican Republic is summarized in Table 3-18³⁸.

Table 3-18 Financing Need for Metering System (Dominican Republic)

Distribution Company Name	Potential Users/5 years	Financing Need (USD mil.)
Edenorte	150,000	22.5

- vi) Cost and benefit analysis

Focusing on high-efficient ACs, high efficiency compressors, Eco-cute, mega SPG, new construction of GBs and anti-tampering metering system, cost-benefit analyses was conducted for the 20 years, since the installation of EE equipment. For the trial calculation, the comparison was made between the total investment costs (by local enterprises) and benefits (i.e. total cost reductions realized through decreased electricity consumptions for 20 years). As for GBs, it was assumed that the share of investment costs of ACs and SPG in total construction costs is 30%³⁹.

The result of calculation is shown in Table 3-19. The differences between the figures under Cost Reduction (the column on the far right) and Investment (second column from the left) are the estimated 20-year benefits for local enterprises. The larger figures imply bigger economic benefits. The figures under Project Size column show the expected numbers of EE equipment to be installed. As for Eco-cute, the negative figures under Electricity Consumption represent the

³⁸ Estimation by EDMI

³⁹ Source: According to “Cost Management for Building Works” by The Building Surveyor’s Institute of Japan, 31.2 % for middle sized buildings, 28.0% for large sized buildings.

increase in electricity consumption after introduction, while it had significantly reduced fuel consumptions. In Dominican Republic, the cumulative sum of 20-year benefits for introducing mega SPG amounts to about USD 20 million, while those of other EE equipment are about USD 280 million which include the not so large benefits of GBs. (If an estimation will be done for the useful life of GBs, for instance 50 years, this benefits will become larger.)

As shown in the table, the cost reduction benefits to be gained by the introduction of EE technologies are estimated to be quite large. Therefore, it is highly anticipated that the solutions to break through the barriers that prevent the usage of these EE technologies will be implemented as early as possible.

Table 3-19 Cost and Benefit Analysis by Technology (Dominican Republic)

	Investment (USD mil.)	Project Size	Benefit in 20 years		
			Electricity Consumption (MWh)	Fuel Consumption (MWh) 60cent/L fuel oil A	Cost Reduction (USD mil.) 20cent/kWh
Air Conditioner	16.5	16,500units	650,000		130.0
Industrial Compressor for Chilling & Cooling	12.3	12,000kW	200,000		39.9
Double-bundle Eco-cute	2.9	800kW	-54,000	526,000	18.2
Solar Generation	8.0	4MW	140,000		28.0
Green Building	10.0	5,000m2* 2-3projects	50,000		10.1
Smart Metering	22.5	150,000points	750,000		150.0

Note: The share of domestic suppliers in total mega SPG is assumed to be 20%. For industrial compressors and Eco-cute, it is assumed that 10% of total project costs will be procured from banks. The AC market potential for the entire business and commercial sector is (rather conservatively) estimated to be 5 times larger than that of the hotel sector; and the share of the domestic suppliers and distributors is assumed to be about 50%. (In Japan, the electricity consumption of the entire business and commercial sector is over 10 times larger than that of the hotel industry)

(4) Jamaica

1) EE promotion financing methods

Electricity prices in Jamaica for commercial and industrial facilities are among the highest (at 38 US cent/kWh) in the four survey target countries, and therefore the needs to cut energy costs are huge. Similar to the situation in Guatemala, Jamaica also has tax benefit for finance lease of industrial equipment and vehicles. There are some ESCOs, but their activities are still limited. Leasing companies dealing with EE equipment cannot be found, and ESCO services still focus on consulting services. In order to formulate EE equipment leasing and ESCO schemes in Jamaica, the following issues need to be solved: a) end-users as well as FIs do not understand quantitative benefit of the introduction of EE and SPG, b) very limited access to manufacturers, which provide those equipment, and c) successful examples which can become showcases are not yet formulated and shared. Table 3-20 shows the list of some of the enterprises and FIs, which already started or preparing to start ESCO or ESCO-alike businesses in Jamaica. As well, Table 3-21 shows the list of agencies, which support such EE business promotion activities by enterprises and FIs. In Jamaica, just as in the Dominican Republic, borrowing need (except for hotels and exporting

industries) are basically in local currency (JMD) not in USD.

Table 3-20 Enterprises and FIs Implementing ESCO / ESCO-alike Businesses (Jamaica)

Name of Enterprises and FIs	Overview of ESCO / ESCO-alike Businesses
Jamaica Scotia Bank (Private Bank)	Since a year ago, the Bank's Home Equity Section of Personal Loan Division has started providing a mortgage loan scheme, for which energy cost savings generated from SPG, can be utilized for the loan repayments.
Caribbean ESCO Ltd. (Independent ESCO)	It currently provides guaranteed savings model ESCO services, but wishes to provide shared savings model. The company has abundant knowledge and high respect on Japanese EE equipment and manufacturers.
New Leaf (Independent ESCO)	The company implements ESCO businesses, including the promotion of solar water heaters, SPG, high-efficient lightings and electric vehicles.

Table 3-21 Agencies Supporting EE Businesses (Jamaica)

Name of Organizations	Activities
Development Bank of Jamaica (DBoJ)	DBoJ provides finance for EE investments by SMEs and ESCO projects. The bank is able to provide risk guarantees, by utilizing its Credit Enhancement Facility (CEF), to promote private banks' local currency loans for SMEs.
JAMPRO (Jamaica Promotions Corporation)	JAMPRO considers it important to promote implementation of EE measures as follow-up to energy audits. It considers to implement IIC's GREENPYME as an extension of IIC's FINPYME (EXPORT Plus) program.

2) Technical aspect

Same as the case of Dominican Republic it is estimated that the energy reduction effects by introducing high-efficient ACs is 50%. Thus the expected benefit to introducing high-efficient ACs is quite large. Besides, there are less cases of implementation.

The barrier that prevents the usage of high-efficient ACs is lack of measurement and verification of the quantitative benefit of high-efficient ACs. (i.e. lack of data).

In Jamaica, small SPG projects, ranging from several kW to several 100 kW have been implemented gradually by EPC contractors. However in spite of the highest electricity tariff in the CAC region, the penetration speed is not so fast. The barriers to prevent the penetration of SPG are as follows:

- a) Lack of measurement and verification of the quantitative financial benefit of SPG (no data)
- b) Lack of access chances between end-users / FIs and manufacturers
- c) Incentive mechanism to promote SPG in Jamaica is inferior⁴⁰ to these of surrounding

⁴⁰ Under the existing program (net billing), selling price of electricity is set about 50% of purchasing price. Contract by every 100 kW. On the other hand in the other countries selling price is set as same as that of purchasing.

countries. And as for mega SPG projects, 20 MW project will be planned by ESA renewables (USA). However the electricity transmission line is fragile in Jamaica, so it is difficult to introduce additional large sized RE power generation projects, whose generating fluctuation is larger than traditional ones.

In Jamaica GB Council has not been established yet. However two (2) LEED certificate GBs have been constructed and one will be constructed in 2014. The need to construct GBs is increasing gradually.

And it is supposed that within several years in Jamaica about five (5) new GBs will be constructed (Total about USD 20 million, average USD 4 million financing need). Assuming the ratio of domestic financing need as 50%, then domestic financing need is estimated to be USD 10 million.

The barriers that prevent the introduction of GBs are as follows:

- a) The importance and meanings to conduct GBs are not recognized clearly by end-users (building owners). And the support to formulate GBs is not sufficient.
- b) Lack of more simple and less costly GB evaluation tool than LEED, which meets Jamaican climate and building size.
- c) Lack of incentive mechanism to promote GBs

Besides in Jamaica electricity non-technical loss is also as large as 15-16%. And East West Power (Korea), which is a major investor of JPS (Jamaica Public Service Company Limited), will introduce Korean metering system to avoid non-technical loss. In this context Korean company named YPP will introduce its anti-tampering metering system partially soon. Evaluation of this trial is needed at first. (Marubeni, another major investor of JPS, also has less interest in EDMI technology.)

3.1.3 Applicable Japanese Technologies and Their Introduction Measures by Country and for the CAC Region

Referring to the current status and barriers that prevent the usage of EE technologies, the performance of applicable Japanese technologies and their cost competitiveness, applicable Japanese technologies and their introduction measures are described as follows.

(1) High-efficient ACs

Inverter split ACs and VRF ACs are typical high-efficient technologies for air conditioning.

For both technologies Japanese products have the highest energy efficiency performance. And they can contribute significantly to the cost reduction of ACs in the CAC region, where it is hot and humid, electricity tariff levels are high and the efficiency of existing ACs is low. The prominent Japanese manufacturers which provide these appliances in the CAC region include Panasonic, Toshiba Carrier, Mitsubishi Electric, Daikin and Fujitsu General. Not only Japanese manufacturers, but also LG (Korea) is providing its appliances in the CAC region. In order to compete with LG,

which entered CAC market earlier than Japanese manufacturers, and at the same time increase the market share of Japanese products, the following measures are to be taken:

- a) Visualization of the benefits and higher performance of Japanese products through pilot projects
- b) Increasing the opportunities for Japanese manufacturers to meet their target end-users

In parallel, in order to disseminate inverter technology, for which both Japanese manufacturers and LG have competitive edge, awareness raising activities for governmental and related organizations is necessary especially on ISO 16358 (enacted in 2013), which is an international energy efficiency evaluation method for seasonal performance of high-efficient ACs. As for introducing VRF ACs, stability of electricity grid voltage is needed; and therefore, in case where a country has the problem of larger grid voltage fluctuations, an additional TA program is needed to increase the grid stability. Furthermore, since the unit price of an AC is too low to secure bank loans, it is recommended to adopt the following specified financial measures to facilitate introduction of high-efficient ACs:

- a) Bulk procurement under ESCO financing, ESCO-alike financing or finance lease schemes
- b) Bulk procurement for the new constructions of GBs

High-efficient ACs can contribute to EE promotion in all CAC countries. Referring to each country's current conditions and barriers, effective approaches for each country will be pointed out below:

1) Guatemala

Leasing, ESCO and ESCO-alike financing schemes can be applied. High-efficient ACs can be incorporated in the design of new GBs. Since energy efficiency performance and economic benefits of high-efficient ACs have not been recognized quantitatively by the end-users, industrial associations and FIs, it is necessary to formulate an awareness program, arrange business matching meetings between manufacturers and end-users, and secure long-term low-interest loans to facilitate introduction of high-efficient ACs.

2) Nicaragua

Financing schemes, such as leasing and ESCO business, are not mature in Nicaragua. Incorporating high-efficient ACs into the design of new GBs should be recommended as a promotion measure. Same as in the case of Guatemala, in order to promote the introduction of high-efficient ACs, it is needed to formulate an awareness program and arrange business matching meetings between manufacturers and end-users. (In Nicaragua, FIs are currently not allowed to provide lower-than-market interest loans.)

3) Dominican Republic

ESCO and ESCO-alike financing schemes can be applied. Incorporation of high-efficient ACs

into the design of new GBs can also be applied. Since the energy efficiency performance and economic benefits of high-efficient ACs have not been recognized quantitatively by the end-users, industry associations and FIs, it is necessary to formulate an awareness program, arrange business matching meetings between manufacturers and end-users, and facilitate the end-users' access to long-term low-interest loans to promote the introduction of high-efficient ACs.

4) Jamaica

Leasing and ESCO financing schemes have been introduced; however, they are not yet mature to handle EE equipment. It is therefore recommended to handle EE equipment through leasing and ESCO financing scheme in the mid-term: and for the time being, it is recommended to focus on EE awareness programs to disseminate the benefits and measures of EE. Meanwhile, high-efficient ACs can be incorporated into the construction design of new GBs. In order to promote the introduction of high-efficient ACs, it is necessary to formulate awareness programs, arrange business matching meetings between manufacturers and the end-users, and facilitate access to long-term low-interest loans for leasing companies and ESCOs.

(2) High efficiency compressors and Eco-cute

For industrial high efficiency compressors and Eco-cute, Japanese products have cost and performance competitiveness in the CAC region, where almost all factories had introduced and operated low efficient ones. Japanese technologies can contribute to EE improvement and cost reduction in the region. The prominent Japanese manufacturer, which already provides its appliances in the CAC region, is MYCOM. In order to expand its market share and compete with Johnson Control (USA) and other manufactures which provide competitive products, the following facts need to be emphasized:

- a) The fact that all developing countries need to take measures to stop the use of CFC as cooling refrigerant by 2030 (according to the Montreal Protocol). Since the expected useful life of these equipment is 20-40 years, it is the right time to introduce non-CFC refrigerants.
- b) The fact that all MYCOM products use non-CFC natural refrigerants

Since unit price of industrial high efficiency compressor and Eco-cute, is comparatively low, ranging from USD 50,000 to USD 500,000 /unit, it is suitable to introduce them through ESCO or ESCO-alike financing schemes. These products can be applied and contribute to EE improvement in all CAC countries. Referring to each country's conditions and barriers, effective approaches for each country will be described below:

1) Guatemala

Leasing, ESCO and ESCO-alike financing schemes can be applicable. However through field surveys, it has been confirmed that end-users and potential industrial associations are not aware of the eligible EE technologies and the benefit gained from them. Therefore, it is needed to

formulate an awareness program, arrange business matching meetings between manufacturers and end-users and secure end-users' access to long-term low-interest loans to facilitate their introduction.

2) Nicaragua

Financing schemes, such as leasing and ESCO financing, to promote EE equipment is not yet developed in Nicaragua. Therefore, in order to promote the introduction of high efficiency compressors and Eco-cute, it is needed to formulate an awareness program and arrange business matching meetings between manufacturers and end-users.

3) Dominican Republic

ESCO and ESCO-alike financing schemes can be applied in Dominican Republic. Similar to the situation in Guatemala, the energy efficiency performance and economic benefits of industrial high efficiency compressors and Eco-cute have not been recognized quantitatively by end-users, industrial associations and FIs. Therefore, it is necessary to formulate awareness programs, arrange business matching meetings between manufacturers and end-users and provide long-term low-interest loans to facilitate their introduction.

4) Jamaica

Leasing and ESCO financing schemes have been introduced. However, they are not mature yet to handle EE equipment. Considering the relatively small market size compared with other CAC countries, Jamaica will not be the target country for the time being.

(3) SPG

In the CAC region, Chinese, German, Spanish and Japanese SPG systems have been introduced. The prominent Japanese manufacturer, which has cost competitiveness and provides a reliable warranty mechanism, is Panasonic. In order to increase the market share of Panasonic, it is important that the company will emphasize the significance of providing a long-term system warranty (not limited to equipment warranty) to end-users.

The methods of introducing SPG are different by implementation size. In the case of mega SPG projects (with generation capacity over 1 MW), manufacturers or major distributors provide SPG system to SPG business operators; and SPG business operators secure financing for the project. In the case of SPG projects with the sizes ranging from tens-kW to hundreds-kW, distributors usually arrange EPC contractors to introduce SPG directly to end-users. In the latter case, financing will be secured either by the end-users, leasing companies, ESCOs or ESCO-alike companies.

SPG is applicable in all CAC countries and can contribute to their energy consumption reductions. Referring to each country's conditions and barriers, effective approaches for each country are

described as below:

1) Guatemala

Regarding mega SPG, Guatemala has one of the largest potential among the CAC region, since net metering program is applicable to below-5 MW SPG projects. In order to promote mega SPG, it is useful to collect project information at an earlier stage and provide accessible long-term low-interest loans for end-users.

For small and medium sized SPG projects, leasing, ESCO and ESCO-alike financing schemes can be applicable. It is also possible to incorporate SPG into the construction design of new GBs. The economic benefits of introducing SPG have not been recognized quantitatively by end-users, industry associations and FIs. Therefore, it is necessary to formulate awareness programs, arrange business matching meetings between manufacturers and end-users and secure easier access to long-term and low-interest-loans for end-users.

2) Nicaragua

Net metering program, which can promote the implementation of SPG, will be applied in 2014. However, since financing schemes such as leasing and ESCO are not yet mature in Nicaragua, it is recommended to focus on new GB constructions as a measure to promote SPG. Similar to the case of Guatemala, in order to promote the introduction SPG, it is recommended to formulate awareness programs and arrange business matching meetings between manufacturers and end-users. In Nicaragua, solar panels are mostly imported from China (the products of Yingli, etc.) and some from Isofoton (Spain) and SolarWorld (Germany), and seldom from Japan. Therefore, it is especially important to introduce EE performance of Japanese products as much as possible through business matching meetings etc.

3) Dominican Republic

Net metering program has been applied for below 1.5 MW SPG projects. In order to promote mega SPG projects, it is useful to collect project information at an early stage and provide long-term low-interest loans for them.

As for small and medium sized SPG projects, ESCO and ESCO-alike financing schemes are applicable. It is also possible to incorporate SPG into construction design of new GBs. Since the economic benefits of SPG have not been recognized quantitatively by end-users, industry associations and FIs, in order to promote the introduction of SPG, it is needed to formulate an awareness program, arrange business matching meetings between manufacturers and end-users and provide low interest rate loan for SPG projects implementation.

4) Jamaica

Leasing and ESCO financing schemes have introduced, however it is not yet mature to handle

SPG. And it is recommended to handle SPG under leasing and ESCO financing schemes in the mid-term. For the time being, awareness programs to show the benefits and measures of EE as well as the incorporation of SPG into construction design of new GBs will be emphasized. In order to facilitate the introduction of SPG, it is recommended to provide awareness programs, business matching meetings between manufacturers and end-users and accessible long-term low-interest loans. In Jamaica, solar panels are mostly imported from USSolar (USA), Isofoton (Spain) and Solar World (Germany), and seldom from Japan. Therefore, it is very important to introduce EE performance of Japanese products through such business matching meetings.

(4) New construction of GBs

The major technologies to contribute to new construction of GBs are high-efficient ACs and SPG. In this context Japanese high-efficient ACs (both inverter and VRF) and SPG systems provided by Panasonic are the major target technologies to be introduced. (Regarding the useful measures to promote Japanese products, refer to the previous sections on ACs and SPG.) In order to promote the introduction of eligible Japanese technologies, it is necessary to ensure that these technologies meet the specifications of design documents (by providing effective information at GBs construction designing stage).

The largest and common barrier to prevent the promotion of eligible Japanese high efficient ACs and SPG systems in CAC countries is the lack of knowledge and awareness of end-users, construction companies and designers about actual energy savings and economic benefits of introducing these technologies. Referring to each country's conditions and barriers, effective approaches for each country are described below:

1) Guatemala

Economic benefits of high-efficient ACs and SPG need to be introduced to investors / owners directly or through the cooperation of the GB Council and contractors. It is also necessary to support GB projects formulation and facilitate fund procurement through the provision of accessible long-term low-interest loans. And it is also important to collect project information at an early stage and follow them through.

2) Nicaragua

Similar to the case of Guatemala, information of the economic benefits of high-efficient ACs and SPG need to be provided to investors / owners directly or through the GB Council and contractors. GB project formulation support and provision of accessible financing shall be provided as well. It is also important to collect project information at an early stage and follow them through.

3) Dominican Republic

It is needed to provide effective information directly to investors / owners or through the GB

Council / contractors, support formulation of GB projects and secure accessible long-term low-interest loans to facilitate the introduction of high-efficient ACs and SPG. And it is also important to collect project information at an early stage and follow them through.

4) Jamaica

In Jamaica, GB Council has not been established. But necessary information can be provided directly to building owners / investors or through contractors. It is necessary to support formulation of GB projects as well as provide accessible financing to facilitate GBs construction. It is also important to get project information at an early stage to follow them through.

(5) Anti-tampering metering system

The prominent Japanese company that promotes anti-tampering metering system is EDM I. It has already started discussions to introduce anti-tampering metering system with distribution companies in Nicaragua, Guatemala and Dominican Republic. In order to facilitate introduction of EDM I technology into the CAC region, introduction of the success cases in Nicaragua and other countries is not enough. But verification of applicable technology is needed in each host country. In this sense, it is needed to formulate pilot projects earlier, verify the results of pilot project and provide a long-term low interest loans to facilitate the implementation of full-fledged project. By referring to each country's conditions and barriers, effective approaches for each country will be described below:

1) Guatemala

According to the progress of discussions between EDM I and Energuate (an electricity distribution company), it is effective to support the early formulation of a pilot project, verify the results of the pilot project, and provide long-term low-interest loans for the full-fledged project.

2) Nicaragua

Pilot projects have been successfully completed, with their economic benefits verified. In order to effectively implement full-fledged project, it is effective to provide an adequate long-term low-interest financing, according to the progress of agreement made between EDM I and Disnorte / Dissur (an electricity distribution company).

3) Dominican Republic

According to the progress of discussions and agreements between EDM I and Edenorte (an electricity distribution company), it is effective to support the early formulation of pilot project, verification of the results of the result of pilot project, and to provide long-term low-interest loans to facilitate the implementation of full-fledged project.

4) Jamaica

Another metering system will be introduced. Therefore there is little possibility to apply Japanese metering technology in Jamaica

3.2 EE and RE Policies and Incentive Mechanisms

3.2.1 EE Policy

In each of the four countries, namely, Guatemala, Nicaragua, the Dominican Republic and Jamaica, EE Law has not yet been established. In this section, important points on EE policy in each country are described. The improvement of incentive mechanisms (including low interest loan) as well as the establishment of EE Law (regulation) will be expected⁴¹.

(1) Guatemala

- a) National Quality System Law/Decree, which contains norms, certification and credentials regarding energy use, was established in 2005. Climate Change National Policy was established in 2009 and Cleaner Production National Policy, which intends to reduce the environmental load by efficiency improvement of production processes, was established in 2010.
- b) EE Law (draft) has been tabled in the Diet, however an enactment of the Law in 2014 is considered to be quite difficult. The incentive mechanism for the improvement of EE has not been established yet.
- c) In the draft law above, the target of the Law is defined as follows: confirming the cheapest source of energy, promoting the use of technologies that achieve greater EE in the use of energy, confirming optimization of economy, and protecting well-being of people, rights and environment of consumers. Ministry of Energy and Mines (MEM) has a responsibility in collaboration with National Commission of Electric Energy (NCEE) for improving the efficient / rational use of energy.
- d) For the delay of establishment of EE Law in contrast with the momentum of EE, the establishment of EE Platform⁴², Public and Private Partnership scheme, is under preparation in 2014 (Refer to Appendix 1). This Platform is expected to lead the improvement of EE, even though there seems to be no prospect for the establishment of EE Law. The issues of its activity are that it does not have the legal and financial back ground.

(2) Nicaragua

- a) EE Law (draft) has been discussed, but there seems to be no prospect for its enactment.

⁴¹ Source: Collected data in "Seminar on Energy Efficiency and Conservation in Central America and the Caribbean Region for potential projects/programs development under CORE Scheme" and "Data Collection Survey for Promotion of Energy Efficiency in Central America and Caribbean Region 2013-2014" ,JICA

⁴² Source: NCEE is also in charge of its establishment.

- b) In the draft law above, the following targets are described: (i) Realizing energy mix, (ii) improvement of the quality of life of the 23.6% of the population that still does not have accesses to electricity, (iii) reduction of imported oil, development of renewable energy resources, such as geothermal, hydroelectric, wind, solar and biomass, (iv) reduction of the greenhouse gas, (v) strengthening the international competitiveness of industries, (vi) strengthening energy security and (vii) improvement of efficient use of energy .
- c) In addition to this, tax exemptions for introduction of EE equipment, as well as subsidies for energy audits are provided, but these measures have not yet contributed to realize any EE projects.
- d) In the program of PNSER, which is not a legal framework, in cooperation with IDB, JICA and Nicaraguan government, advanced ways of energy use including high efficiency residential lighting as well as the improvement of electrification and the standardization of power supply have been promoted.

(3) Dominican Republic

- a) In August 2000, Ministry of Energy and Mines (MEM) was established as an energy sector regulatory agency.
- b) EE Law (draft) has been tabled in the Diet, but there seems to be no prospect for the early enactment.
- c) In the draft law above, the following directions are described: (i) Establishing a framework that allows the enactment of standards and (ii) the development of activities that promote EE and RE in the production and use of energy in public and private buildings (including newly constructed and retrofitted buildings).
- d) Tax exemptions for introduction of EE equipment and low interest loans have been partially provided, but not yet applied very much.
- e) The National Program for Energy Efficiency (PNEE) was established by the National Energy Commission (CNE) in 2013. This program is not mandatory, but includes the following action plans for governmental facilities:
 - Conducting energy audits for the governmental buildings
 - Introduction of an energy management program aiming at 10% energy conservation in the government buildings.
 - Conducting lectures and workshops for 10,000 people (students) in schools, universities, etc.
 - Formulation of TA Programs for EE in cooperation with IDB. (Details have not been decided).

(4) Jamaica

- a) EE guideline for public sector (which is not mandatory) has been established.
- b) In the guideline above, Jamaica is stated as an inefficient country in the use of energy according to the following indications: (i) the high energy use by the bauxite and alumina industries, (ii) an inefficient public electricity system, (iii) inefficient energy technologies and other productive sectors, (iv) low public awareness of the importance of EE, and (v) an inadequate policy framework to promote EE. Jamaica's energy intensity has increased steadily in recent years, and the economy requires up to 20,000 British thermal units (BTU) in 2014 to produce USD 1.00 of product, which is four times as large as the global average of 4,600 BTU. Increasing the efficiency of energy production and consumption is necessary for Jamaica's future economic growth. Introduction of a target setting approach, identification of strategies to overcome the barriers to prevent the implementation of EE initiatives, improvement of public awareness on EE, provision of appropriate financial mechanism, and implementation of the target setting approach through the establishment of an institutional framework are recommended here. The government intends to promote EE in the public sector first, and expand its activity in the private sector.
- c) Ministry of Energy and Mines (MEM) published the National EE Plan (2009-2030) (in the year of 2008). This plan is not mandatory, but the following action plans for EE initiative are included:
 - The first goal of this plan is the efficiency improvement of energy use.
 - The government is a model / leader of EE initiative.
 - Industries should enhance its international competitiveness alongside with the concern in the environment.
- d) The building code (including EE initiative) is under preparation for amendment. (not mandatory.)
- e) Tax exemptions for introduction of EE equipment and low interest loans have been partially provided, but not yet fully applied.
- f) In addition to this, as a part of non-legal framework, MEM and DBoJ (Development Bank of Jamaica) are studying to formulate a PPP program for the public sector (schools and hospitals) as well as an EE program for SMEs (in the private sector). However, an organizational structure and financial sources for these programs have not been figured out yet.

The main points of EE policy in each country are summarized in Table 3-22.

Table 3-22 Main Points of EE Policy in Each Country

Country	EE Policy	Incentive Mechanism
Guatemala	EE Law (draft) has been tabled in the Diet. The establishment of EE Platform in cooperation with Public and Private Partnership is in preparation in 2014.	Incentive mechanism has been supplied for small projects.
Nicaragua	EE Law (draft) has been discussed.	Tax benefits for introduction of EE equipment and subsidy of energy audit have been supplied.
Dominican Republic	EE Law (draft) has been tabled in the Diet.	Tax benefits for introduction of EE equipment and low interest loan have been supplied.
Jamaica	EE guideline for public sector has been established. The revised building code is in preparation.	Tax benefits for introduction of EE equipment and low interest loan have been supplied.

Source: JICA Survey Team, summarizing collected information in the Study

3.2.2 Incentive Mechanism to Promote RE

In the four (4) survey target countries, there are incentive mechanisms for power generation using renewable resources including SPG. Outline of CAC countries' incentive mechanisms are described below:

(1) Guatemala

Guatemala applies the following preferential treatments for power generation using RE (including SPG):

- a) Under the net metering program, for up to 5 MW SPG, power generators are allowed to have direct connections to the electricity grid, and allowed to sell their net generated power to the grid at the prices same as their purchasing prices. In addition, for the household sector, lower electricity tariffs will be applied for those consumers consuming less than 300 kWh/month⁴³.
- b) For all RE projects, all import related taxes (including import tariffs and VAT) for construction materials and equipment are exempted, in addition to the application of corporate tax exemptions for the first 10-year of commercial operations⁴⁴.

(2) Nicaragua

Nicaragua has the following preferential treatments including those to be introduced:

- a) Net metering program will be introduced in 2014.
- b) For power generation using renewable resources, the following tax benefits are applied:
 - Income tax exemption on the sale of carbon credits,
 - Property tax exemption for a period of 7 years,
 - Exemption on import duties and sales taxes on construction materials, machinery and

⁴³ Distributed Renewable Generation (DRG) Rule under the General Electricity Law (amended in 2007)

⁴⁴ Incentive Law for the Development of Renewable Energy Projects, Decree No. 52-2003 and its Regulation. (enacted in 2003)

equipment,

- Exemption on all taxes related to the exploitation of natural resources for a period of 5 years and
- Exemption on all taxes related to fixed investment in machineries, equipment and hydroelectric dams for 10 years⁴⁵.

(3) Dominican Republic

In the Dominican Republic, following incentive mechanisms have been applied:

- a) Tax benefit is provided to RE power generation (including SPG). One thirds of the amount equal to 40% of the total investment costs (excluding labor costs) will be deducted over three years (i.e. 1/3 of 40% of the total investment costs will be deducted each year) from annual income tax payment⁴⁶.
- b) Import tax exemption for solar panels, inverters and cables, etc⁴⁷.
- c) Net metering system is applied for SPG up to 1.5 MW, which can be sold to the electricity grid (i.e. distributing companies). Of the total amount of power sold, 75% will be paid a year later after deducing 25% set aside for the purpose of improving the grid's RE facilities⁴⁸.

(4) Jamaica

In Jamaica, the following incentive mechanisms have been (and will be) introduced:

- a) Import tax exemption for solar panels⁴⁹
- b) Introducing net metering system is only at the conceptual stage
- c) Net billing program⁵⁰, unlike net metering program, intends not to promote purchase of net electricity generation from customers. For instance, the purchasing price (set at 19.6 US cent/kWh) from the household sector is set at almost half the level of selling price (set at 42 US cent/kWh). (The program intends not to allow consumers to achieve breakeven.) As well, there is a cap (up to 100 kWh) on the amount of electricity, which can be sold to the grid.
- d) Electricity wheeling program legislature⁵¹ is expected to pass the Congress during 2014. Under this wheeling program, large energy consumers such as hotels may take advantage since they can generate electricity for their usage by constructing large sized SPG plants and distribute the

⁴⁵ Law on the Promotion of Renewable Electricity Generation from Renewable Sources (532)

⁴⁶ The Renewable Energy Incentives Law (57-07) (2007/5/7: came into force in 2008) and Law 186-07 (amendment of General Electrical Law 125-01) (Amendment: 2011/7/26)

⁴⁷ The Renewable Energy Incentives Law (57-07)

⁴⁸ "Net Metering" Regulation (Jun. 2011), "Distributed Generation" Regulation (Nov. 2011)

⁴⁹ Jamaican Government amended the Customs Act in February, and import tax exemption for 16 EE products (compact fluorescent lamps: absorption refrigeration systems, including solar equipment and materials; air conditioning chillers; mounting accessories for solar water heating systems, etc.) has been enacted for 5 years (2013/1/1-2017/12/31).

⁵⁰ Jamaica Public Service Company (JPS) website: "Net Billing" <http://www.myjpsco.com/net-billing/> and hearing from Jamaica Public Service Company Limited (January 15th 2014)

⁵¹ Office of Utilities Regulation (OUR) website: "Wheeling": under discussion in the parliament, it is expected to be enforced in 2014.

power through the electric grid to their local hotel branches⁵².

The main points of incentive mechanisms in four (4) countries are summarized in Table 3-23.

Table 3-23 Main Points of RE Generation Incentives in CAC region

Country	Solar Generation	Incentive Mechanism for RE
Guatemala	Up to 5 MW net metering (can be sold to grid)	Import tax exemption, Income tax exemption
Nicaragua	Net metering program will be introduced in 2014	Import tax exemption, Income tax exemption
Dominican Republic	Up to 1.5 MW net metering Import tax exemption for main equipment	Income tax exemption
Jamaica	Up to 100 kW net billing (selling priced is regulated lower). Net wheeling program will be introduced in 2014. Import tax exemption for solar panel.	None

Source: JICA Survey Team, summarizing collected information in the Study

In Section 3.1 and this chapter electricity tariff level, policies to promote EE and RE, financial mechanism, preferential currency type, and potential sectors to promote EE and potential technologies are summarized. Table 3-24 shows the related data and target countries' basic economic indicators, estimated electricity consumption in SMEs, interest rate in FIs, the name of organizations having partnership with IIC and human resources in IIC etc. The important points to be considered in formulating an IIC-JICA co-financing scheme are described below:

- a) Electricity consumption by SME is the largest in Guatemala.
- b) The incentive programs to implement SPG are well designed in Guatemala and Dominican Republic. Especially in Guatemala there is incentive mechanism to promote mega SPG project up to 5 MW (net metering program).
- c) The incentive programs for leasing are set in Guatemala and Jamaica.

⁵² Hearing from Spanish Court Hotel (SCH: January 15th 2014) and ATL (a distributor of Panasonic)

Table 3-24 Summary of Site Surveys in 4 Countries

Items	Guatemala	Nicaragua	Dominican Republic	Jamaica
Population (in mil.)	14.1	6.3	10.3	2.7
SME power consumptions (estimate)	4200 GWh/year (about 50% of total)	1700 GWh/year (about 50% of total)	Export industries & hotels: 2400 GWh/year (about 20% of total)	Export industries & hotels: 640 GWh/year (about 20% of total)
Electricity tariffs (for SMEs)	Industry: 10-22 UScents/kWh Commerce: 20-23 UScents/kWh	Industry: 20 UScents/kWh Commerce: 30 UScents/kWh	Industry: 20 UScents/kWh Commerce: 20 UScents/kWh	Industry: 38 UScents/kWh Commerce: 38 UScents/kWh
GDP (2012)	USD 50.81 billion	USD 10.51 billion	USD 58.95 billion	USD 14.84 billion
Sovereign debt to GDP ratio (2012)	29.74%	68.70%	45.71%	145.80%
Energy Conservation Law	Under discussion	Under discussion	Under discussion	None, Guideline for public sector, Preparation for amendment of building code
Incentive mechanism for EE	For small projects	Tax exemption	Tax exemption, Low interest loan	Tax exemption, Low interest loan
Incentives for SPG	1) Net metering (up to 5 MW) 2) For residential sector, electric consumption up to 300 kWh can enjoy low tariffs 3) 10-year corporate tax exemption for small-scale power generators 4) Tariff exemptions for import of related equipment 4) Tariff exemptions for imports of related equipment	1) Incentives for RE power generation including 100% exemption on all taxes related to fixed investment in machinery and equipment for 10 years. 2) Net metering to be introduced in 2014	1) Net metering up to 1.5 MW 2) 40% tax exemption for investment costs (excl. labor costs) 3) Import tariff exemption for PV panels	1) Import tax exemptions for PV panels 2) Net billing (limited application) 3) Wheeling program (to be introduced in 2014)
Simple payback period for SPG	6.5 years (3.5 years together with EE equipment investments)	5-7 years	3.5 years for tax paying companies 7 years for non-tax paying companies	4 years (due to high electricity tariffs without tax benefit) 3 years for industries not operating during the night time, 5 years for the households with batteries for night time use
Market interest rates [based on interviews with end users (January 2014)]	USD loans: 10-12% GTQ loans: 12-16%	USD loans: 1) For SMEs (four years, no grace period): 10.5-14%, (In general, 18-19% for less credible SMEs) 2) For large companies (long-term loans above 5 years): above 9.5%	USD loans: 1) For SMEs: 7-7.5% 2) For large companies: 6-6.5% DOP loans: 1) For SMEs: 16-20% in general 2) For large companies with more than 200 employees: 12-13% in general	USD loans: 7% JMD loans: For SMEs: 17-20% depending on their credibility DBJ Energy Fund 8%, DBJ Residential Energy Line of Credit 9.5%, DBJ SME EE Loan 7.5%
Currency of loans in high demand (USD/local currency)	USD	USD	DOP for SMEs USD for medium to large sized companies, hotels and exporting companies	JMD for all enterprises USD for hotels and exporting industries
Lessee recognizes any lease payment as expense (off-balance sheet treatment)	Yes	No	No	Yes
Promising sectors for Japanese EE equipment	Textiles, poultry, beverages, food processing, hotels and exporting industries	There are plans for construction of private sector hotels, residents and buildings (condominiums and office buildings)	Exporting industries and hotels	Exporting industries and hotels
Availability of Japanese EE equipment in CAC region	PV, AC, Cooling & Chilling, Ecocute	PC, AC, Cooling & Chilling	PV, AC, Cooling & Chilling, Ecocute	PV, AC
IIC partner organizations	CGPL, AGEXPORT, AMCHAM	APEN, CPML, Invest in Guatemala	Banco BHD	JAMPRO, Scotia Bank
IIC resources available	Abundant	Abundant	Not abundant (chance to expand)	Not abundant (chance to expand)

3.3 Solutions to Solve the Barriers to Promote EE and RE in the CAC Region

3.3.1 Barriers to Promote EE and RE in the CAC Region

The financial barriers that prevent the usage of EE technologies referred in Section 3.1 are summarized by technology in this section. And the issues for JICA to formulate programs to promote EE in the CAC region are also stated here.

(1) SPG

In CAC countries there is large potential for SPG. However, it is difficult to secure financing sources for these projects; interest rates of accessible financing are comparatively high, rendering these projects less profitable. As a result, implementation of these projects has been delayed.

(2) New construction of GBs

The largest barrier to promote the construction of GBs is lack of incentive mechanisms to promote GBs. Lack of access to adequate financing is another barrier. Accessible financing is comparatively expensive, rendering owners / investors hard to secure their target profits.

(3) Anti-tampering metering system

Many electricity distribution companies in the CAC region intend to reduce their high non-technical loss. However, their accessible financing sources are limited and expensive (interest rates are high).

(4) High-efficient ACs, compressors and Eco-cute

In the survey target four (4) countries it is assumed that the energy savings and cost reduction benefits to be gained by introducing high-efficient ACs, compressors and Eco-cute will be quite large. At the same time, it became clear that it is difficult to formulate an adequate financing mechanism to promote the introduction of these EE products to end-users, because each equipment price is too low to finance relative to the transaction costs per loan. Therefore, it is recommended that financial measures which can handle these products as a bulk trading should be applied.

In this context, dissemination of the newly emerging financing models in the CAC region, namely, ESCO, ESCO-alike and lease financing schemes for EE projects, which handle EE equipment as a bulk, can contribute to the promotion of EE in the region. At the same time, the remaining issues such as the lack of risk-taking measures and lack of accessible long-term low-interest loans should be taken care of.

(5) Issues for JICA to formulate EE programs in the CAC region

JICA has a lot of experiences in implementing EE programs in Asian countries. However, in the

CAC region, its experience is limited and no local networks constructed yet. In order to formulate a functional EE promotion finance scheme, it is necessary for JICA to secure reliable local networks as well as ensure outreaches to the target countries.

3.3.2 EE and SPG Promotion Financing

In order to break through the barriers mentioned in Section 3.3.1, the following five (5) schemes are proposed in this section. And, to realize these schemes, it is necessary to cooperate with a strategic partner organization to secure out-reaches and local network in the CAC region.

(1) Mega SPG promotion loans

As mentioned in Section 3.1, solar radiation and electricity prices are both high in the CAC region, and the potential for SPG is very high in the four survey target countries, where (mostly in Guatemala) there are altogether over 500 MW mega SPG projects (equivalent of USD 3-5 million/project) planned to be introduced in a few years. However it generally takes longer time to acquire funding for a mega SPG project, and that not many mega SPG projects have been introduced smoothly in the past. Here, provision of a concessional loan can contribute to facilitating the implementation of mega SPG projects.

(2) New GBs promotion loans

New construction of GBs is gradually emerging in CAC countries as mentioned earlier in Section 3.1. In each of the four survey target countries, around 5 GBs (equivalent of USD 20 million in total and on average USD 4 million per project) are expected to be newly constructed in the coming few years. On the other hand, incentive mechanisms to promote GBs have not been formulated yet. In order to promote GBs, provision of concessional loans can contribute to the penetration of GBs and the improvement of the quality of the building stocks in the market.

(3) Anti-tampering metering system promotion loans

Many of the electricity distribution companies in the four survey target countries are already considering the introduction of an anti-tampering metering system in order to reduce non-technical loss. And providing concessional loans for the projects can contribute to their early implementation.

(4) On-lending scheme through FIs to support ESCO / ESCO-alike businesses

In all the four survey target countries, electricity prices are high and the need for energy cost reduction is already felt strongly especially among the medium to large customers of financial FIs. And there are various types of EE promotion financing scheme emerging as in the forms of ESCO / ESCO-alike businesses, targeting SPG and EE equipment introduction. In order to promote the above mentioned innovative financing schemes, providing concessional long term loan are

considered to be quite effective.

(5) On-lending scheme through FIs to support EE equipment finance lease

Among the four survey target countries, Guatemala and Jamaica will be the target of this on lending scheme since they have tax benefits for finance leases.

As mentioned earlier in Section 3.1, in Guatemala, EE equipment leases of up to 7-8 years are currently provided by an independent leasing company as well as by the leasing division of a bank. And the provision of longer-term and lower-interest loans with 8-10 year maturity could further expand EE equipment finance lease market.

3.4 Partner for Tackling Issues in EE and SPG Promotion

Upon understanding the issues, needs and solutions to promote EE and SPG in Sections 3.1 to 3.3, this section will analyze the significance and effectiveness of partnering with IIC, which has abundant experience in providing finance and TA to the CAC private sectors, being a member of the IDB Group, which maintains a strong alliance with JICA.

3.4.1 IIC's Lending Works

(1) Lending operations

Established in 1984 as an IDB Group company, IIC has a mission to contribute to the economic development of the Latin America and Caribbean (LAC) region member countries by supplementing IDB operations. Through provision of equity, debt, credit guarantees and technical assistance, IIC supports establishment, business expansion and modernization of small and medium sized enterprises (SMEs) and FIs.⁵³ Especially focusing on energy and infrastructure sectors, IIC mainly provides long-term finance and advisory services to SMEs in each of the LAC countries.

IIC, following its business plan (2011-2013) featuring the 1+1=3 formula in the past three years, has aimed to achieve growth and productivity as a FI while contributing to the development of SMEs in the LAC countries⁵⁴.

Total amount and number of loans to SMEs are accomplished through direct loans from IIC as well as by lending to FIs which on lend to SMEs in the LAC countries. IIC as well finance large-sized enterprises with outstanding value chains involving local SMEs, distributors and contractors.

There is a clear demarcation between IIC and IDB as to the roles of each entity. IDB is a policy-based FI, whose major clients are the public sector (i.e. central, local and state governments and municipalities) of twenty six (26) LAC member countries, and it aims to contribute to poverty

⁵³ Sources: IIC website: "About us" //www.iic.org/en/about-inter-american-investment-corporation, IIC website, "IIC Charter" <http://www.iic.org/en/node/12337>, and IDB website "Financial Instruments for the Private Sector by IDB Group Window" <http://www.iadb.org/en/resources-for-businesses/idb-financial-instruments-for-private-sector,5800.html>

⁵⁴ IIC Strategic and Evaluation Framework, Briefing to the Board of Executive Directors, September 16, 2011

alleviation and sustainable economic development in each country through provision of finance and technical assistance. IIC, on the other hand, serves mainly for the private sector clients and sometimes for the public sector entity engaging in privatization.

IIC currently has four major lending channels featured by loan size (see Table 3-25 for the detail).

- a) Loans for small sized enterprises: Small-sized loans refer to FINPYME Credit Program. Since it is necessary for IIC to reduce its transaction costs as much as possible for dealing with this size of loans, program loan is preferred. Once approved by the Board as a program loan, each lending project implemented under the program will not be subject to the Board approval and therewith able to cut transaction costs. For each of the small sized loans provided under FINPYME Credit Program, Debt Investment Division makes loan decisions based on the borrower's eligibility determined according to the given loan standards (i.e. credit ratings). FINPYME Credit Program also includes TA (such as advisory services for business management improvements) to promote SME loans. Loan size is between USD 100,000 and USD 600,000 with maturity between 3 and 7 years. In FY2012, fifteen (15) loans (amounting to USD 4 million) were approved (which consisted 1% of total loans approved).
- b) Loans for medium sized enterprises: Average loan size is between USD 3 million and 6 million, and in principle, each loan requires the Board approval. The size of loan is larger compared to those under FINPYME Credit Program. As well, for those loans with the amount below USD 3 million, Debt Investment Division may make loan decision upon appraisal of engaged products and markets, provided that the borrower meets certain eligibility criteria including adequate financial ratios. In FY2012, USD 41.7 million (or 11% of total approved loans) was approved for medium-sized enterprises.
- c) Loans for large sized enterprises: As a rule, IIC can provide loans with the size varying between USD 1 million and USD 20 million (with 1-15 years maturity) to medium sized enterprises⁵⁵. As for loans provided to large sized enterprises, average size is around USD 6-8 million. Such projects include RE power generation projects employing small hydro, solar and wind. In FY 2012, a total of USD 88.2 million (or 23% of total approved loans) was approved for large sized enterprises loans. All required the Board approvals.
- d) On-lending to SMEs through FIs: IIC's minimum loan size is USD 100,000 currently provided under FINPYME Credit Program. For loans below that minimum threshold, IIC utilizes on lending through local FIs in order to expand its outreach to SMEs. In FY 2012, the amount of loans approved to FIs amounted to USD 200 million (which consisted 53% of total approved loans). As a reference, average transaction sizes for small sized FIs (with asset size below USD 500 million) and large sized FIs (with asset size larger than USD 500 million) are around USD 2.5 million and USD 11 million, respectively. Every loan to FI is subject to the Board approval.

⁵⁵ IDB website "Financial Instruments for the Private Sector by IDB Group Window"
(<http://www.iadb.org/en/resources-for-businesses/idb-financial-instruments-for-private-sector,5800.html>)

Table 3-25 IIC's Current Lending Channels by Loan Size

Lending Channel	Feature	Current Status
FINPYME Credit Program (Loans for Small Sized Enterprises)	a) Loans for small-sized companies: USD 100,000 - 600,000 per project (Maturity: 3-7 years) b) No need to be approved by the Board project by project. Final loan decision is made by Debt Investment Division.	a) Program approving authority: Chief of Debt Investment Division b) Percentage share in total loans & investments approved in FY2012: 1% (USD 4 million, 15 projects) (Note)
Loans for Medium Sized Enterprises	a) Loans for medium-sized companies: USD 3-6 million per project (Board approval required) b) A loan below USD 3 million can be approved by Debt Investment Division, provided it meets certain conditions.	a) Percentage share in total investments & loans approved in FY2012: 11% (USD 41.7 million) (Note)
Loans for Large Sized Enterprises	a) USD 6-8 million per project (Board approval required) b) USD 1-20 million (Maturity: 1-15 years) can be provided to medium sized companies	a) Loans for RE (small-scale hydro, solar and wind power) projects are included. b) Maturity of the existing SPG projects ranges between 10 and 17 years c) Percentage share in total investments & loans approved in FY2012: 23% (USD 88.2 million) (Note)
On-lending through Financial Institutions (FIs)	a) Average transaction size for small FIs: USD 2.5 million b) Average transaction size for large FIs: USD 11 million c) For a loan below USD 100,000 which cannot be handled by IIC, on lending through FIs is important for expanding IIC's outreach to SMEs.	a) In the Draft Business Plan 2014-2016, IIC plans to reduce the percentage of lending to FIs and strengthen IIC direct lending. b) Percentage share in total investment & loans approved in FY2012: 53% (USD 200 million) (Note)

Note: Of the total investments and loans approved in FY2012 (USD 378.9 million), USD 200 million (or 53% of total) was on-lending through FIs, USD 39.5 million (or 10% of total) subordinated debts for financial institutions and enterprises, USD 5.5 million (or 1% of total) equity investments, USD 4 million (or 1% of total) FINPYME Credit Program and remaining USD 129.9 million (or 34% of total) were direct loans. (Direct loans include those for large sized companies, which amounts to USD 88.2 million or 11% of total portfolio)

Sources: Compiled by JICA Survey Team based on information acquired through meetings with IIC management members in October 2013, as well as those based on IIC Annual Report 2012 and IDB website "Financial Instruments for the Private Sector by IDB Group Window" (<http://www.iadb.org/en/resources-for-businesses/idb-financial-instruments-for-private-sector,5800.html>)

IIC, from the viewpoint of portfolio management, applies exposure limits per country, sector, economic group and client to keep each of them below certain percentage of IIC's net worth or portfolio, whichever is higher. See the list below for the details⁵⁶:

- a) Per country: up to 15%
- b) In case of direct lending from IIC: up to 10% per sector, up to 6% per economic group and up to 5% per client
- c) In case of on lending through FIs: As a sector, up to 75% aggregate exposure to financial

⁵⁶ IIC Operating Policy

intermediaries, and as an economic group, aggregate exposure up to 12% to a Global Financial Group and aggregate exposure up to 8% to a Regional Financial Group; and as a client, aggregate exposure up to 5% to any particular FI.

- d) In case of new enterprises, IIC generally finance up to 33% of total project costs.
- e) In case of ongoing enterprises, IIC can finance up to 100% of a company's net worth (but not exceeding 33% of the borrower's total assets of the previous fiscal year).
- f) In case FI, exposure to any single FI will be up to 33% of FI's total liabilities.

For the purpose of the above mentioned portfolio exposure management, IIC utilizes credit risk rating (which is revised every 2 years) in the process of loan project selection and in the determination of pricing. In principle, IIC applies interest rates based on market rates, and interest rate spreads are decided based on credit ratings⁵⁷.

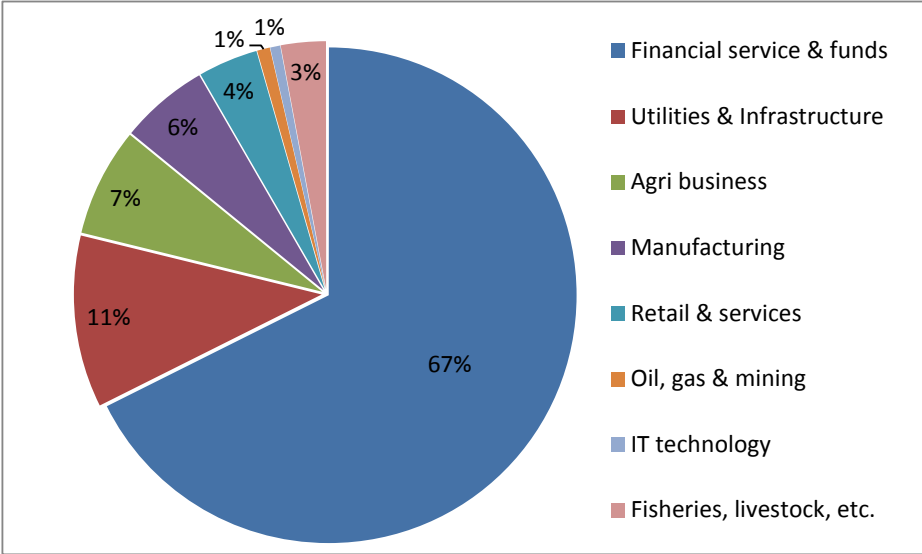
(2) Lending performance

A total of one hundred and ten (110) employees are allocated among the ten divisions, of which debt and equity division, IIC's core banking business division, has around thirty (30) (including five (5) officers at branch offices) are allocated.

IIC's areas of loans and investments vary widely from FIs, utilities, agri-business to manufacturing, retails and communications. Nevertheless, there is a distinct feature that close to 70% of its loan portfolio is on-lent through FIs. On-lending through local FIs, which specializes in SME finance, is indispensable for IIC to maximize the use of its limited resources and at the same time expand its SME outreach in the region as much as possible. As a matter of fact, the total number of SME loans approved in FY 2012(, which amounted to USD 378.9 million for seventy three (73) cases in sixteen (16) countries) included the loans to FIs (which amounted to USD 197.0 million for twenty seven (27) cases in twelve (12) countries).

IIC's portfolio breakdown by sector (as of end-2012) (see Figure 3-14) shows that major sectors of IIC direct lending consists of utilities and infrastructure (11% of total), agro business (7% of total) and manufacturing (6% of total). As well, on-lending to SMEs through FIs and funds amounted to 67% of total.

⁵⁷ IIC Operating Policy



Source: Compiled by JICA Survey Team based on information from IIC Annual Report 2012

Figure 3-14 Portfolio Breakdown by Sector (As of End-2012)

Of the total investments and loans approved in FY2012 which amounted to USD 378.9 million (Seventy three (73) projects in sixteen (16) countries), 53% was on-lending through FIs, 10% subordinated debts for FIs and enterprises, 2% equity investments for FIs and investment funds, and the remaining 35% was direct lending to SMEs and others. In addition, based on IIC’s co-financing principle, it has succeeded in mobilizing private sector co-financing (USD 384 million) as big as its total approved loans.

As can be seen in Table 3-26, outstanding loans and investments have expanded two years in a row compared with the previous years (FY2011: 17%, FY2012: 7%), achieving an annual average growth of 6% in the past five years. And assets have expanded 2 years in a row compared with the previous years (FY2011: 4%, FY2012: 22%), achieving an annual average growth rate of 5.3% in the past five years. Two-digit expansion in FY2012 can be attributed to the successful bond issuance of USD 350 million in November, which expanded IIC’s liquid assets dramatically. There were three cases of past due loans in FY2012, which together amounted to less than 0.7% of total loan portfolio. And the level of allowance for the expected loan loss (above 600%) is more than enough.

Table 3-26 Trends in Total Assets, Loans & Investments Outstanding

Items	2010	2011	2012
Assets (1) (mil. USD)	1,427	1,483	1,815
Loans & Investments (2) (mil. USD)	874	1,020	1,088
Ratio (2)/(1)	61%	69%	60%
NPL (3) (mil. USD)	35	16	7
NPL ratio (3)/(2)	4.0%	1.6%	0.7%
Loan Loss Provisions(4) (mil. USD)	57	45	47
Coverage ratio (4)/(3)	161%	283%	655%

Source: IIC Annual Report 2012, financial statements

IIC, as mentioned earlier, has the mission to promote the private sector (especially SMEs) and therewith contribute to the economic development of LAC countries. At the same time, it is equally important for IIC to remain financially sound as a FI and therefore to ensure profitability and efficiency of each investment project. For this very purpose, IIC Development Effectiveness Division has been conducting an ex-ante evaluation utilizing Development Impact and Additionality Scoring System (DIAS) prior to the implementation of each project in order to estimate its expected development effect and economic sustainability. (See Appendix 1-1 for DIAS for corporate operations and Appendix 1-2 for DIAS for operations with financial intermediaries.) DIAS (on a total score of 10) consists of over 30 evaluation criteria, both financial and non-financial, whose points are carefully allotted so as not to make any project too inclined to either high financial profitability or high development impact. For instance, “resource mobilization (i.e., co-financing with IIC)” among financial criteria and “use of technical assistance” among non-financial criteria are allotted relatively higher points. In the case, where a project has exhibited low economic sustainability, the project needs to prove its high development impact by acquiring higher points in non-financial criteria. According to loan amount and enterprise size, IIC sets the lower limit threshold which has to be exceeded. (The absolute threshold is 5.) DIAS score is currently utilized as a loan decision-making tool at the Board; however it has no impact on lending terms and conditions. As well, DIAS is not applied to projects implemented under FINPYME Credit Program.

(3) Issues

1) Limitations on human & physical resources as well as loan size restriction

A total of one hundred and ten (110) employees are allocated among the ten divisions⁵⁸, of which debt and equity division, IIC’s core banking business division, has around thirty (30) (including five (5) officers at branch offices) personnel allocated⁵⁹. Among the four survey

⁵⁸ Legal Division, Corporate Affairs Division, Development Effectiveness Division, Finance Division, Risk Management Division, Equity Investment Division, Debt Investment Division, Portfolio Management Division, Technical Assistance & Strategic Partnerships Division, Strategy & Innovation Division (newly established in 2013)

⁵⁹ Interview with Debt Investment Division (Oct. 3, 2013)

target countries, IIC has branch offices in Guatemala and Nicaragua. IIC currently has human & physical resources limitations regarding the numbers of investment officers and branch locations. In addition to this, the lower limit of loan size is USD 100,000, which is permitted under FINPYME Credit Program⁶⁰. In order to provide loans with sizes below this threshold, IIC must resort to on-lending through FIs.

2) Goals under the next 3-year business plan

IIC, according to the resource limitation and loan size restrictions mentioned above, has been utilizing FIs to extend its outreaches to SME in each country. However, according to the next 3-year business plan (2014-2016), IIC aims to increase direct lending and reduce on lending to SMEs through FI⁶¹.

3) Features of SMEs in the CAC region

SMEs in the CAC region are not mature enough to smoothly precede the processes between project appraisals and loan disbursements, and therefore TA component is considered indispensable for SME loans. As well, following a loan disbursement, monitoring is generally required in order to assure actual implementation of planned investments⁶². Despite all these needs, TA budget is limited and depend largely on donor funding.

3.4.2 IIC's TA Works

(1) TA operations

Since the establishment of FINPYME PROGRAM in 2000 to date, IIC has implemented six TA programs: namely, a) FINPYME Diagnostics (for management consulting), b) FINPYME Plus (for operational improvement coaching), c) FINPYME Family Business (for corporate governance), d) FINPYME Integrity (for business ethics education), e) FINPYME TA (for various advisory services to SMEs) and f) GREENPYME PROGRAM (for energy audits, EE awareness-raising activities). TA is utilized to reduce IIC's transaction costs per loan project, which are relatively high for small sized enterprises (with loan sizes ranging USD 100,000-600,000). FINPYME Diagnostics, for instance, supports financially fragile SMEs with the preparation of documents required to be submitted to banks for receiving long-term loans. As well, IIC provides various supports to SMEs to solve their problems in the processes leading to loan disbursements. Prior to SME loan project formulation, for instance, IIC considers it important to provide TAs to give advices for the improvements of management skills, operations, corporate governance, business ethics education, prevention of illegal transactions and portfolio management⁶³.

⁶⁰ IDB website "Financial Instruments for the Private Sector by IDB Group Window"

⁶¹ Interview with Development Effectiveness Division (Oct. 2, 2013)

⁶² Interview with Technical Assistance & Strategic Partnerships Division (March 17, 2014)

⁶³ IIC website: "FINLYME" <http://finpyme.iic.org/en/programs>

In 2008, as part of FINPYME Initiative, IIC has launched GREENPYME PROGRAM based on the following three objectives: a) promotion of EE improvements, b) identifying areas of EE improvements and c) provision of access to finance to promote EE improvement investments. Under this PROGRAM, IIC have implemented trainings for energy auditors and energy managers, trainings for bank loan officers and EE awareness raising seminars for SMEs (end-users), etc. in five Central American countries (namely, Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua), and many other regions including Bahamas, Belize, Trinidad Tobago, Jamaica and Columbia (approved in January 2013)⁶⁴.

Under the GREENPYME PROGRAM, IIC currently provides only TA portion to SMEs, whereas its partner local private banks provide EE loans to the extent where they can cover the risks by their own funds. For instance, in Costa Rica, BAC which is the private bank signed MOU with IIC to promote GREENPYME PROGRAM has been providing EE loans for high energy efficiency projects (such as high energy efficiency lighting (with payback period shorter than a year), EE motors, insulation of high temperature pipes and machineries) with payback period shorter than 2 years⁶⁵.

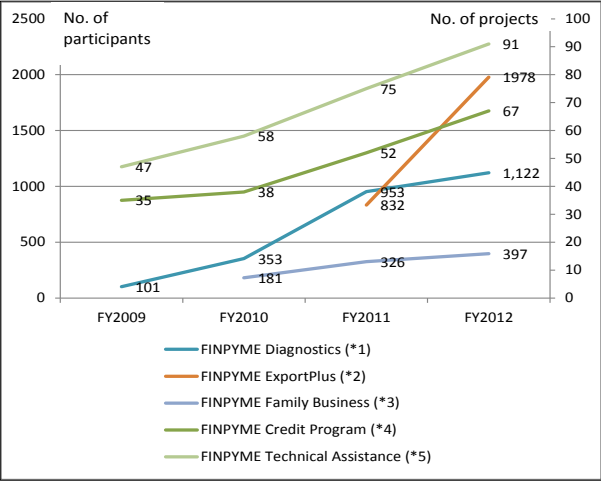
(2) TA performance

The consecutive number of loan projects approved each year under FINPYME Credit Program in the past four years is 35, 38 (including 3 new ones), 52 (including 14 new ones) and 67 (including 15 new ones) in 2009, 2010, 2011 and 2012, respectively. In comparison, the cumulative number of companies that received TA each year under FINPYME Diagnostics (which provides management audits) between the same period amounted to 191, 335 (including 144 new ones), 365 (including 30 new ones), and 365 (including 0 new ones) in 2009, 2010, 2011 and 2012, respectively. At the same time, the cumulative number of companies that participated in TA provided under FINPYME Diagnostics amounted to 101, 353, 953 and 1122 in 2009, 2010, 2011 and 2012, respectively. As for the FINPYME Family Business which provides corporate governance advisory services to family businesses, the cumulative number of participants in workshops was 181, 326 (including 45 new ones), 397 (including 71 new ones) in 2010, 2011 and 2012, respectively. With regard to FINPYME Technical Assistance, in which IIC provides advisory services to miscellaneous problems faced by SMEs, the cumulative number of projects which included a technical assistance component amounted to 47, 58 (including 11 new ones), 75 (including 17 new ones) and 91 (including 16 new ones), respectively.

Figure 3-15 shows the past trends in the number of TA implemented and number of loan projects approved under FINPYME Credit Program. Especially for small sized enterprises, provision of TA is considered highly important.

⁶⁴ IIC website: "GREENPYME" <http://www.iic.org/en/key-initiative/greenpyme> and the interview with Technical Assistant and Strategic Partnerships Division (Oct. 3, 2013)

⁶⁵ Interview with the CICR (Camara de Industrias de Costa Rica) (Oct. 7, 2013)



Note: *1: Cumulative number of companies that received TA
 *2: Cumulative number of SMEs that received TA
 *3: Cumulative number of participants in workshops
 *4: Cumulative number of projects
 *5: Cumulative number of projects with a technical assistance component

Source: IIC Annual Reports (FYs 2009-2012)

Figure 3-15 Past Trends in FINPYME TA and FINPYME Credit Program (FYs 2009-2012)

Tables 3-27 and 3-28 are the lists of TA activities implemented by the Technical Assistance and Strategic Partnerships (TAS) Division during the period from the inception of GREENPYME Program in 2008 to January 2013. Especially for the promotion of EE in the Central America, IIC has been receiving financial support from Korea-IIC SME Development Trust Fund funded by the Government of South Korea, IIC-NDF Trust Fund funded by the Nordic Development Fund⁶⁶ and IIC -Austria Trust Fund funded by the Government of Austria.

IIC has signed a memorandum of understanding (MOU) in 2011 with NDF and the Nordic Investment Bank (NIB) regarding financing and TA necessary for environmental, EE and RE projects, while signed another MOU in 2012 with the Korean Energy Management Corporation (KEMCO) with regard to TA (for energy audits and energy auditors trainings) for formulating EE and climate change programs for Central American SMEs.

⁶⁶ Nordic Development Fund (NDF): is a development financial institution which is funded by five Nordic countries, namely, Denmark, Finland, Iceland, Norway and Sweden. NDF has the mandate to finance climate change mitigation activities in developing countries. (www.ndf.fi.)

Table 3-27 GREENPYME Program Activities (2008/11-2013/1) (Part 1)

Y/M/D	Program name	Target sectors/ clients	Host country	Financier & contribution	Sponsor/co-sponsor	Agencies supported implementation
2011/4	GREENPYME PROGRAM (EE training for bank officers)	Training workshops for 40 bank loan officers of BAC 1) Provision of EE loans ("Green Line") to SMEs 2) Improvement of knowledge on clean technologies	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua	Nordic Development Fund (IIC-NDF Trust Fund)	IIC	
2011/08/17-30	GREENPYME PROGRAM (EE training workshop for entrepreneurs)	Over 250 participants in Costa Rica (8/17), Nicaragua (8/22), El Salvador (8/24), Honduras (8/26) and Guatemala (8/30)	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua	Nordic Development Fund (IIC-NDF Trust Fund)	IIC	IDB/SECCI Unit, BAC/CREDOMATIC, Siemens and Schneider
2011/09/23	Signed MOU with Nordic Development Fund (NDF) and Nordic Investment Bank	Provision of TA and funds necessary for environment/EE/RE related projects for SMEs	LAC countries		IIC, NDF, NIB	
2012/03/17	Agreement to strengthen GREENPYME PROGRAM in three countries	In three Central American countries, GREENPYME will be strengthened through EE trainings, etc.	Bolivia, Honduras, Nicaragua	NDF agreed to provide an additional EUR 3 mil. to IIC-NDF Trust Fund (EUR2.2 mil.)	IIC, NDF	
2012/04-05	GREENPYME PROGRAM (Scholarship program: phase 1)	48-hour intensive course to nurture 40 energy auditors selected from four countries	Costa Rica, El Salvador, Honduras, Nicaragua	IIC and NDF (IIC-NDF Trust Fund)	IIC, KEMCO	
2012/06/19	MOU with Korea Energy Management Corporation (KEMCO)	TA (for energy audits, energy auditors' training) for climate change measures and EE of Central American SMEs				
2012/11/05	GREENPYME PROGRAM (energy auditors' training)	Provided 6-day training in Seoul/ Korea for nine energy auditors selected in five Central American countries	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua	Korea Energy Management Corporation (KEMCO)	IIC, KEMCO	
2013/06-07	GREENPYME PROGRAM scholarship program phase 2	48-hour intensive course to nurture 50 energy auditors selected in 5 countries (trainings were held in each country)	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua	IIC and NDF (IIC-NDF Trust Fund)	IIC	
2013/08/01	MOU with KEMCO for joint pilot project in Bolivia (GREENPYME PROGRAM)	Joint pilot project in Bolivia	Bolivia	IIC, KEMCO	IIC, KEMCO	

Source: Compiled by JICA Survey Team based on GREENPYME News, Inter-American Investment Fund website (<http://greenpyme.iic.org/media/press>) accessed on Oct 15, 2013

Table 3-28 GREENPYME Program Activities (2008/11-2013/1) (Part 2)

2011/4	GREENPYME PROGRAM (EE training for bank officers)	Training workshops for 40 bank loan officers of BAC 1) Provision of EE loans ("Green Line") to SMEs 2) Improvement of knowledge on clean technologies	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua	Nordic Development Fund (IIC-NDF Trust Fund)	IIC	
2011/08/17-30	GREENPYME PROGRAM (EE training workshop for entrepreneurs)	Over 250 participants in Costa Rica (8/17), Nicaragua (8/22), El Salvador (8/24), Honduras (8/26) and Guatemala (8/30)	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua	Nordic Development Fund (IIC-NDF Trust Fund)	IIC	IDB/SECCI Unit, BACICREDO MATIC, Siemens and Schneider
2011/09/23	Signed MOU with Nordic Development Fund (NDF) and Nordic Investment Bank	Provision of TA and funds necessary for environment/EE/RE related projects for SMEs	LAC countries		IIC, NDF, NIB	
2012/03/17	Agreement to strengthen GREENPYME PROGRAM in three countries	In three Central American countries, GREENPYME will be strengthened through EE trainings, etc.	Bolivia, Honduras, Nicaragua	NDF agreed to provide an additional €3 million to IIC-NDF Trust Fund (€2.2 mil.)	IIC, NDF	
2012/04-05	GREENPYME PROGRAM (Scholarship program: phase 1)	48-hour intensive course to nurture 40 energy auditors selected from four countries	Costa Rica, El Salvador, Honduras, Nicaragua	IIC and NDF (IIC-NDF Trust Fund)	IIC, KEMCO	
2012/06/19	MOU with Korea Energy Management Corporation (KEMCO)	TA (for energy audits, energy auditors' training) for climate change measures and EE of Central American SMEs				
2012/11/05	GREENPYME PROGRAM (energy auditors' training)	Provided 6-day training in Seoul/ Korea for nine energy auditors selected in five Central American countries	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua	Korea Energy Management Corporation (KEMCO)	IIC, KEMCO	
2013/06-07	GREENPYME PROGRAM scholarship program phase 2	48-hour intensive course to nurture 50 energy auditors selected in 5 countries (trainings were held in each country)	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua	IIC and NDF (IIC-NDF Trust Fund)	IIC	
2013/08/01	MOU with KEMCO for joint pilot project in Bolivia (GREENPYME PROGRAM)	Joint pilot project in Bolivia	Bolivia	IIC, KEMCO	IIC, KEMCO	

Source: Compiled by JICA Survey Team based on GREENPYME News, Inter-American Investment Fund website (<http://greenpyme.iic.org/media/press>) accessed on Oct 15, 2013

1) EE awareness raising seminars and workshops for entrepreneurs

In October 2009, GREENPYME Program in Columbia was launched. Co-sponsored by IIC and BBVA Columbia (local bank) and supported by the Government of Columbia, training workshops to raise entrepreneurs' awareness on EE/RE was held in three cities, namely, Bogota, Medellín and Cali.

As well in August 2011, IIC in co-sponsored by NDF (IIC-NDF Trust Fund), with the support of IDB, BAC (private bank) and private companies (Siemens and Schneider), held EE training workshops for around two hundred fifty (250) entrepreneurs in the five Central America countries.

2) SME EE training workshops

SME EE trainings have started in 2008 since the inception of GREENPYME Program, supported mainly by the Korea-IIC SME Development Fund, co-sponsored by FIs (such as the Royal Bank of Canada, Scotia Bank and BAC San Jose) for Caribbean countries (including Jamaica, Belize, Bahama and Trinidad Tobago).

3) Energy audits for SMEs:

In March 2010, IIC and NDF have agreed on the establishment of the IIC-NDF Trust Fund (with NDF contributing EUR 2,200,000) in order to finance the IIC's GREENPYME initiative mainly in the Central American countries.

In the following years, IIC has been conducting energy audits (divided into two phases: Level 1 and Level 2) in each of the five Central American countries. In June 2013, IIC had received reports from five countries. IIC currently plans to implement both Level 2 and the second round Level 1 energy audits at the same time. The contents and targets of Level 1 and Level 2 energy audits are as below:

- a) Level 1: Energy audits conducted for two hundred eighty (280) projects. It is a walk-through energy audit, which takes 2-3 days. No measurement, but checking of electricity consumptions through electricity bills.
- b) Level 2: twenty (20) projects per country or a total of one hundred (100) projects were selected from the above two hundred eighty (280) projects. It takes a month to conduct energy audits and compile the results. TAS plans to submit the final report to the Debt Investment Division in order to share information.

As for energy audit expenses, IIC covers the entire costs for Level 1 energy audits, while 20% of the entire expense must be covered by companies (as a Counterparty Fee) for Level 2 energy audits. Energy audits are conducted by local energy auditors (or a team of energy auditors) under the supervision of IIC Project Manager. Among the four (4) survey target countries, Nicaragua and Guatemala each has a team of energy auditors at the Cleaner

Production Center (Centro de Produccion Limpia⁶⁷) to which IIC consigns the works.

4) Scholarship program

The first phase scholarship program was held in April-May 2012. A total of forty prospective energy auditors were selected from the four Central American countries (namely, Costa Rica, El Salvador, Honduras and Nicaragua) to participate in the 48-hour intensive course held in each country. As well in November 2012, nine energy auditors were selected from the five Central American countries, including Guatemala to participate in 6-day training held in Seoul, Korea

The second-phase scholarship program was held in June-July 2013, where fifty prospective energy auditors selected from the five Central American countries had participated in the 48-hour intensive course held in each country.

5) Carbon footprint assessment for a hotel:

In 2010, as part of the EE initiative under the GREENPYME Program, IIC had supported the Half Moon resort in Rose Hall, Jamaica, to turn itself into a carbon-neutral hotel by conducting its carbon footprint (CO₂ emission amount) assessment. The actual measurement was done by an Austrian consultancy firm called (ALLPLAM / Climate Partner Austria) with the support from the IIC-Austrian Trust Fund.

6) Pilot project

In August 1, 2013, IIC and KEMKO had signed a MOU in order to conduct a pilot project in Bolivia as part of the GREENPYME Program

For the execution of the above mentioned variety of TA activities, IIC has been cooperating with industrial associations, FIs, private companies, etc. Especially for the promotion of EE in the Central American countries, IIC had signed a MOU with the Costa Rica Chamber of Industries (CICR) and BAC International Bank (private bank) in order to conduct EE training workshops for SMEs, energy audits as well as to provide financing for EE investments by SMEs.

The TA infrastructure (a network of regional organizations, FIs and energy auditors) thus accumulated by IIC is an asset which will certainly be very effective when promoting EE in CAC region.

⁶⁷ As part of the National Cleaner Production Centers (NCPCs) Program established in 1994 with the support of the Governments of Switzerland and Austria, the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP) have launched in 1998 the Cleaner Production Centre of Nicaragua (CPmL-N) in the premise of the National Engineering University (UNI) and in 1999 established the Cleaner Production Center of Guatemala (CGP+L).

(3) Issues related to TA activities

The establishment of GREENPYME Credit Program, which will provide financing as well as TA, is currently discussed within IIC. In general, the lower limit of IIC's loan size has been USD 100,000 provided under FINPYME Credit Program, and the loan sizes below that threshold have been dealt by on-lending through FIs in the past. According to the next three-year business plan, however, IIC plans to strengthen the credit ownership by decreasing on-lending through FIs and increasing direct lending to SMEs even for the loan sizes as small as USD 50,000. In the case of small-sized loans, it is crucial that IIC will reduce its transaction costs per project as much as possible, by getting approval of the Board as a program loan (and thus avoid the necessity of getting project-by-project approval from the Board); and simplifying credit appraisal processes by introducing a check sheet. As well, concessional funding sources, which will enable the provision of TA and low-interest loans under this GREENPYME Credit Program, must be acquired from donor agencies.

Issues related to TA for EE promotion (pointed out by IIC partner organizations, with which JICA Survey Team had meetings) include below:

- a) Number of energy audits and workshops are not enough. Enterprises and end-users still have low EE awareness and lack knowledge on EE. The number of EE awareness-raising workshops and the number of energy audits need to be expanded further more.
- b) Among the EE improvement measures that had been proposed in the past energy audits, those implemented were limited to non-cost and low-cost measures that required no bank loans. In order to promote high-cost EE improvement measures which have higher EE effects and require bank loans, it is necessary to provide adequate financing as well as additional explanation on EE advantages to facilitate project structuring, and also to provide follow-up.
- c) In the first round of GREENPYME energy audits, SME is the only criteria for selecting participants. Accordingly, participating enterprises were selected irrespective of their corporate sizes and industrial sectors. As a result of this, in Costa Rica, it became clear that for small sized enterprises, EE effects were hard to recognize. Therefore, the Chamber of Industries of Costa Rica (CICR) had proposed IIC to revise the selection criteria so as to differentiate participating enterprises by energy consumption volume⁶⁸.

3.5 Consideration of IIC-JICA Collaboration and their Contribution Methods for Realizing the Solutions to Barriers for Promoting EE and SPG

3.5.1 IIC-JICA collaborative EE & SPG Promotion Financing

Practical IIC-JICA collaborative measures to realize the five (5) financial schemes, which are mentioned in Section 3.3.2 and intend to provide solutions to overcome the bottlenecks (which are

⁶⁸ CICR (Camara de Industrias de Costa Rica) meeting (Oct. 7, 2013)

summarized in section 3.4) for promoting EE and SPG in the CAC region will be proposed in this section. Strong requests for formulating these IIC-JICA collaborative schemes are expressed by a lot of enterprises and organizations, with which JICA Survey Team conducted interview surveys.

(1) Direct lending from IIC

Each of the following three loan schemes, as mentioned earlier in section 3.1, has the investment potential of tens million to 200 million in USD. Considering the average size of loans per project relative to IIC's transaction costs, these three loan schemes are adequate for IIC direct lending. These schemes would also be significant as the targets of lending scheme formulated through IIC-JICA collaboration.

1) Mega SPG promotion loan

Solar radiation and electricity prices are both high in the CAC region, and the potential for SPG is very high in the four survey target countries, where (mostly in Guatemala) there are altogether over 500 MW mega SPG projects (equivalent of USD 3-5 million/project) planned to be implemented in a few years. Nevertheless, there are some concerns with regard to mega SPG as well, such as the fact that it generally takes longer time to acquire funding for a mega SPG project, and that not many mega SPG projects have been introduced smoothly in the past. Here, provision of concessional loans through IIC-JICA collaboration may contribute to facilitate the implementation of mega SPG projects.

2) New GBs promotion loan

New construction of GBs is increasing in CAC countries as mentioned earlier in Section 3.1. In each of the four survey target countries, around five (5) GBs (equivalent of USD 20 million in total and on average USD 4 million per project) are expected to be newly constructed in the coming few years. At the same time, there are some issues, which need to be solved for the promotion of new GBs construction including the following: a) not enough information disclosed about the economic and social significance of GBs construction and b) lack of financial incentives to promote GBs construction. In order to meet such need, provision of concessional loans as well as GBs awareness-raising program through IIC-JICA collaboration will contribute to actual formation of GB projects and to raise the quality of the building stocks in the market.

3) Anti-tampering metering system promotion loans

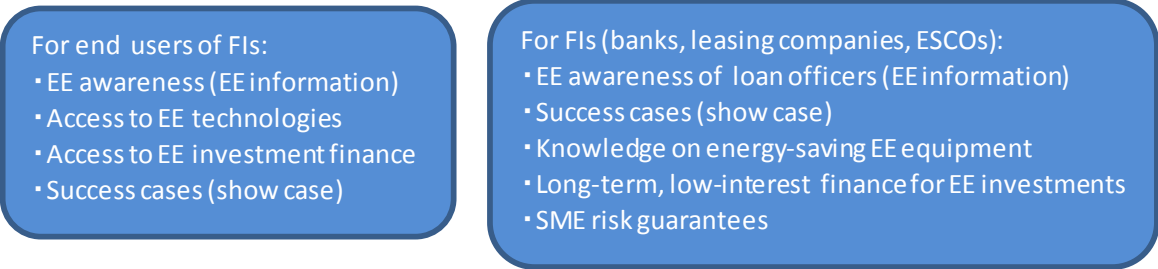
Many of the electricity distribution companies in the four (4) survey target countries are already considering the adoption of anti-tampering smart metering technology in order to tackle the problem of non-technical losses of electricity. IIC-JICA collaboration will facilitate the introduction of Japanese technologies and contribute to reduction in non-technical electricity losses by supporting the formulation of pilot projects and verification of the results, as well as by

providing concessional loans at the implementation stage of actual projects.

(2) IIC on lending through FIs

As mentioned in Section 3.1, in the four survey target countries, against the backdrop of high electricity prices, abundant solar radiation as well as the adequate government incentives provided for SPG, ESCO / ESCO-alike projects and EE equipment leasing are emerging through the initiatives of large energy consuming industries, ESCOs, EE equipment distributors and FIs. At the same time, FIs which provide these EE promotion financing pointed out the following bottlenecks need to be solved in order to see further business expansions: a) FIs as well as end-users and leasing companies lack adequate information about reliable EE technology and how to access their manufacturers, b) lack of examples and data of success cases with regard to SPG and high- efficient AC projects which are the core technologies dealt currently by ESCO / ESCO-alike projects, c) lack of risk-taking structures which support ESCO scheme and d) not enough long-term low-interest financing sources available for formulating EE projects. (See Table 3-29.)

Table 3-29 EE Promotion Bottlenecks (for FIs and End-users)



Taking into account the current status and bottlenecks, if JICA in collaboration with IIC may technically and financially support these innovative EE initiatives (such as ESCO / ESCO-alike businesses and EE equipment finance leases) emerging in the CAC region, it would contribute significantly to EE promotion in the regions. From this point of view, the following two areas of financing are proposed to be strengthened and promoted:

1) On-lending scheme through FIs to support ESCO / ESCO-alike businesses

ESCO project formation is increasing in Guatemala, Dominican Republic and Jamaica among the four surveys target countries. Especially in Dominican Republic where the government provides strongest investment incentives for SPG, there is a high potential demand for ESCO projects, which deal with SPG and EE equipment together in one package. In the Dominican Republic, there are various entities (an independent ESCO, contracting company-backed ESCO and a bank) currently preparing to enter into the ESCO market. And the common issues faced by these ESCOs are lack of acknowledgement from investors (such as FIs) and lack of end-users' knowledge on ESCO business. In order to enable ESCOs to procure funds for their ESCO

projects, it is necessary for them to strengthen their credibility. And it is also important that end-users (as ESCO project implementers) become more knowledgeable about ESCO project formulation. Therefore, in order to promote ESCO businesses, equity participation by highly credible investors (such as banks) and provision of long-term low-interest loans are both preferable. In addition, provision of awareness raising seminars and implementation of pilot projects to present success cases are needed for FIs (which provide financing for ESCO projects) and end-users (implementers of ESCO projects) to understand more about ESCO business mechanism and its economic benefits.

ESCO-alike projects, unlike ESCO project, do not provide performance guarantees, but assume energy cost savings to be utilized for repayments. In fact, ESCO-alike businesses are emerging in Guatemala and the Dominican Republic, where EE equipment distributors and banks are in alliance to implement such businesses. For instance, there are cases in which: a) bank is providing additional financing for SPG for its existing mortgage loan customers by allowing them to extend loan terms so as not to increase their monthly payment burden, b) bank is providing its existing borrowers additional loans for EE equipment investments and c) bank is providing financing for EE equipment installment sales by appliance distributors. In order to support the expansion of such ESCO-alike businesses among other FIs in the CAC region: a) provision of business-matching forums for FIs to get acquainted with EE equipment and their manufacturers, b) provision of long-term low-interest on-lending sources and c) implementation of pilot projects for showcasing the success cases in order to increase EE awareness of the customers of FIs, among others, can be implemented.

In order to support the above mentioned ESCO / ESCO-alike business initiatives and to support their expansions, IIC-JICA collaboration in providing concessional loans as well as TA for project formulation is greatly desired. However, taking into account the fact that FIs in Jamaica and the Dominican Republic prefer to borrow in their local currencies, whereas FIs in Guatemala can borrow from IIC in USD and under certain lending conditions Dominican FIs may as well borrow in USD, it is recommended that IIC-JICA will initially target Guatemala as well as the Dominican Republic under certain conditions for this “on-lending scheme through FIs to support ESCO / ESCO-alike businesses.”

2) On-lending scheme through FIs to support EE equipment finance lease

Among the four (4) survey target countries, Guatemala and Jamaica will be the target of this on-lending scheme, since they have tax benefits for finance leases. In Jamaica, however, there is local currency devaluation risk against USD and therefore enterprises prefer local-currency borrowing. In addition to this, private FIs also prefer on-lending funds from IIC to be in local currency, since they too are refraining from giving USD loan to non USD income earners including SMEs.

All things considered, it is recommended that “on lending scheme through FIs to support EE equipment finance lease” shall be targeted initially at Guatemala alone.

As mentioned earlier in Section 3.1, in Guatemala, EE equipment leases of up to 7-8 years are currently provided by an independent leasing company as well as by the leasing division of a bank. In either case, maximum length of leasing term available is restricted by the maturity of the fund procured by leasing companies. Corresponding to the current market needs of up to 8-10 years, leasing companies are seeking to find reliable funding sources with matched maturity. To this end, it is recommended for IIC and JICA to cooperate to enable the provision of a long-term low-interest loan with 10-year maturity.

In addition, in order to promote the leases of SPG and EE equipment, it is necessary to raise EE awareness of end-users and provide them with success cases (showcases). In order to meet these needs, JICA cooperation with IIC in providing TA programs is also desired in addition to their financial support.

As a summary, Table 3-30 shows the applicable countries of the proposed five loan schemes, namely, three direct loans from IIC and two IIC on lending through FIs. The applicability by country is defined (○=possible, Δ=little possibility, ×=no possibility) according to the levels of electricity prices, current status of laws & incentives and the current status of financial system. As to the utilization of finance lease method, it is limited to Guatemala and Jamaica, which are the only two countries that have tax benefits for finance leases among the four survey target countries.

Table 3-30 Applicability by Country of the Proposed Loan Schemes

Type of loan	Target technology	Applicability			
		Guatemala	Nicaragua	Dominican Republic	Jamaica
Direct lending from IIC	Mega SPG	○	○	Δ	Δ
	Green building	○	○	○	Δ
	Smart meter	○	○	○	×
On-lending through FIs	ESCO / ESCO-alike businesses	○	×	Δ	Δ
Loans to leasing companies	EE equipment & SPG	○	×	×	○

3.5.2 Expected Positive Impact of IIC-JICA Collaboration

- (1) Strengthening IIC’s TA operation in order to materialize loan schemes through IIC-JICA collaboration

In order to make functional the proposed five loan schemes presented in Section 3.3, it is considered most effective to utilize IIC’s strength, i.e. the existing TA infrastructure which consists of TA tools (such as EE seminars, trainings, scholarship programs and energy audits implemented under GREENPYME Program) and the network of partner agencies. At the same time, it is

necessary for IIC-JICA to create synergy effects, in which JICA will complement and strengthen IIC’s limited resources through the provisions of both in-kind support (including the dispatch of consultants) and comprehensive TA programs, while IIC will facilitate the effective preparation of pipeline projects. (See Figure 3-16)

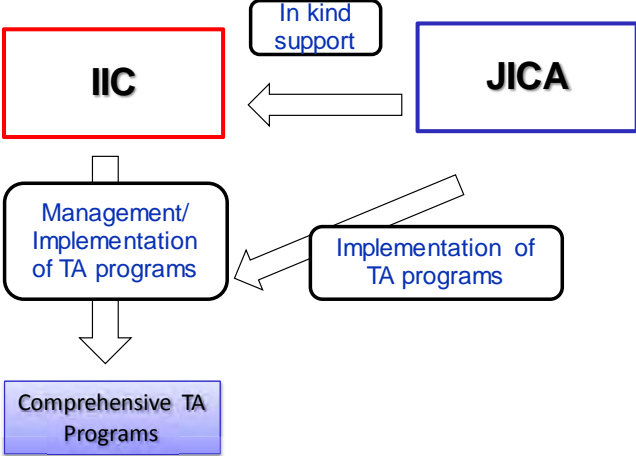


Figure 3-16 Proposed IIC-JICA Collaborative Technical Assistance Programs

In concrete, we propose that comprehensive TA programs should include the following several components which would solve the issues and bottlenecks witnessed during the field surveys. Figure 3-17 shows the relationship between bottlenecks and their solutions.

- a) EE awareness-raising of end-users, industrial sectors and FIs: business-matching forums for end-users, target sectors and FIs to acquire information on most promising EE technologies and their manufacturers.
- b) Provision of showcases (success cases) and formulation of pilot projects: pilot projects will be formulated for the purpose of showcasing. The quantified EE effects of this pilot project will be shared with all participants in the seminar mentioned above.
- c) Support for project designing and formulation: energy auditors in cooperation with IIC will be invited to get training on Japanese EE technologies and Japanese energy audit techniques. Following the training, energy auditors will conduct energy audits of the pipeline projects (prospective investment projects). It is especially important to ensure that energy auditors understand thoroughly about the concept of life cycle costs (not only the initial costs) based on the availability of long-term warranty of EE equipment. As well, various financial methods including ESCO, ESCO-alike and finance lease schemes will be introduced.

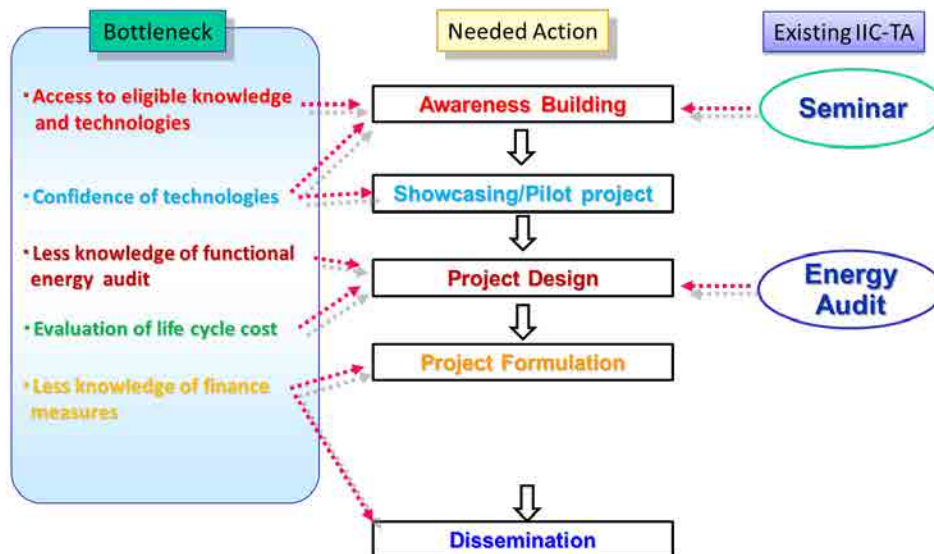


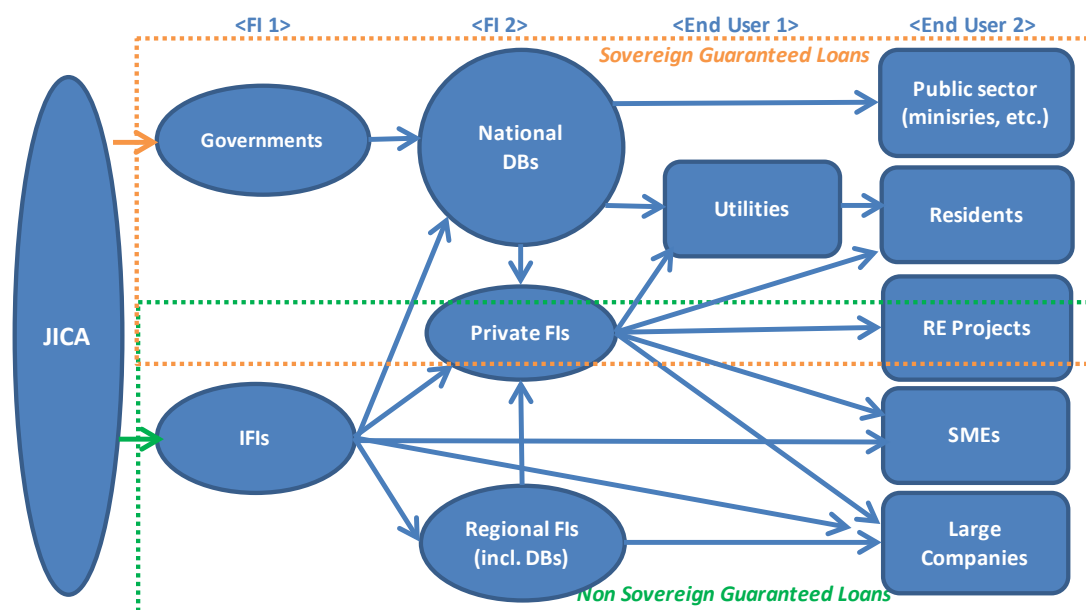
Figure 3-17 Bottlenecks and Necessary Actions for EE Project Formation

(2) Provision of direct support (long-term loans and TA) for the private sector

For JICA, providing Yen loan to IIC (i.e., non-sovereign guaranteed loans) entails several benefits including the below:

- a) Bypassing the government and government agencies will avoid expansion of public debt as well as red tape, implying the possibility of higher efficiency.
- b) Formulation of EE support program targeted at the private sector which cannot be covered by sovereign guaranteed loans (see Figure 3-18).
- c) Provision of direct financial support for projects involving Japanese companies
- d) Possibility of providing a wide range of regional countries (i.e. twenty six (26) IDB-IIC member countries).
- e) By participating in the process of formulating the projects involving Japanese companies, proliferation and application of their highly energy efficient technologies become possible.
- f) For the private sector lending, the existing business relationship of IDB-IIC with FIs can be utilized (see Table 3-31).
- g) In the twenty six (26) IDB-IIC member countries, IIC direct lending projects as well as co-financing projects with IIC will be granted tax exemption⁶⁹.

⁶⁹ IIC Charter, Section 9, "Immunities from Taxation": IIC website, "IIC Charter" <http://www.iic.org/en/node/12337>



Note: IFI/international financial institution; DB/development Bank; SME/small and medium-sized enterprise

Source: Compiled by JICA Survey Team

Figure 3-18 Loan Target Sectors Covered Either by JICA’s Non Sovereign-guaranteed or Sovereign-guaranteed Loans

Table 3-31 FIs Which Already Have Transactions with IDB-IIC in the Target Four Countries

	Nicaragua	Guatemala	Dominican Republic	Jamaica
IDB/JICA CORE Scheme target country	○	○	○	○
IDB Trade Finance Facilitation Program (TFFP) participating Fis	Banco de Credito Centroamericano (Bancentro), Banco de la Production (BanPro), Banco Finanzas	Banco Agromercantile de Guatemala, Banco G&T Continental, Banco Industrial.	Banco BHD, Banco Popular Dominicano C. por A., Banco de Reservas (Banreservas)	First Global Bank Limited First Caribbean International Bank (Jamaica) Limited
IDB EE TA granted		○	○	○
IDB concessional loans (FSO) target countries	○	△	×	×
IIC office located	○	○	×	×
IIC GREENPYME Program (Energy audits & TA)	○	○	Participated in Financial Sustainability Week	○
IIC onlending partner FIs	Banco de Finanzas (BDF), Credifactor, Financiera ProCredit, Finca Nicaragua, Financiera Nicaragiense de Desarrollo, Banco Uno, Banco de Credito Centroamericano, Financiera Delta- Nicaragua, Bancentro, Banco Mercantil, S.A.	Banco de Occidente, Banco Internacional, Banco de América Central, Financiera de Occidente, Facto-Rent	Banco Popular, Banco Santa Cruz, Banco BHD, Banco Nacional de Credito, Banco Intercontinental Leasing, Banco Mercantil, Banco Intercontinental	First Global Bank Ltd., RBTT Bank Jamaica Limited, Citizens Bank Limited, Eagle Merchant Bank, Trafalgar Development Bank

Note: ○=yes; △=partially yes; ×=no

Sources: Compiled by JICA Survey Team based on information publicly disclosed on IIC website (accessed in October 2013)

Thus, JICA is able to contribute to the formulation of private sector projects involving Japanese technologies more directly in the CAC region by supplementing and enhancing IIC's abundant knowledge, expertise and the customer base (i.e. regional private companies, TA participating companies and intermediary FIs).

3.5.3 Proposed IIC-JICA Collaborative Loan Scheme

In order to materialize the five loan schemes proposed earlier (in section 3.5.1) for promoting EE and SPG in the CAC region, Figure 3-19 intends to show the detailed workflow of what need to be done through IIC-JICA collaboration. This flow chart illustrates the overall workflow and timeline of IIC-JICA collaboration: including a) general works affecting the entire lending scheme, b) project identification processes for direct lending from IIC (for SPG, new GBs construction, smart metering system) as well as for on-lending schemes through FIs (such as local banks and leasing companies) (i) to support ESCO / ESCO-alike businesses and (ii) to support EE equipment finance lease, c) formulation of TA programs to support project identification, and d) processes leading to loan disbursement by IIC or private FIs.

With regard to the on-lending scheme to support ESCO projects, IIC needs to consider the method of risk-taking etc., which would take time. Therefore, it would be suitable to consider ESCOs in the second round of the IIC-JICA collaborative loan.

There are some differences in components among the five lending schemes, but the general workflow is similar as shown below: (As for the detailed information, see Appendix 6)

- a) Acquiring the resources necessary for the formulation of the pipeline projects, and implementing basic trainings
- b) Formulation and confirmation of EE equipment sales scheme
- c) Preparation of sales model, loan screening sheet, etc. necessary for project identification
- d) Sales and marketing for project identification
- e) Formulation of pilot projects as showcases
- f) Information dissemination through seminars about the results of pilot projects and available financial schemes
- g) For those companies interested in formulating EE projects, conducting the first screening
- h) For those prospective borrowers (companies/projects) which passed the first screening, conducting additional energy audits or small-scale feasibility study
- i) Preparation and revision of a list of pipeline projects
- j) Credit appraisals by IIC

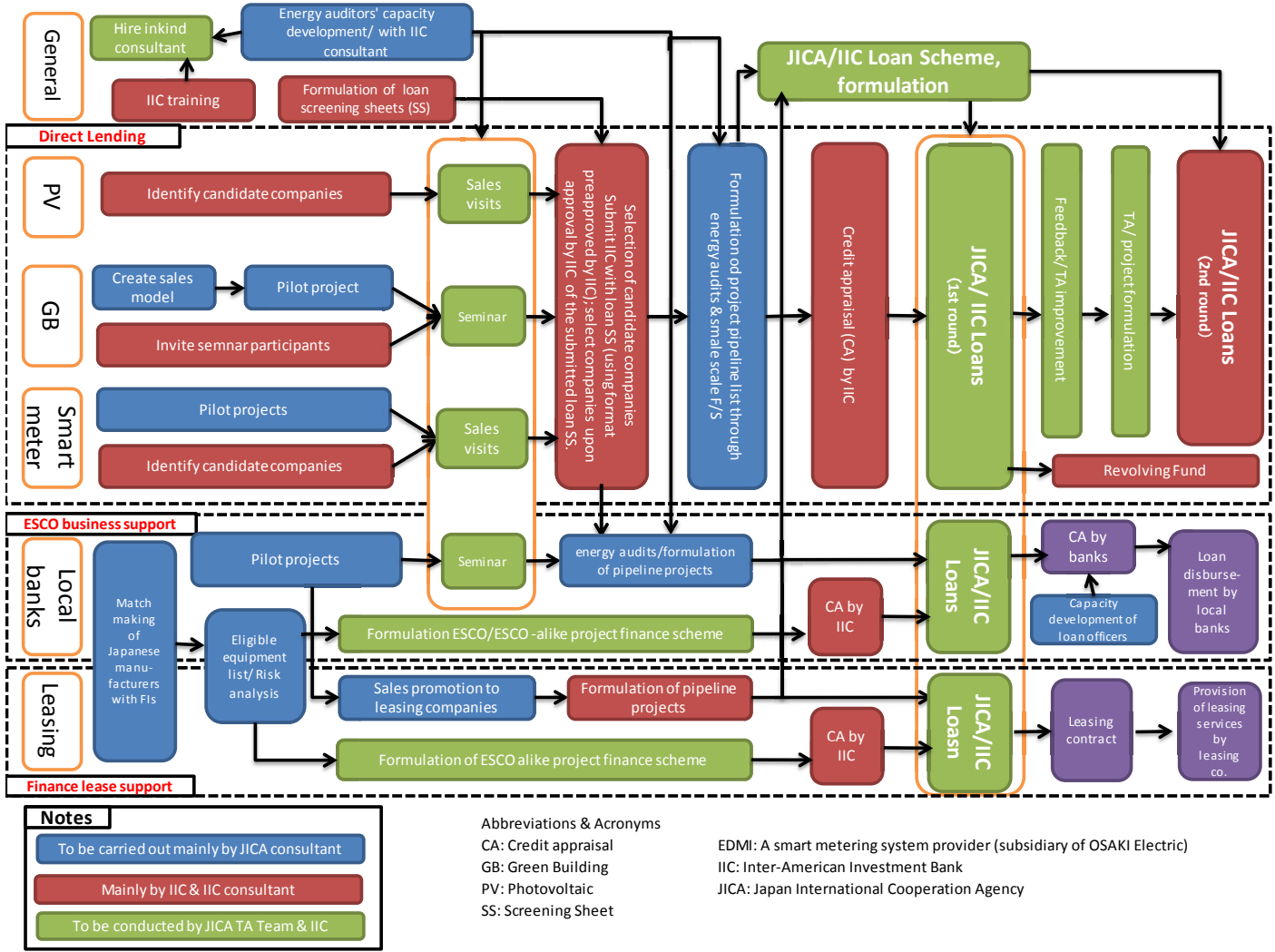


Figure 3-19 Work Flow for Formulating IIC-JICA Collaborative Loan & TA Scheme

Below is the proposed overview and workflow of each component consisting: a) general works, b) mega SPG, c) new construction of GBs, d) smart metering system, e) on lending through local banks and f) on lending through leasing companies.

(1) Preparation of general works affecting the entire IIC-JICA Collaborative Loan Program

1) Component 1: Hiring in-kind consultants (as part of in-kind support from JICA)

In order to effectively utilize IIC's existing TA tools as well as to supplement its limited resources, local consultants will be hired to work for IIC. The persons, who will be hired, must have a qualified background in finance, and who are from the CAC region and are knowledgeable about the region. Thus hired consultants will go under training to learn IIC work procedures and policies as well as to acquire the basic knowledge on energy efficiency.

2) Component 2: Capacity development of energy auditors

In order for energy auditors in the CAC region to enhance their basic knowledge on EE technologies and to acquire higher levels of skills with regards to energy auditing methods (strength to formulate projects), select 8-10 energy auditors already cooperating with IIC and invite them to attend 1-2 weeks' EE training in Japan.

3) Component 3: Preparation of loan screening sheet

At the earlier stage of the pipeline project formulation, it is necessary to have a loan screening sheet which will enable screening of prospective borrowers. The screening sheet will be fixed after IIC-JICA consultations. The contents of the sheet include the minimum information necessary for the preliminary credit appraisal based on which IIC may have a rough idea on bankability of the project.

4) Component 4: Utilization of the net interest margin reserve fund (the so-called, "revolving loan fund")

If IIC decides to implement the IIC-JICA collaborative lending scheme in several rounds (by utilizing loan repayments which can "revolve" to finance other projects), it may utilize the net interest reserve fund from the second round. Especially in cases of IIC direct lending schemes, the size of the reserve fund will expected to be fairly large. The below are some of the ideas utilizing this reserve fund:

- a) For the expansion and strengthening of IIC's TA program
- b) To cover the expense of preparing EE equipment list which could contribute to the simplification of credit appraisals
- c) For the formulation of ESCO performance guarantee scheme
- d) For providing additional and extended trainings to in-kind consultants for IIC and

prospective energy auditors in CAC countries so as to enable them to understand and proliferate Japanese EE technologies

- e) For increasing the number of Japanese companies, which attend the trainings to be held in the CAC region (by supporting their travel expenses, etc.)
- f) To contribute to the launch and development of the GREENPYME Credit Program
- g) To contribute to enable more preferential interest rate for end- users

(2) Direct lending from IIC

1) Mega SPG

As for mega SPG, there is huge potential demand in the CAC region. As well, Panasonic and other enterprises already have a good amount of projects in the pipeline. Promotional tools such as pilot projects and seminars are not necessary. Nevertheless, it is important to catch up with sales persons of these SPG projects to acquire information of prospective projects as early as possible. In-kind consultants will confirm the borrowing needs, check the feasibility of the borrower by utilizing loan screening sheet, conduct additional feasibility study and formulate the project pipeline list.

2) Formulation of GBs sales model

Unlike other lending schemes, GBs requires the formulation of a sales model. IIC will and JICA first collaborate to have the common understanding with regard to the ideal GB concept in the CAC region, the existing GB evaluation tools and the current status and issues of GBs in the CAC region. Then, based on the common understanding, IIC and JICA will discuss the draft criteria for formulating low interest lending scheme for GBs.

The implementation of a pilot project which involves typical GB technologies such as SPG and high-efficient ACs, and introduce the results at local seminars. (Not only GBs, SPG and high-efficient ACs are also the main target of the two IIC on lending schemes through FIs, namely banks and leasing companies) This type of seminar will be implemented in close partnership with local GB Councils, and will invite the potential end-users including contracting associations and hotel associations. It is important to share the positive results of the pilot project as much as possible with the support of local GB Councils and universities.

Targeting at the new GB construction projects identified through the above process, in-kind consultants will confirm the borrowing needs, check the feasibility of the borrower by utilizing loan screening sheet, conduct additional feasibility study and formulate the project pipeline list.

3) Smart metering system

Since the prospective customers of anti-tampering (smart) metering system are restricted to

power distribution companies, individual visits to these companies will be more effective than holding seminars. In order to accumulate the pipeline projects, in-kind consultants will visit EDM's potential clients to introduce the IIC-JICA collaborative lending scheme. As well, prior to the implementation of an actual project, pilot project will be conducted to verify technology. Following the technical verification, in-kind consultants will confirm the borrowing need, check the feasibility of the borrower by utilizing loan screening sheet, conduct additional feasibility study and formulate the project pipeline list.

(3) On lending through FIs to local banks and leasing companies

1) Component 1: Match-making between manufacturers and FIs (local banks / leasing companies)

In order to promote ESCO / ESCO-alike businesses as well as EE equipment leases, it is crucial to provide the forums, where FIs and EE equipment manufacturers can meet and get acquainted enough to form some kind of business alliance.

2) Component 2: Preparation of EE equipment list, risk analysis, formulation of ESCO and ESCO-alike schemes

IIC is interested in formulating ESCO / ESCO-alike projects, in which FIs assume part of the EE equipment technical performance risks. In order to realize this, preparation of in-depth list of EE equipment is necessary. For instance: a) EE performance, b) warranty and c) other end-user benefits must be specified in the list of feasible EE equipment list, based on which loan project formulation process will be simplified and facilitated. In addition, it is important for IIC to consider providing a risk guarantee structure or a credit enhancement mechanism to strengthen the credibility of ESCOs / leasing companies, by utilizing the interest margin reserve fund of JICA loan.

3) Component 3: Pilot projects

As previously mentioned with regard to GBs, as a pilot project, a technical package of SPG and high-efficient ACs will be the most effective (See Section 3.5.2. (1)-2) for GBs).

Pilot project will include impact analyses with regard to financial elements (such as types of lending schemes applicable as financing methods and cost effectiveness analysis). Seminars will be held to disclose the results of the pilot project by inviting not only IIC, JICA and universities, but also prospective customers such as industrial associations, end-users and FIs (as the potential borrowers of IIC on lending scheme).

4) Component 4: Sales promotion through seminars

SPG, ACs and other EE equipment provided by Japanese Manufacturers will be introduced at seminars. As well, the results of pilot projects will be share to potential industrial associations and end-users. At the seminar, end-user benefits will also be explained since they vary depending on selected financial scheme.

5) Component 5: Energy audits and the project pipeline formulation

In order for the above mentioned project formulation efforts to bear fruits (i.e. to have actually disbursable loan projects), it is crucial to persuade end-users to decide introducing EE equipment. And energy audits and FS are effective tools to facilitate their investment decisions. Energy auditors, who had been trained by IIC (including those who will participate trainings to be held Japan), are expected to take charge from energy audits to the implementation of EE improvement measures.

Since IIC has conducted many energy audits as part of TA activities under the GREENPYME Program, those customers who had already received energy audits could be included among the project pipeline list. These customers, who have not yet implemented their EE improvement measures after energy audits, will need to be followed as prospective borrowers.

6) Component 6: Capacity building of loan officers

In Figure 3.19, capacity building of loan officers is located immediately before the loan appraisals by local banks. In practice, however, it should be conducted in much earlier stages. It is important to educate FI's loan officers about the economic benefit of introducing prominent EE technologies and their suitable financial methods to be applied.

3.5.4 Proposed IIC-JICA Collaborative TA Programs

Prior to the formulation of IIC-JICA collaborative financing schemes, comprehensive TA programs should be implemented. Specified TA programs are especially needed to formulate GBs, anti-tampering metering system and ESCO / ESCO-alike projects. The proposed TA programs are described below.

Note that if IIC decides to implement IIC-JICA collaborative lending scheme in several rounds, the reserve fund of net interest revenues (the so-called "revolving loan fund") can be utilized by IIC for non-earmarked purposes for the second disbursement on. The size of this reserve fund would become bigger for IIC's direct lending to end-users (compared with on-lending through FIs). It is worth considering utilizing part of this fund to formulate TA programs for EE promotion in the CAC region, such as those presented below.

(1) TA to promote new construction of GBs (Cooperation with GB Councils)

As mentioned in Chapter 2, in many CAC countries GB Councils have been established. These councils intend to promote GBs in their countries; however it is not easy to promote GBs, because of lack of these councils' resources. Formulating TA programs to cooperate and support these GB Councils' awareness-raising activities, develop their capacity and promote GBs construction are worth considering. The following are the examples of TA programs to be implemented in cooperation with GBCs:

- a) Holding seminars focusing on sharing the results (benefits) confirmed in the pilot projects (to be described in details in (2) below)
- b) Providing business matching meetings between eligible EE suppliers and GBCs / potential sectors and end-users

(2) Implementation of pilot project for high-efficient ACs and SPG package

The most effective technologies to contribute to new construction of GBs in the CAC region are high-efficient ACs and SPG. However, the largest barrier that prevents the introduction of them are lack of reliable data on the economic benefits to be gained by introducing them. In order to break through this barrier, it is recommended to implement pilot projects (showcasing, visualization) by the academy (universities). The ripple effect of presenting the data of actual EE benefits gained from the pilot projects to the general public by the academy is to be quite large. Tables 3-32 and 3-33 show the candidates of organizations (universities) to implement the pilot projects for high-efficient ACs and SPG. In Guatemala, Gallileo University and Del Valle University, which have good facilities and experienced staffs, are recommended. And in Dominican Republic, INTEC and PUCMM with abundant measurement experiences are recommended. It is recommended to select / decide the implementing organizations by referring to these information and assessing their actual capacities (resources / facility). Through data collection / analysis / presentation by the academy, the knowledges gained through the pilot projects can be accumulated in the academic sector.

Table 3-32 Candidates to Implement Pilot Project in Guatemala

University Name	Note
Universidad Galileo	
Universidad Del Valle	
Universidad Zamorano	from Honduras

Table 3-33 Candidates to Implement Pilot Project in Dominican Republic

University Name	Note
Instituto Tecnológico (INTEC)	Experiences for measurement
Universidad Nacional Pedro Henriquez Urena (UNDHU)	
Universidad Central Del Este (UCE)	
PUCMM UNIBE	Well maintained facility

(3) Implementation of pilot project of anti-tampering metering system

Pilot projects of anti-tampering metering system for about three hundred (300) end-users in the districts of high non-technical loss are to be implemented, in the areas of target electricity distribution companies described in Table 3-34. Based on the results of these pilot projects, full-fledged projects will be planned.

Table 3-34 Candidates to Implement Pilot Project of Metering System

Country	Distribution Company Name	Note
Guatemala	Energuate	Need for pilot project
Dominican Republic	Edenorte	Need for pilot project
El Salvador	Delsur	Need for pilot project

(4) Implementation of TA programs to promote ESCO / ESCO-alike schemes

As mentioned earlier, the largest barriers to prevent the promotion of EE in target four (4) countries are: a) lack of access to long-term low-interest loans and b) lack of understanding / awareness on the financial benefits to be gained by EE investments among FIs and end-users. The promotion of these niche EE market through IIC-JICA collaborative loan and TA programs would have a significant implication to enhance EE in the CAC region. The following effective TA programs to support the growth of ESCO / ESCO-alike markets are recommended to be formulated:

- a) Holding seminars focusing on sharing the results / benefits confirmed in the pilot projects of EE and solar power generation equipment (described in details in (2) above)
- b) Providing business matching meetings between eligible EE suppliers and banks / leasing companies / potential sectors and und-users
- c) Preparation of “Eligible EE equipment list” and risk analysis, which can contribute to simplify loan appraisal procedures
- d) Capacity development of loan officers of FIs and leasing companies

(5) Implementation of TA programs to support formulating pipe line projects

In order to implement projects utilizing the outputs through TA programs, in some cases, additional energy audits and/or small FS need to be conducted. And in order to increase the number if successful project executions, it is effective to involve energy auditors who had been trained under IIC TA programs.

And as described before under IIC’s GREENPYME Program, there are several projects, for which energy audits had been carried out but still awaiting to secure financing for their implementation, or those which had energy audits but have not even considered implementation yet. For comparatively large sized projects among these projects, it is useful to carry out additional energy audits and/or small FS and create additional pipeline projects, for which eligible Japanese EE technologies may contribute to reduce of energy consumptions.

3.6 Summary

This report had focused on EE and SPG in the CAC region and proposed ideas to formulate the IIC-JICA collaborative loan and TA programs.

Through the field surveys conducted, it has been confirmed that Guatemala, Nicaragua, Dominican Republic and Jamaica deeply depend on fossil energy generation and are facing high electricity tariffs, ranging from 18 US cent/kWh to 38 US cent/kWh⁷⁰. These countries are strongly promoting renewable energy use since the solar radiation in the CAC region is more abundant than those of top SPG leading countries. CAC countries have introduced various kinds of incentive mechanism to promote SPG. And the future market of SPG in the CAC region is expected to continue expanding. On the other hand, the largest barrier that prevents the dissemination of SPG in the region is lack of adequate financing, which meet the emerging demand.

In the CAC region, it has been confirmed that about 50% of electricity in business and commercial buildings is consumed by air conditioning. The average efficiency of the existing ACs is low, and it is estimated that by replacing these existing ACs with higher-efficient inverter / VRF ones, about 50% electricity reductions can be achieved. Besides, in the industry sector, it was estimated that quite a large energy and cost reductions can be achieved by introducing high-efficiency compressors and Eco-cute.

As well, it has been confirmed that the number of GBs (both new construction and retrofiting) is increasing in the CAC region, because of the trend to introduce environmentally friendly management and the need to reduce operating costs. GB Councils have been established in several CAC countries to promote the construction of GBs. The barriers that prevent the introduction of GBs are: a) lack of awareness-raising on the significance of constructing GBs, b) lack of opportunities to disseminate eligible EE technologies and SPG, which are key technologies to formulate GBs and c) lack of incentive mechanisms to promote GBs.

Furthermore, the reduction of electricity distribution loss in the CAC region, which varies from 25% to 40%, is also one of the big issues to be solved. In this context, electricity distribution companies are very much interested in the anti-tampering smart metering technology.

Especially in Guatemala and Dominican Republic, ESCO or ESCO-alike businesses are becoming popular. The biggest bottleneck that prevents the promotion of these businesses is lack of adequate financing. In addition, in Guatemala and Jamaica, finance leases can be treated as expenditures, not as asset, and therefore leasing scheme is increasingly applied to promote the installation of SPG and EE equipment among enterprises.

As a result of the above mentioned surveys, the following five (5) financing schemes are proposed: (the figures in the brackets show the average investment size of a project)

⁷⁰An average of industry and commercial tariffs.

- i) Direct lending from IIC
 - a) For supporting mega SPG projects (USD 3-5 million)
 - b) For supporting constructing GB projects (USD 1-10 million)
 - c) For supporting implementation of anti-tampering smart metering system projects (over USD 3million)
- ii) On-lending through local FIs (Instillation of SPG and EE equipment)
 - a) For supporting ESCO / ESCO-alike businesses
 - b) For supporting finance lease scheme for EE equipment

A concessional loan and TA programs provided by the IIC-JICA collaborative scheme will be able to contribute to realize the above proposed schemes. In order to formulate IIC-JICA TA programs effectively, the following approaches are recommended:

- a) Utilizing existing IIC's TA infrastructure in the CAC region
- b) Utilizing in-kind support from JICA to IIC (e.g. dispatched consultant) to strengthen IIC's resources
- c) Provision of a comprehensive TA programs to break through the barriers to promote EE in the CAC region.

TA programs should be prepared covering the following contents:

- a) Awareness-raising for end-users, target sectors and financial institutions (hereinafter referred to as "FIs") (Sharing data and information through seminars etc.)
- b) Formulating pilot projects as show-casing (for visualization of success cases)
- c) Support for project designing and formulation of the pipe line projects

Compared with top SPG leading countries, CAC countries have higher electricity tariffs, more abundant sun shine, incentive mechanisms to promote SPG and large demand for cooling. The energy savings and financial benefits to be gained from introducing SPG and EE equipment with an adequate support of concessional loans would be quite large.

Thus, through an early formulation of the IIC-JICA collaborative loan and TA programs, Japanese EE technologies will be able to contribute to enhance the energy efficiency in the CAC region.

Appendixes

- Appendix 1: Energy Efficiency Platform in Guatemala
 - 1-1 Energy Efficiency Platform in Guatemala (Outline)
 - 1-2 Energy Efficiency Alliance Alternative Platform in Guatemala (Concept)

- Appendix 2: Survey Result of Financial Institutions

- Appendix 3: Energy Efficiency Seminars in Guatemala and Dominican Republic
 - 3-1 Energy Efficiency Seminars in Guatemala
 - 3-2 Energy Efficiency Seminars in Dominican Republic

- Appendix 4: Hearing Result from MGM Innova

- Appendix 5: IIC Corporate Profile and Dias Scoring Templates
 - 5-1 IIC Dias Scoring Template for Corporate Projects
 - 5-2 IIC Dias Scoring Template for FI Projects
 - 5-3 IIC Corporate Profile

- Appendix 6: Notes to Formulate Proposed Schemes

Energy Efficiency Platform in Guatemala (Outline)

1. Objectives

- 1) To be an awareness center of Guatemala
- 2) To be a lobbying group to promote the government EE policies (to promote EE Law)
- 3) To be an EE opinion leader through information sharing: Follow up of JICA Survey on EE Promotion in the CAC region)

2. Key implementer

Mr. Giovanni Andrino, President of ENERGUUA

With the support of NCEE (National Commission of Energy), Mr. Argueta Monterroso Jose Rafael, Manager of Strategic Planning Dept.

3. Promoters

- 1) Access to Academic in Guatemala

ZAMORANO (RE/EE promoting agency based in Honduras, branch in Guatemala)

Ms. Ingrid Godinez, Representante de Zamorano para Guatemala

(EE seminars for industries starting in 2014)

- 2) Access to energy, industrial, commercial and services companies including ESCOs

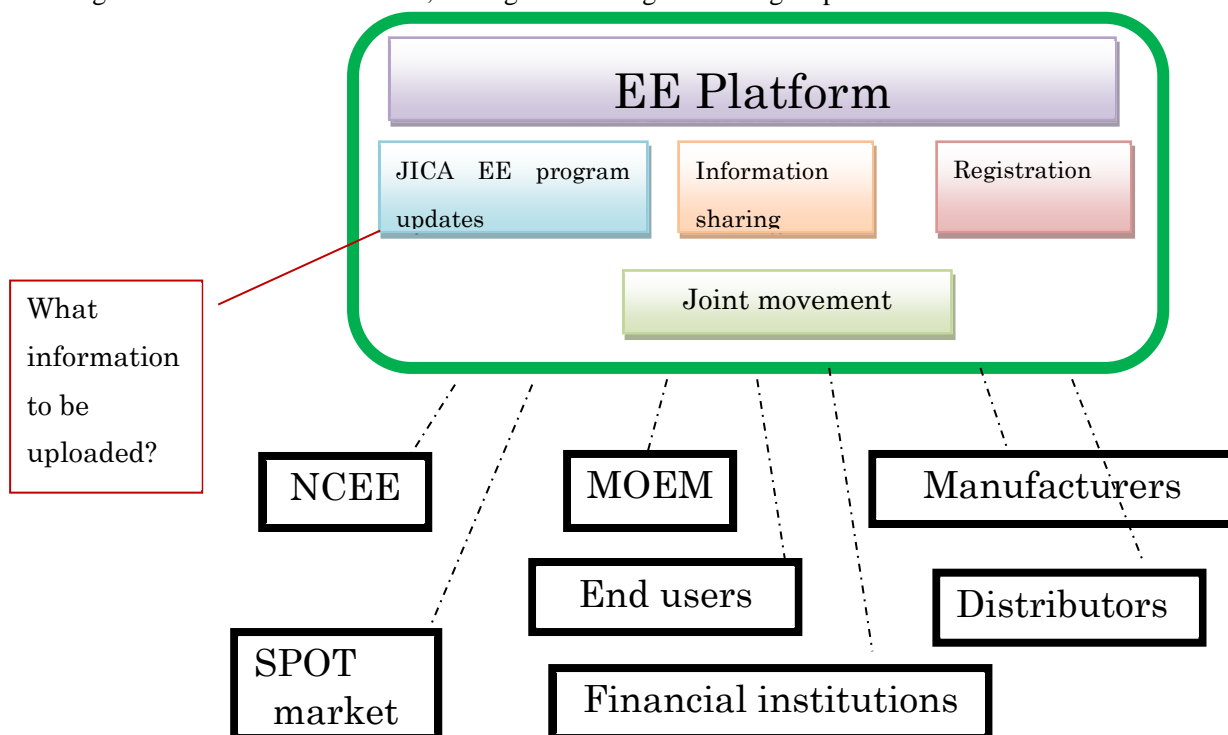
AMCHAM

Ms. Carolina Castellanos, Directora Ejecutiva; Mr. Estardo Cepollina, Consultor en Energia y Medio Ambiente

- 3) Access to government sector

NCEE

Mr. Argueta Monterroso Jose Rafael, Manager of Strategic Planning Dept.



Energy Efficiency Alliance Alternative Platform

“Rich is not the one who has the most, but the one who needs the least”.



Source: Mr.Giovanni, President EUERGUA, Guatemala

Mission Satament

Our mission as the Energy Efficiency Alternative Platform in Guatemala is to actively pursue, as a first priority of national sustainable economical environmental interest, initiatives to encourage industry and public officials to think energy efficiency first, when they are making energy resource procurement or energy policy choices for the nation.



Accomplishing the Mission Statement

- Promoting high standards of quality, responsibility and integrity among members of the Alliance;
- Be responsible for a strict accreditation process of the Alliance at a national and international levels to ensure the continuous growth of the Energy Efficiency Platform;
- Motivate industry to adopt best business practices;
- Serve as a data bank for aggregate energy efficient investment;
- Circulate information about developing technologies and their appropriate applications;
- Actively participate in legislative and regulatory proceedings which affect energy policy in the country.;
- Ensuring the best use of the Alliance Platform in the delivery of all promoted energy services by its member companies (Product, ESCO and Finance Services);
- Provide a vehicle to publicize and share the benefits of energy efficiency investment and project implementation and successes;
- And act on behalf of the Alliance members when its welfare and that of the public in general require a single voice.



About the Energy Efficiency Alliance Alternative Platform

The Energy Efficiency Alliance Alternative Platform will be a nationwide association formed to promote the benefits of widespread use of energy efficiency in the sectors of the economy most affected by the high costs of electricity. On behalf of the Alliance's membership, the future multidisciplinary make-up of its board members will work together to assist open new opportunities for energy efficient technologies, energy services and financing and by promoting the value of energy demand reduction through implementation of seminars, workshops, training programs, publication of case studies and guidebooks and the collection and circulation of aggregate industry data.



About the Energy Efficiency Alliance Platform

The Alliance will be proud to take a leadership role in assisting to devise innovative energy efficient policies in our ever changing national marketplace. The membership will represent every aspect of industry and how it relates to the energy market, and also as its future advocate for the cost effective delivery of comprehensive energy services, technology implementation and financial services, to all customer classes.

The Alliance will work strongly to promote the benefits of energy efficiency in a highly competitive evolving market. In order to ensure industry quality, the Alliance will seek a strict accreditation or certification program for ESCOs, Energy Service Providers, Energy Efficiency Contractors, Energy Consultants and Technology Suppliers to measure capabilities and experience. The Alliance will place a high priority on making the Alternative Platform a forum for the broadest spectrum of participants in the market, including generation, distribution companies, wholesale energy brokers and generation project developers. The Alliance will also look outside its borders and bring together energy service providers, technology opportunities and financing opportunities from around the world to broaden the market opportunities of its members.

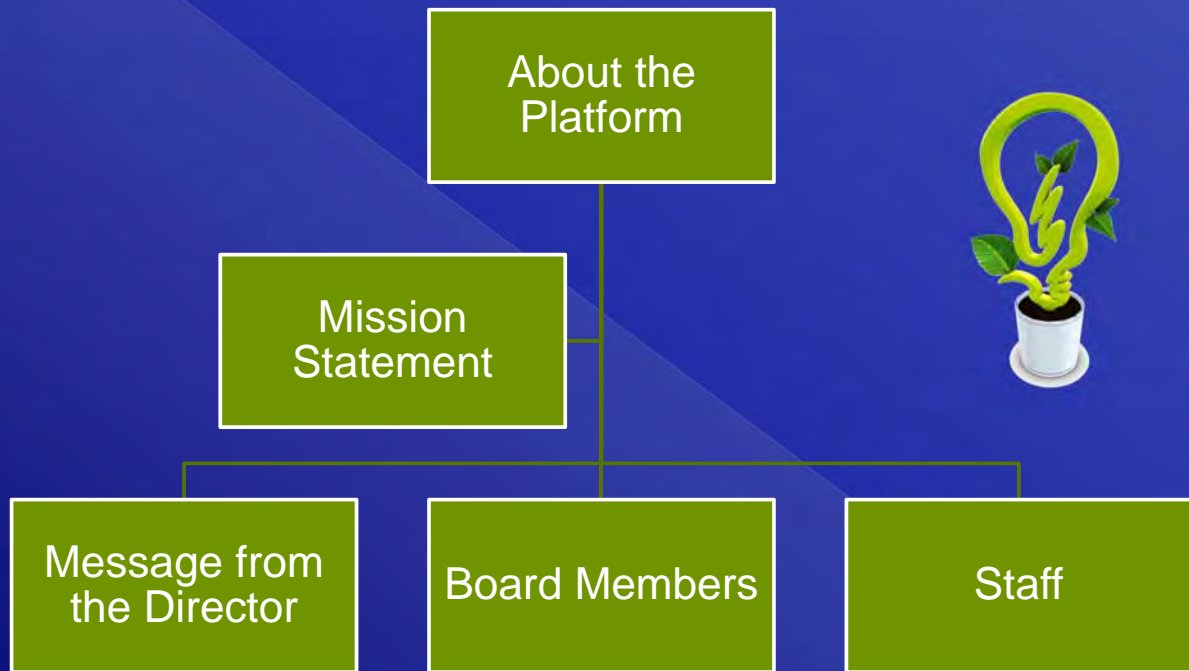
The Alliance will seek to collaborate with existing trade groups, policy makers and customer service representatives of financial institutions to accelerate market development and growth by:



Acerca de la Plataforma Alternativa para la Alianza de Eficiencia Energética

- Advocating the immediate passing by Congress of the National Energy Efficiency Law, now in the hands of the Ministry of Energy and Mines
- Advocating the implementation of the widely accepted International Performance Monitoring and Verification Protocol (IPMVP) to accommodate the increasing broad uses of energy efficiency and energy savings and ensure that the verification methodologies appropriately meet the growing number of new energy and environmental compliance requirements.
- Collecting and publishing industry reports based on empirical ESCO delivered project data through partnerships with established international think tanks, energy research centers and equipment suppliers.
- Providing information about industry trends and practices through the production of guidebooks, case studies and industry reports.
- Establishing industry standards and best practices through a well-regarded accreditation program.
- Organizing and hosting numerous workshops and conferences targeted at end users as well as policy makers and industry participants

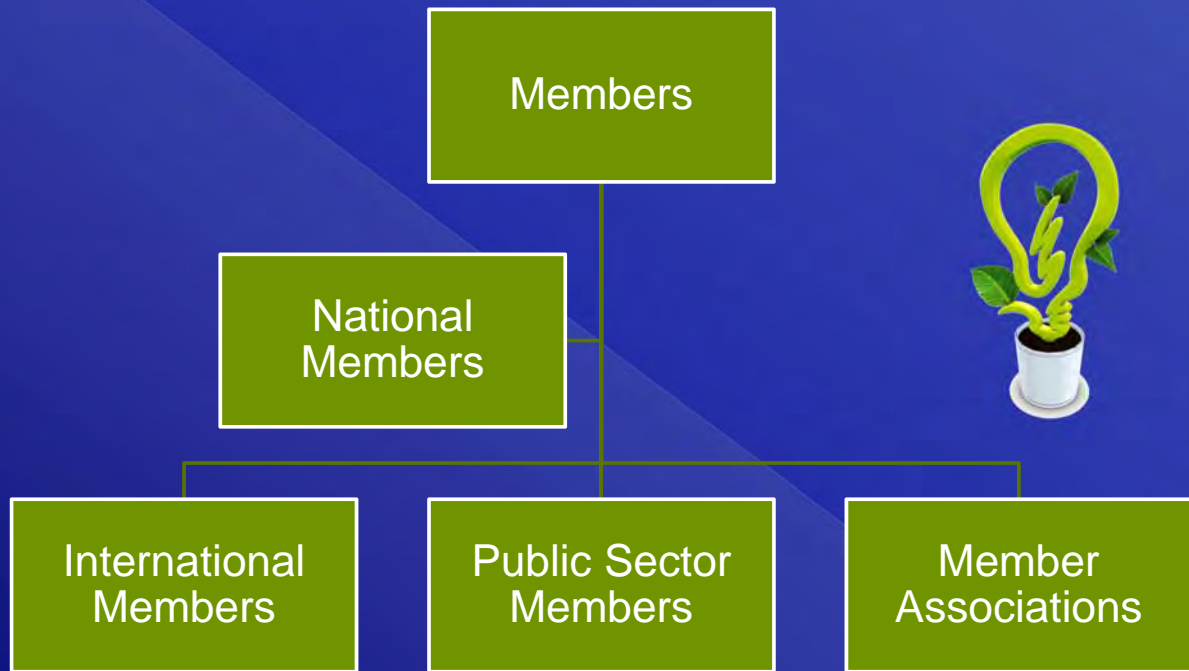




Joining the Alliance



Members



Accreditation Programs



Events

- Seminars
- Conferences
- Industry Events
- Energy Sector Events
- Regional and international events of Interest to the members

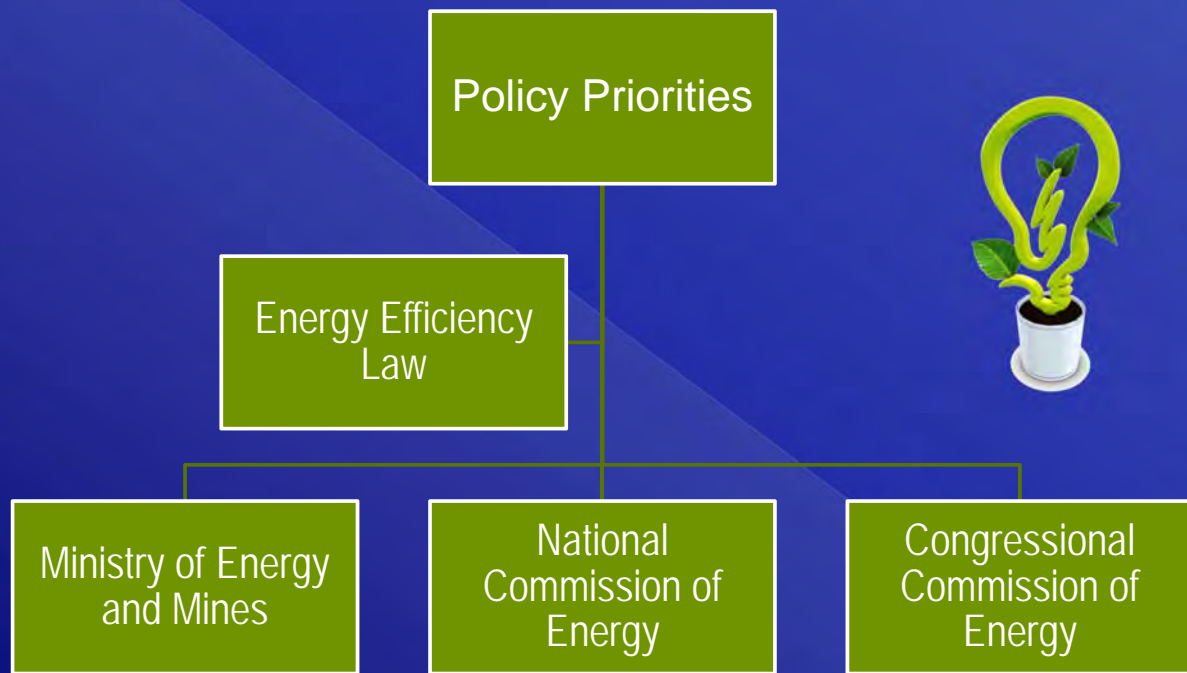


Collaborating Associations

- Agexport
- Cámara de Industria
- ANAVI
- Cámara de la Construcción
- AMCHAM
- Canadian Alliance of Energy Efficiency
- Etc.



Policy Priorities

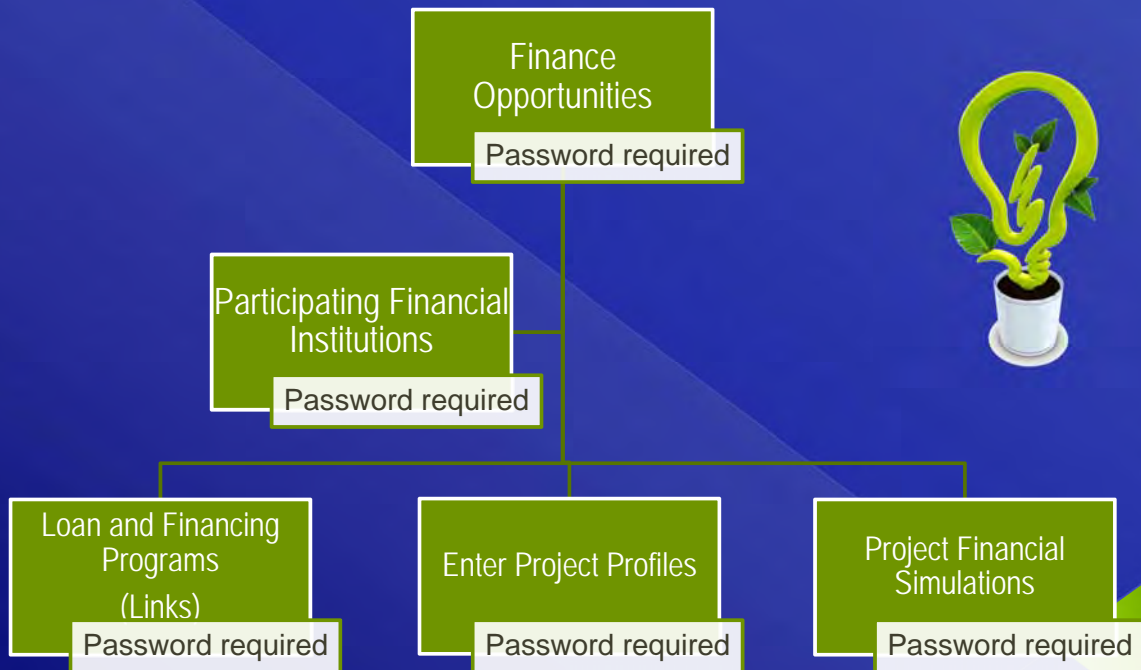


Industry News

- National energy sector news
- Updated energy market analysis
- Industry specific news for the members
- Updated industry journals and periodicals
- Informative industry links



Finance Opportunities



Thank you



Survey Result of Financial Institutions

CN	Name of FI	Sector	Lending currency	EE equipment list	EE funding (currency)	EE finance	EE finance bottleneck
GT	Banco Industrial (1)	Corporate loans (power generation, communication, commerce, industries)	USD: 60% Local: 40%	Applicable	Needed (USD)	Loans for solar power generation & EE improvement	Long-term low interest funding sources
GT	BAC Credomatic Guatemala (2)	Corporate, housing loan, consumer loans (credit card & POS system)	USD, Local	N.A.	Needed (USD)	Not specifically promote RE/EE sector loans	<ul style="list-style-type: none"> • EE Law enforcement needed to raise end users' EE awareness • Pilot project needed for showcasing good practice • Awareness raising of loan officers & end users
GT	GCF Leasing	Operating/ Finance lease for commercial & industrial customers	USD, Local	Applicable	Needed (USD)	PV & EE equipment finance lease	10 year funding is needed to expand the term of the current 7 year finance lease
GT	BAM Leasing	Corporate, retail loans	USD, Local	N.A.	Needed (USD)	Sales & Lease back of PV panels & EE equipment	Long-term funding needed to expand the current maximum term of 8 years
DR	BancoBHD Leon (4)	Micro finance, SME loans, retail, consumer, corporate loans	USD, Local	Applicable	Needed (Local) If in USD: below 4% interest rate	Financing investments on EE improvement and solar generation	<ul style="list-style-type: none"> • Longer payback period for SMEs which are not paying taxes • Need SME risk guarantees to promote EE investments • Local currency loans for non USD earning companies
						ESCO business (plan)	For project structuring, awareness raising on economic benefit of ESCO type investments is needed for loan officers and end users
DR	Banco Ademi	Micro finance, SME loans	USD 30%, Local 70%	N.A.	Needed (Local) If in USD: below 5% interest rate	Finance SMEs for sales on installment of EE equipment and PV solar generation system	<ul style="list-style-type: none"> • EE awareness raising for SMEs • Local currency loans for non USD earning companies
JA	Scotia Bank Jamaica	Retail (housing), corporate loans	Local	N.A.	Needed (Local)	Receive DBJ on-lending for: ①DBJ Energy Fund Credit Line (DBJ Energy Audit Grant Program applicable for energy audits)	<ul style="list-style-type: none"> • Funding sources similar to DBJ loans (local currency, low interest loans) needed • Awareness raising for end users, SME engagement • Local currency loans for non USD earning companies
JA	National Commercial Bank	Retail (SME, housing, car), corporate loans	Local	N.A.	N.A.	②DBJ Residential Energy Line of Credit for RE power generation	<ul style="list-style-type: none"> • Local currency loans for non USD earning companies
NI	BAC Nicaragua (3)	Housing/ car loans, consumer (credit card), corporate finance	USD, Local	Applicable	Needed (USD)	<ul style="list-style-type: none"> • Provide loans for EE investments • Finance lease 	<ul style="list-style-type: none"> • Long-term low interest funding sources • Leasing is limited to foreign companies (no tax benefit and charges high fees)

(1) Biggest private bank in Guatemala. Have a leasing subsidiary called Leasing Solution .

(2) In June 2013, BAC Guatemala merged with Banco Reformador (which specializes in corporate finance)

(3)&(2) Parent company is BAC International Bank, but fund procurement is done by each local bank

(4) In January 2014, Centro Financiero BHD merged with Grupo Financiero Leon and became Centro Financiero BHD Leon, the second largest private bank in Guatemala (Abbreviations) CN: Country; JA: Jamaica; DR: Dominican Republic; GT: Guatemala; NI: Nicaragua

Energy Efficiency Seminars in Guatemala

(1) The first seminar in Guatemala

- 1) Date & Time: March 6th, 2014 (2 p.m.-4 p.m.)
- 2) Hosts: JICA Survey Team, AGEXPORT, CIG and CGPL (AGEXPORT and CGPL are IIC's partner organizations)
- 3) Target end-users: Registered companies and organizations under AGEXPORT and CIG, and others
- 4) Purposes: To introduce Japanese EE and solar power generation technologies to the audience; to grasp EE needs and issues; and to collect related information
- 5) Contents of seminar:
 - a) Presentations by Japanese manufacturers with Q & A sessions:
 - Panasonic (Presentation on solar generation, inverter and VRF air conditioners)
 - MYCOM (Presentation on high efficiency air compressors and "Eco-cute")
 - b) Information exchanges on financing need and barriers that prevent the promotion of EE
- 6) Role-sharing among the host organizations:
 - a) Entire coordination: CGPL, Mr. Luis Munoz, Executive Director
 - b) Collection of participating enterprises:
 - AGEXPORT (MC), Ms. Wendy MENA, Analista de Competitividad
 - CIG, Mr. Daniel Garcia, Asesor en Politicaws y Estandares Ambientales
 - c) Planning and implementation: JICA Survey Team
- 7) Achievements and proposals for the future:
 - a) The high interest was shown by the participants. Many inquiries were made on basic technical aspects, and active discussions were made on a variety of issues including useful life of equipment, treatment of surplus electricity, etc.
 - b) After the seminar, many participants remained and further asked a lot of questions directly to manufacturers and JICA Survey Team. Information exchanges were also made among the participants. It was only a few-hour seminar, but it turned out to be an effective forum to proliferate Japanese technologies and to provide an opportunity to have direct dialogue with Japanese manufacturers.
 - c) The cooperation with IIC's partner organizations, namely, AGEXPORT and CGPL, was quite effective for inviting target participants. For another such occasion in the

future, conducting a program in cooperation with CIG is also worth being considered.

8) List of participants:

(Guest Name	Company	Type of business)
1. Pablo Rogeles&others	Gamatextils	Supplier of textiles
2. Jise Tejado	Soprema	Waterproofing solutions
3. Juan Prillwitz	IDEACSA	Food products manufacturers
4. Jise Homandoze	Proelectric	Distributor of Mitsubishi Electric
5. Bolando Padella&others	Gupo COBRA	Power Generation equipment installation
6. Mr. Eduardo Beneke	Distributor of Panasonic	PV panels
7. Jenniler Mendoza&others	AGEXPORT	
8. Davis Garcia	CIG	
9. Ivan Mendoza	CNEE	
10. Hector Mendoza	CCA	
11. Reue Grori	Comcel	
12. Karl Brenner	Enernova	ESCO
13. Robert Lopez	Nova	
14. Miguel Pigmoa	Awanaya	Consultant
15. Carlos Caronado	ILC	
16. Melun Castro	Armarja	Consultant
17. Many others (Total 34)		

(2) The second seminar in Guatemala

- 1) Date & Time: March 7th, 2014 (10 a.m.-12 p.m.)
- 2) Hosts: JICA Survey Team and AMCHAM (IIC's partner organization)
- 3) Target end users: Registered companies and organizations under AMCHAM (mostly engineering companies and ESCOs), leasing companies and others
- 4) Purposes: To introduce Japanese EE and solar power generation technologies to the audience; to grasp EE need and issues; and to collect related information
- 5) Contents of seminar:
 - a) Presentations by Japanese manufacturers with Q & A sessions:
 - Panasonic (Presentation on solar generation, inverter and VRF air conditioners)
 - MYCOM (Presentation on high efficiency air compressors and "Eco-cute")
 - b) Information exchanges on the financing need and barriers that prevent the promotion of EE

6) Role-sharing among the host organizations:

- a) Entire coordination and collection of participating enterprises (MC): AMCHAM, Mr. Estuard Cepollina, Consultor en Energia Y Medio Ambiente
- b) Planning and implementation: JICA Survey Team

7) Achievements and proposals for the future:

- a) The high interest was shown by the participants. Many inquiries were made with regard to technical aspects, and there were active discussions on a wide variety of issues such as useful life of equipment, incentive programs, financial benefits of EE investments, etc.
- b) After the seminar, many participants remained, and further asked a lot of questions directly to manufacturers and JICA Survey Team. Information exchanges were also made among the participants. The seminar lasted only for a few hours, but it turned out to be an effective forum to proliferate Japanese technologies and to provide the participants chances to have direct dialogue with Japanese manufacturers.
- c) The cooperation with IIC's partner organization, namely, AMCHAM was quite effective to invite target participants. The continued cooperation with AMCHAM is highly recommended for the future similar occasions.
- d) The background and interest of the participants were different from those of the previous seminar co-hosted by AGEXPORT, CGPL and CIG. Therefore, holding two separate seminars was a good decision.

8) List of participants:

(Guest Name	Company	Type of business)
1. Valeria Prado	OEG	ESCO
2. Javier Rodas Briones	Melecsa	Consultores de Energ.ANma
3. Max Lainfiesta	Enersol	Solar Termico
4. Juan Pablo Sinibaldi	Sincorp	Outsourcing
5. Javier R. Briones	Melecsa	Asesores en energ.ANma
6. Andr.ANis Prera	AN= Ambiente Arquitectura	LEED AP
7. Arq. David Hern.Anandez	AN= Ambiente Arquitectura	LEED AP
8. Heber Gonz.ANalez	Inversiones Pasabi.ANin	Energy Generator
9. Carlos Moino	Moino Atturney	Energy and Environmental Legal Advisor
10. Juan pablo Sinibaldi	Sincorp	Outsourcing Services (ESCO etc)
11. Guillermo Chang	Sincorp	Outsourcing Services (ESCO etc.)
12. Moises Roman Canahui	Aursa	Solar 5 MW Community Project
13. Mr. Luis Carrera	M Leasyng	Leasing of PV panels and EE equipment
14. Mr. Francisco Javier Garcia	BAM Leasyng	
15. Ms. Ingrid Godinez	Unisidad Zamorano	Academic

-The end-

Energy Efficiency Seminars in Dominican Republic

(1) The first seminar in Dominican Republic

- 1) Date: March 13th, 2014 (2 p.m.-4 p.m.)
- 2) Host: JICA Survey Team
- 3) Supporting agencies:
 - CCP: Ms. Lissette Dumit, Directora Internacional
Mr. Jose Gautreau De Moya, Encargado de Proyectos
Mr. Jonathan Aragonez, Gerente de Comercio Exterior
 - MEM: Mr. Jose M. Vela, Energy Sustainable Advisor
 - DRGBC: Ms. Angelica Redpath Perez, Presidente
 - ASONAHORES: Ms. Thelma Martinez, Directora de Mercadeo
- 4) Target end-users: Registered companies and organizations under CCP, DRGBC and ASONAHORES, and others (in business and commercial sectors)
- 5) Purposes: To introduce Japanese EE and solar power generation technologies to the audience; to grasp EE need and issues; and to collect related information
- 6) Contents of seminar:
 - a) Presentations by Japanese manufacturers with Q & A sessions:
 - Panasonic (Presentation on solar generation, inverter and VRF air conditioners)
 - MYCOM (Presentation on high efficiency air compressors and “Eco-cute”)
 - b) Information exchanges on financing need and barriers that prevent the promotion of EE
- 7) Role-sharing among the host and supporting agencies:
 - a) Collection of participating enterprises: CCP, DRGBC and ASONAHORES
 - b) Advisor: MEM
 - c) Planning and Implementation (MC): JICA Survey Team
- 8) Achievements and proposals for the future:
 - a) The high interest was shown by the participants. Many inquiries were made on technical aspects, and active discussions were made on a variety of issues including useful life of equipment, warranties, incentive programs, etc.
 - b) After the seminar, many participants remained and further asked questions directly to manufacturers and JICA Survey Team. As well, information exchanges were actively

conducted among the participants. The seminar, although it lasted only for a few hours, turned out to be an effective forum to proliferate Japanese technologies and a good opportunity for the audience to have direct dialogue with Japanese manufacturers.

- c) The cooperation with one of IIC's partner organizations, namely, CCP, was quite effective in inviting target participants. For another such occasion in the future, conducting a program in cooperates with DRGBC and ASONAHORES is also worth considering.

9) List of participants:

(Guest Name	Company	Type of business)
1. Mr. Shajira Nazir	MEM	Government
2. Mr. Keluyn Rufes	DGEM	Government
3. Mr. Ramon Beras	Camara de Comercio y Produccion	Chamber
4. Ms. Angel Manuel Hernandez Then	Camara de Comercio Magva	Chamber
5. Ms. Laura Flores	Fundacion Energia & Desarrollo	NGO
6. Ms. Nilda Remigio	Fundacion Energia & Desarrollo	NGO
7. Ms. Iliana Gallado	CRISFER	Developer
8. Mr. Oliver Pimentel	ODESA	Sub-contractor
9. Mr. Carlos Socias	CJ/Socias	Sub-contractor
10. Mr. Pablo Sosa	Concrecon, S.R.L.	Construction materials supplier
11. Mr. Diana Gonzalez	Concrecon, S.R.L.	Construction materials supplier
12. Mr. Hamilton	FERREGILTRO	Manufacturer
13. Ms. Veronica	CordivaPanasonic DR	Manufacturer
14. Mr. Nairobi Pimentel M.	Prieto Nouel	Appliance dealer
15. Mr. Luis Miguel Mendez	Edeu Roc	Hotel
16. Mr. Edgar Carrillo	Crowne Plaza	Hotel
17. Mr. Roberto Martinez Torres	RMT & ASOCS.	Lawyer
18. Mr. Luginco Woncion	RECASTA	
19. Mr. Batslo Gdoy	GSP	
20. Mr. Domingo Pena	DGII	

(2) The second seminar in Dominican Republic

1) Date: March 14th, 2014 (10 a.m.-12 p.m.)

2) Host: JICA Survey Team

3) Supporting agencies:

- MEM: Mr. Jose M. Vela, Energy Sustainable Advisor

- ADOEXPO: Ms. Gladis Pimentel
- AIRD: Mr. Carlos Rodriguez, Project Director

- 4) Target end users: Registered companies and organizations under ADOEXPO and AIRD, and others (in industrial sector)
- 5) Purposes: To introduce Japanese EE and solar power generation technologies to the audience; to grasp EE need and issues; and to collect related information
- 6) Contents of seminar:
 - a) Presentations by Japanese manufacturers with Q & A sessions:
 - Panasonic (Presentation on solar generation, inverter and VRF air conditioners)
 - MYCOM (Presentation on high efficiency air compressors and “Eco-cute”)
 - b) Information exchanges on financing need and barriers that prevent the promotion of EE
- 7) Role-sharing among the host and supporting agencies:
 - a) Collection of participating enterprises: ADOEXPO and AIRD
 - b) Advisor: MEM
 - c) Planning and Implementation (MC): JICA Survey Team
- 8) Achievements and proposals for the future:
 - a) The high interest was shown by the participants. Many inquiries were made on technical aspects, and active discussions were made on a variety of issues such as equipment maintenance, warranties, ways to access manufacturers, etc.
 - b) After the seminar, many participants remained in the seminar room, and continued to ask many questions to manufacturers and JICA Survey Team. Information exchanges were also conducted among the participants themselves. It was only a few-hour seminar, but it was effective to provide a forum to proliferate Japanese technologies and a good opportunity for the participants to have direct dialogue with Japanese manufacturers.
 - c) The cooperation with ADOEXPO and AIRD was effective to invite target participants. It is recommended to cooperate with these two organizations again when holding similar types of seminars in the future.
 - d) The background and interest of the participants were different from those of the previous seminar co-hosted by CCP, DRGBC and ASONAHORES. Therefore, holding two separate seminars was a good decision.

9) List of participants:

(Guest Name	Company	Type of business)
1. Mr. Gilberto Martinez	MIC	Government
2. Ms. Angelica Redpath Perez	DRGBC	Association
3. Ms. Rosa B. Almonde	DRGBC	Association
4. Mr. Gustavo A. Diaz Diaz	CEI-RD	Exporter
5. Mr. Thanya Guzman R	Consultoria	Consultant
6. Mr. Cesar Donastorg	LEED AP	Building certification
7. Mr. Oscar Fermin	INSEL, S.R.	Sub-contractor
8. Mr. Carlos Sanchez	TecniCaribe	Sub-contractor
9. Mr. Victor Susana	Supra Refrigeracion	Sub-contractor
10. Mr. Fcoicruz B.	Supra Refrigeracion	Sub-contractor
11. Mr. Lorient Florentin	Taller Industrial Lorient	Construction materials supplier
12. Mr. Neybin Garcia	Taller Industrial Lorient	Construction materials supplier
13. Ms. Juan Segura	Laboratorio Magnachem International S.R.L	Manufacturer
14. Mr. Ysidro Alejandro Santana	Hraina Caribe Agro Industrial	Agricultural products
15. Mr. Mayra Rodriguez Valdez	Marova Foods	Food products
16. Mr. Pablo Contreras	CONALECHE	Food products
17. Mr. Meyuel Maw	CASABERO	Food products
18. Mr. Alberto Jinus	CASABERO	Food product
19. Mr. Jairo Santo	CASABERO	Food products
20. Mr. Erich Frankenberg Reid	Reid y Compania S.A.	Credit
21. Mr. Eduardo A. Santana Pereyra	ESASA	Accountant
22. Mr. Jua Roedan	AGAMPTN	

-The end-

Memo of Interview with MGM Innova

On 17th January 2014, JICA Survey Team visited MGM Innova, which is promoting energy conservation and solar power generation business in the Central America and Caribbean region, and interviewed on the current status and barriers to prevent the promotion of its business. The collected information is summarized below:

1. MGM Innova group is composed of the following four (4) companies: a) MGM Innova (for planning and group management), b) MGM Innova Energy Services (for energy conservation engineering), MGM Innova Renewables (for renewable energy engineering) and MGM Innova Capital (for investment fund management).
2. MGM Innova Capital is operating MGM Sustainable Energy Fund (MSEF), which invests in energy conservation and renewable energy projects in the Central and South America region. The target investment amount of MSFF is USD 10 billion. As of the end of 2013, IDB, DEG (Germany), EIB (EU), Bancoldez (Colombia) and others have invested about USD 4 billion. MGM Innova is negotiating to acquire additional investments from other international cooperation agencies. (The largest issue for the company is securing financial sources which meet the increasing financial demand.)
3. MSEF is planning to invest in several SPVs (Special Purpose Vehicles), which will be established by MGM Innova and promote energy conservation and renewable energy in Costa Rica, Guatemala, Nicaragua, El Salvador, Honduras and Dominican Republic in 2014. (MGM Innova has already signed several MOU to develop projects with the partner companies in these countries. It has initially started energy conservation businesses in Mexico and Colombia.)
4. SPVs, which will be established in several countries, will start their business firstly in leasing of solar generation systems. And as the second stage, they will expand their businesses into leasing of energy conservation equipment. Target technologies are to be limited only to some reliable Japanese ones, such as Panasonic products.
5. MGM Innova is interested in utilizing the IIC-JICA collaborative financing scheme as a low interest funding source for SPVs and/or lessees of the above mentioned leasing scheme.
6. With reliable Japanese technologies, good partner companies and adequate amount of financial resources, MGM Innova intends to establish SPVs and start businesses very soon.

-The end-



**The Development Impact and
Additionality Scoring (DIAS) System
for Corporate Operations**

Criteria	Maximum	Score	Assessment
Development Outcome	6.50	0.00	
Project or Company Business Performance	1.50	0.00	
IRR/FRR/ROIC	1.35	0.00	
Increase Sales / Product Capacity	0.15	0.00	
Contribution to Economic Development	1.50	0.00	
ERR/EROIC	0.60	0.00	
FOREX Generation / US\$ Invested	0.15	0.00	
Value Added / US\$ Invested	0.15	0.00	
Job Creation	0.60	0.00	
Environmental & Social Performance	0.50	0.00	
Project Specific Environmental & Social Performance	0.50	0.00	
High	0.50	0.00	
Medium	0.35	0.00	
Low	0.25	0.00	
Climate Change Mitigation/Adaptation	0.50	0.00	
Private Sector Development	1.00	0.00	
Competition	0.20	0.00	
Market Expansion	0.15	0.00	
Private Ownership Entrepreneurship	0.15	0.00	
Technology and Know-how transfer	0.20	0.00	
Demonstration Effect from Innovation	0.10	0.00	
Higher Corporate Governance Standards	0.10	0.00	
Changes in Regulatory Framework	0.05	0.00	
Developments Infrastructure f/ others	0.05	0.00	
IIC Strategic Development Objectives	2.00	0.00	
Country Diversification	0.40	0.00	
Country Group			
A&B Countries	0.14	0.00	
C&D Countries - Caribbean	0.44	0.00	
C&D Countries - Central America	0.40	0.00	
C&D Countries - South America	0.40	0.00	
Regional A/B and C/D	0.40	0.00	
Beneficiary Target Population within country	0.40	0.00	
Geo Coverage	0.40	0.00	
Outside Major Metropolitan Center	0.48	0.00	
Major Metropolitan Center	0.24	0.00	
Type of Investment	0.30	0.00	
Target 1: Local Currency	0.09	0.00	
Target 2: Instrument	0.12	0.00	
Equity/ Quasi Equity	0.14	0.00	
Long Term or Revolving Loan	0.12	0.00	
Small Loan	0.18	0.00	
Target 3: Innovation	0.09	0.00	
Type of Client	0.40	0.00	
Client Size	0.40	0.00	
Micro	0.48	0.00	
SME	0.40	0.00	
Large	0.24	0.00	
Delivery Mechanism	0.30	0.00	
Project Nature	0.30	0.00	
Greenfield	0.36	0.00	
Expansion	0.30	0.00	
Refinance or Working Capital Financing	0.24	0.00	
Coherence with IDB Group Strategy	0.20	0.00	
IIC Obligation under PS IBP	0.10	0.00	
Supports IDB Country Strategy	0.10	0.00	
IIC's Role - Additionality	3.50	0.00	
Financial Additionality	1.50	0.00	
Alternative Financing not available	1.05	0.00	
Resource Mobilization	0.45	0.00	
Non-Financial Additionality*	2.00	0.00	
Use of technical Assistance	0.70	0.00	
Improvements in Corporate Governance	0.40	0.00	
Pioneering or Innovation Dimension	0.20	0.00	
Improvements in Environmental, Social, Health, Labor Standards	0.70	0.00	
Project Score	10.00	0.00	

*This score may exceed the maximum possible DIAS score for this indicator due to the extra points that the system assigns to operations that receive a high score for improvements in corporate governance and environmental standards.



**The Development Impact and
Scoring (DIAS) System for Operations
with Financial Intermediaries**

Criteria	Maximum	Score	Assessment
Development Outcome	6.50	0.00	
Project or Company Business Performance	1.50	0.00	
Volume of targeted loans as a % of IIC Financing	0.75	0.00	
Volume of targeted loans as a % of total targeted portfolio	0.75	0.00	
Contribution to Economic Development	1.50	N/A	
Environmental & Social Performance	0.50	0.00	
Project Specific Environmental & Social Performance	0.50	0.00	
High	0.50	0.00	
Medium	0.35	0.00	
Low	0.25	0.00	
Climate Change Mitigation/Adaptation	0.50	0.00	
Private Sector Development	1.00	0.00	
Impact on Development of Domestic Financial Markets	0.50	0.00	
Technology and Know-how Transfer	0.15	0.00	
Demonstration Effect from Innovation	0.20	0.00	
Changes in Regulatory Framework	0.15	0.00	
IIC Strategic Development Objectives	2.00	0.00	
Country Diversification	0.40	0.00	
Country Group			
A&B Countries	0.14	0.00	
C&D Countries - Caribbean	0.44	0.00	
C&D Countries - Central America	0.40	0.00	
C&D Countries - South America	0.40	0.00	
Regional A/B and C/D	0.40	0.00	
Beneficiary Target Population within country	0.40	0.00	
Geo Coverage			
Outside Major Metropolitan Center	0.48	0.00	
Major Metropolitan Center	0.24	0.00	
Type of Investment	0.30	0.00	
Target 1: Local Currency	0.15	0.00	
Target 2: Innovation	0.15	0.00	
Type of Client:	0.40	0.00	
Client Size: Target for Subloan			
Company - Micro	0.48	0.00	
Company - SME	0.40	0.00	
Company - Large	0.00	0.00	
Mortgage - Low Income	0.40	0.00	
Mortgage - Middle Income	0.28	0.00	
Mortgage - High Income	0.00	0.00	
Delivery Mechanism	0.30	0.00	
Direct (Equity)	0.36	0.00	
Indirect Small FI	0.30	0.00	
Indirect Large FI	0.12	0.00	
Coherence with IDB Group Strategy	0.20	0.00	
IIC Obligation under PS IBP	0.10	0.00	
Supports IDB Country Strategy	0.10	0.00	
IIC's Role - Additionality	3.50	0.00	
Financial Additionality	1.50	0.00	
Alternative Financing not available	1.05	0.00	
Resource Mobilization	0.45	0.00	
Non-Financial Additionality*	2.00	0.00	
Use of Technical Assistance	0.70	0.00	
Improvements in Corporate Governance	0.40	0.00	
Pioneering or Innovation Dimension	0.20	0.00	
Improvements in Environmental, Social, Health, Labor Standards	0.70	0.00	
Project Score	10.00	0.00	
Adjusted Project Score		0.00	

*This score may exceed the maximum possible DIAS score for this indicator due to the extra points that the system assigns to operations that receive a high score for improvements in corporate governance and environmental standards.

Corporate Profile of the Inter-American Investment Corporation

<p>Governing law for establishment: AGREEMENT ESTABLISHING THE INTER – AMERICAN INVESTMENT CORPORATION (IIC Charter) enforced in March 23, 1986 (revised in 1995, 2001 and 2002)</p>	<p>IIC History: In 1984: Established (with USD 200 mil., of which 25.5% held by the U.S.A. and 19.5% by other developed countries and 55% by LAC countries.)</p>
<p>Registered capital: USD 705.9 mil.(capital increase of USD 500 mil. in 1999, USD 2.2 mil. in 2008) Shares held by 44 member countries (including 26 Latin America & Caribbean member countries)</p>	<p>In 1985: 21 countries including the U.S.A., France, Switzerland and Japan signed the IIC Charter In 1991: IIC Operation Guideline was enforced In 1992: IIC’s first local office (Costa Rika branch) opened</p>
<p>Board of Directors & Management: Each of the members of IIC Board of Governors, which is the supreme decision-making body of IIC, is ex-officio of IDB Governor and Alternate Governor appointed by a member country of IDB. The Board of Executive Directors, to which the Board of Governors delegates all its powers, is in charge of IIC operations according to the IIC Charter. Mr. Luis Alberto Moreno, who is the President of IDB, is the Chairman of the Board of Directors and has right to appoint the General Manager of IIC. Mr. Carl Munana, who is an international investment banker, was appointed the fourth IIC General Manager in Jan 2013. He had served many important positions including the Managing Director of J.P. Morgan Co. in Latin America, after which he served many years as an independent consultant. The Board of Directors (which comprises of 13 Executive Directors and 13 Alternate Executive Directors) has an authority to approve IIC’s organizational structures and positions as well as its budget. IIC’s ten divisions are directed by 12 full-time management members including the GM (Of them, seven came from private sector and four IDB/ other international institutions)</p>	<p>In 1995: IIC Charter amended; expanded financial resources by increasing debt-to-equity ratio from 1:1 to 3:1 allowed direct investment in SMEs majority owned by foreign investors. In 2000: FINPYME Program (technical assistance) launched In 2001: Joined the Multilateral Development Bank Evaluation Cooperation Group; adopted good practice standards In 2005: Financial Institutions Program launched to enhance SME finance through local financial institutions; Completed bond issuance in local currency in Columbia In 2006: Small Business Revolving Line (SBRL) Program launched In 2008: GREENPYME Program (for SME energy audits) launched In 2010: Sustainability Week for the Financial Sector launched In 2011: SBRL rebranded as FINPYME Credit Program; IIC Investment Funds Unit created</p>
<p>IIC Corporate mission and business scope: In supplement to IDB, IIC promotes economic development in LAC member countries by enhancing the establishment, expansion, and modernization of private sector SMEs, small sized banks, leasing companies and other financial institutions by means of equity / debt investments, credit guarantees and technical assistance.</p>	<p>Headquarters, branches and employees: Headquarters in the Washington. D.C. (85 employees as of end-2012), share building at the IDB Headquarters; 12 branch offices in Argentina, Chile, Columbia, Costa Rika, El Salvador, Guatemala, Haiti, Nicaragua, Panama, Paraguay, Peru, Uruguay (25 employees at branch offices)</p>

Assets & loans:

million USD	2010	2011	2012
Assets (1)	1,427	1,483	1,815
Loans & Investments (2)	874	1,020	1,088
Ratio (2)/(1)	61%	69%	60%
NPL (3)	35	16	7
NPL ratio (3)/(2)	4.0%	1.6%	0.7%
Loan Loss Provisions (4)	57	45	47
Coverage ratio (4)/(3)	161%	283%	655%

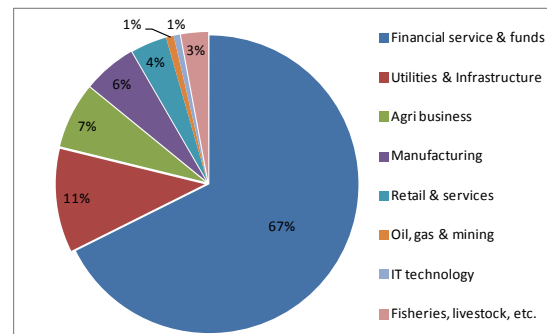
* Outstanding loans and investments have expanded two years in a row compared with the previous years (FY2011: 17%, FY2012: 7%), achieving an annual average growth of 6% in the past five years.

* Assets as well have expanded two years in a row compared with the previous years (FY2011: 4%, FY2012: 22%), achieving an annual average growth rate of 5.3% in the past five years.

Two-digit expansion in FY2012 can be attributed to the successful bond issuance of USD 350 million in November.

* There were three cases of past due loans in FY2012, which amounted to less than 0.7% of total loan portfolio. And there is more than 600% allowance for the expected loan loss.

Loan portfolio (as of end-2012): breakdown by sector:



*On-lending to local FIs consists 67% of total; IIC direct loans to SMEs consists 33% of total.

*Of total IIC direct loans, utilities & infrastructure contributes 11%, agribusiness 7%, and manufacturing 6%.

* Of the total investments and loans approved in FY2012 (73 projects in 16 countries), 53% was on-lending to FIs, 10% subordinated debts for financial institutions and enterprises, 2% equity investments for FIs and investment funds and the remaining 35% was direct loans to SMEs. In addition, IIC was successful in mobilizing private sector financing (USD 384 million) based on the co-financing principle.

*IIC 2011-2013 Business Plan, with the 1+1=3 formula, aimed to achieve high growth & profitability + SME customers to reach 85% in number, 75% in amount of total loan portfolio by end-2013. By end-2013, IIC already achieved 78% and 82%, respectively.

Funding sources:

(million USD)	2012
Long-term borrowing	969
Bonds	473
Long-term borrowing	474
Repayment within a year	22
Total equity	779
Authorized shares	689

*Borrowings are all in long-term, 50% of which is procured from IDB and other FIs. As of end-2012, a USD 100 million (15-year maturity) out of USD 300 million IDB borrowing facility available until November 2015, another USD 100 million stand-by credit facility with an AA-institution (available until July 2013, in addition to other credit facilities amounting to around USD 265 million are available. Of the total borrowing outstanding, 32% have maturity extended to 2025, whereas 68% until 2016.

* Aimed at diversifying its funding sources and reducing funding costs, issued US-dollar denominated notes, (3 year maturity, USD 350 million, 3-month LIBOR plus 0.35%) in the capital markets, successfully procured from 34 institutional investors and central banks of EU, the Middle East, Africa, the Americas and Asia.

*In order to provide local currency loans, IIC issued foreign currency bonds in May 2011 and April 2012 on the Mexican capital market (3 year maturity, 800 mil. pesos, TIEE+0.05%/2011 and +0.22%/2012), successfully procured pesos equivalent to USD 120 million in total.

*Average borrowing costs by currency is as below: USD 1.22%, Mexican peso 4.93%, Brazilian real 10.56%, Euro 2.10%, Peruvian nuevo sol 7.11%, Argentinean peso 9.15%. Average cost of local currency borrowing is relatively high. Nevertheless, 85% of IIC's funding is in USD whose procurement cost is quite cheap.

*As a result of a series of bond issuance, as of end-2012, leverage ratio has increased to 1.3 times, well below the maximum level of 3.0 established by the IIC's Charter.

Profit and Loss situation:

*IIC made reasonable amount of profits in the past five consecutive years (2008-2012), steadily strengthening its capital base.

*Although net income decreased for the past two consecutive years from USD 12.4 million (2010) to USD 10.3 million (2011) and to USD 5.6 million (2012), operating income, which represents the bank's core business, showed a steady growth from USD 41.3 million (2010) to USD 41.5 million (2011) and to USD 46.2 million (2012).

*Major cause of net income decrease in FY2012 can be attributed to the fact that operating cost shot up in the year due to administration cost increase by 21.5% compared to the previous year due to increase in the numbers of employees from 107 to 110 and local offices from 10 to 12.

(million USD)	2011	2012	Growth (%)
Revenues (1)	55.5	63.4	14.1%
Interest & fee income	44.5	49.9	12.2%
Other income	11.0	13.5	21.9%
Interest & fee expense(2)	14.0	17.2	22.8%
Operating income (1)-(2)	41.5	46.2	11.2%
Operating expense	33.1	40.2	21.5%
Net income	10.3	5.6	-46.0%

(million USD)	2011	2012
Interest & fee expense (1)	14.0	17.2
Long-term borrowing (2)	517.7	947.9
Funding costs (1)/(2)	2.7%	1.8%

*Funding cost (percentage ratio of interest & fee expenses to total long-term borrowing) has improved from 3% in 2011 to 2% in 2012, due largely to the successful issuance of global bonds of USD 350 million.

*Financial ratios which represent profitability, both ROA and ROE, deteriorated from 0.7% in 2011 to 0.3% in 2012 and 0.1.3% in 2011 to 0.7% in 2012, respectively, due to large decrease in net income. They are on a worsening trend for the past five years since 2008 (ROA 1.0%, ROE 1.9%), and needs caution.

*Financial ratios such as equity to assets ratio (43%) (Equity shares held by 44 IDB/IIC member countries, 23% of total held by the U.S. government) and debt to equity ratio (125%) reveal financial soundness of IIC. Very high liquidity ratio (42%) implies a high short-term repayment capacity, as well as a possibility that funds are not efficiently utilized to produce revenues.

*IIC has been granted high ratings from Fitch Ratings (AAA/March 2012)), Moody's (Aa2/ March 2012) and S&P (AA as of July 2012) reflecting upon its strong capitalization, high liquidity, financially sustainable operations, corporate standing as a IDB group company as well as the support it gets from shareholding governments

Sources: Information acquired on the websites of IDB and IIC

Notes on Formulation of Proposed Loan Schemes

In order to formulate the IIC-JICA collaborative financing program, a pipeline list of EE projects should be prepared and accumulated gradually. The work flow to formulate the pipeline is described in Figure 1. In this flow chart, main tasks, organizations / persons in charge and procedures related to the common works for all schemes, direct lending schemes from IIC (such as those for mega solar generation, new green building constructions and anti-tampering metering systems) and on-lending schemes through FIs (such as those for ESCOs and ESCO-alike businesses, and leasing) are summarized. And the chart also includes the works related to TA programs for formulating a pipeline list of EE projects and the procedures for the IIC-JICA collaborative financing and loan disbursement. The organizations / persons in charge of each task are clarified in different colors:

- a) Blue colored tasks will be implemented by JICA TA consultant team (“JICA consultant”), which will be hired by JICA for TA program implementation.
- b) Red colored tasks will be conducted by IIC and its consultants (“IIC consultant”), who will be hired by JICA as in-kind support for IIC.
- c) Green colored tasks will be implemented by JICA consultant and IIC.

As for the loans for ESCO businesses, due to lack of ESCO business knowledge and resources, it will take some time for IIC to prepare and actually start the loan program. Therefore the loan for ESCOs can be investigated at the second phase of IIC-JICA collaborative financing program.

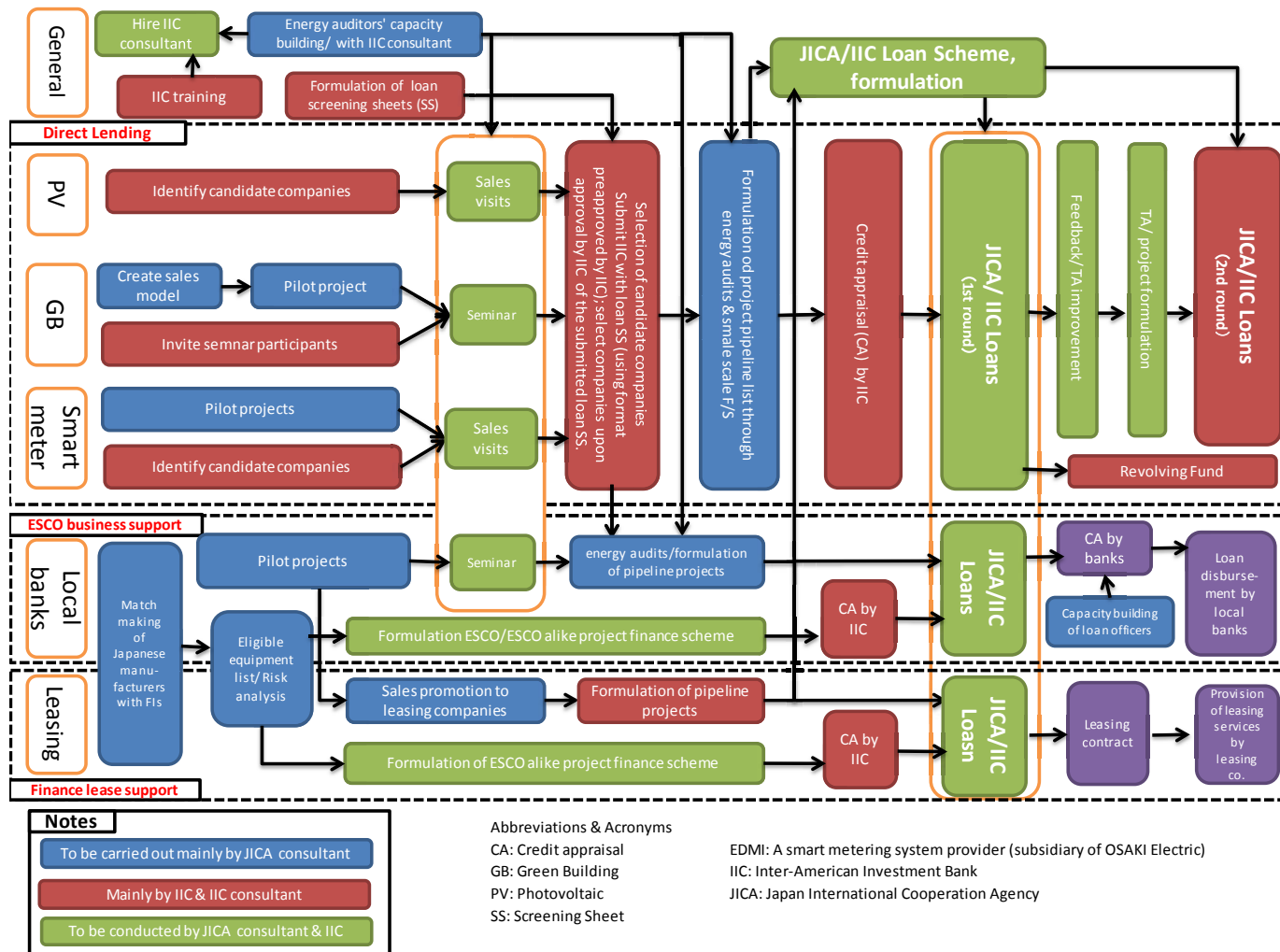


Figure 1 Work Flow to Formulate IIC-JICA Co-financing Schemes

(1) Common works concerning all loan schemes

1) Hiring in-kind consultants (“IIC consultant”)

In order to supplement lack of resources of IIC, JICA will hire local consultants, who will work as IIC internal human resources. They should have knowledge on financing and come from the CAC region. Regarding the knowledge of energy conservation, they should understand main technical terms and general information on EE equipment. They should also participate in the capacity development program for energy auditors or the similar training course to be held in Japan. Technical issues will be handled by JICA consultant and energy auditors, so IIC consultant should know only basic knowledge on EE.

Besides the above, IIC consultant should participate in an IIC training course to understand the basic procedures and systems to work in IIC. And through OJT training at the IIC headquarters for several months, they should understand the important points of loan disbursement and TA implementation. During this period, they should also create a human relationship with such divisions as the Risk Management Division and the Legal Division. Upon the completion of this OJT training, they should be equipped with good human networks within the IIC headquarters.

2) Capacity development of energy auditors

Similar to the training course carried out by the Korea Energy Management Corporation (KEMCO), several auditors selected by the partner associations in CAC countries will be sent to Japan to participate in the EE training course. The participants of this training course will conduct energy audits and/or feasibility studies (FS) for potential projects. The draft of curriculum of the training course in Japan is described below. (This training would be categorized as the third scholarship program of IIC, and 8-10 participants will be selected from CAC countries. Duration of the training will be 1-2 weeks.)

- a) Orientation, and presentation on the general information of Japanese EE systems and Green Buildings (by JICA consultant, 1 day)
- b) Presentation on eligible Japanese EE technologies in the CAC region (by JICA consultant and Japanese manufacturers, half a day)
- c) Presentation on the actual examples of ESCO and ESCO-alike businesses and finance leasing scheme in the CAC and other regions (by JICA consultant)
- d) OJT training on energy auditing (2 days)
- e) Site visits (at Panasonic Center: solar generation, high efficient air conditioners, Zero emission house and LED, etc. (for half a day)
- f) Review and discussions on the technologies and financial schemes applicable in the CAC region (for half a day)

3) Preparation of loan screening sheet

It is not effective to approach potential projects (i.e. seed projects) without any screening criteria. In order to avoid these situations at an early stage of identifying potential projects, preliminary loan screening sheet for the IIC-JICA collaborative loan program should be prepared. It should be structured by including the information on the outline of the target project, financial indicators of end-users, etc., in reference to IIC's existing scoring sheet, namely, the Development Impact and Additionally Scoring System (DIAS).

By utilizing this screening sheet, potential borrowers (projects) can be selected effectively. This screening sheet should be prepared by IIC and the related preparation tasks should be done by IIC consultant (in reference to DIAS)

4) Utilization of the reserves of interest margins (the so-called "revolving loan fund")

A pool of money accumulated from the interest and principal payments of the first series of loans can be utilized by IIC for non-earmarked purposes for the second disbursement on. The size of this reserve fund would become bigger for IIC's direct lending to end-users (compared with on-lending through FIs). The initial ideas for utilizing this reserve fund are described below:

- a) Expansion of IIC TA programs
- b) Development of eligible equipment list to simplify the procedures of technical evaluation
- c) Establishment of guarantee mechanism for ESCO scheme
- d) Expansion of training programs for IIC consultant and energy auditors
- e) Invitation of Japanese manufacturers in the training programs held in the CAC region (including the payment of their travel expenses from Japan, etc.)
- f) Contribution to establishing and development of GREENPYME Credit Program
- g) Reduction of loan interest rates for end users

(2) Direct lending from IIC

1) Mega solar power generation

There are a lot of potential mega solar power generation projects in the CAC region. And developers and manufacturers, such as Panasonic, have dozens of pipeline projects. And it is no need to implement pilot projects and hold seminars on mega solar power generation. In order to find out pipeline projects, it is recommended to catch information of mega solar power projects at an early stage, confirm their financial need, evaluate their eligibility to apply for IIC loan by referring to the screening sheet and, if necessary, by implementing additional small feasibility study (FS).

2) Formulation of GB sales model

Different from other loan schemes, GBs loan scheme need to formulate a sales model. Firstly, IIC, IIC consultant and JICA consultant should make consensus on the concept of GBs and its evaluation methods as well as grasp the current status and barriers that prevent the introduction of GBs in the CAC region. And secondly, the draft lending criteria for new GBs construction should be discussed.

The two draft ideas of such lending criteria are described below:

Draft 1 : Application of LEED certificate, which has been gradually introduced in the CAC region, as lending criteria

Draft 2: Utilization of energy-saving levels of major EE equipment as lending criteria (based on an eligible equipment list)

The outline of these two draft ideas are further elaborated below

Draft 1: Application of LEED certificate, which has been gradually introduced in the CAC region, as lending criteria

LEED (Leadership in Energy and Environmental Design) is an evaluation tool, which was developed in the US and is a method to evaluate the target building based on the following aspects (See Figure 2):



Source: U.S. Green Building Council

Figure 2 Major Evaluation Indicators of LEED

A new construction building is evaluated in a total of 69 points, the breakdown of which consists of site location (14 points), efficiency of water treatment (5 points), energy and atmosphere (incl. EE, RE and environment) (17 points), building materials (13 points) and interior environment /

innovativeness / design process (5 points). The weight of energy and atmosphere (incl. EE/RE) is the highest. The conformity to the US standards is required in several categories; therefore Japanese technologies need to confirm their conformity to the standards. (See Figure 3)

Yes	?	No	Project Totals (Pre-Certification Estimates)		69 Points
			Certified: 26-32 points	Silver: 33-38 points	Gold: 39-51 points
					Platinum: 52-69 points

Yes	?	No	Energy & Atmosphere		17 Points
Yes			Prereq 1	Fundamental Commissioning of the Building Energy Systems	Required
Yes			Prereq 1	Minimum Energy Performance	Required
Yes			Prereq 1	Fundamental Refrigerant Management	Required
*Note for EA1: All LEED for New Construction projects registered after June 26, 2007 are required to achieve at least two (2) points.					
			Credit 1	Optimize Energy Performance	1 to 10
			Credit 1.1	10.5% New Buildings / 3.5% Existing Building Renovations	1
			Credit 1.2	14% New Buildings / 7% Existing Building Renovations	2
			Credit 1.3	17.5% New Buildings / 10.5% Existing Building Renovations	3
			Credit 1.4	21% New Buildings / 14% Existing Building Renovations	4
			Credit 1.5	24.5% New Buildings / 17.5% Existing Building Renovations	5
			Credit 1.6	28% New Buildings / 21% Existing Building Renovations	6
			Credit 1.7	31.5% New Buildings / 24.5% Existing Building Renovations	7
			Credit 1.8	35% New Buildings / 28% Existing Building Renovations	8
			Credit 1.9	38.5% New Buildings / 31.5% Existing Building Renovations	9
			Credit 1.10	42% New Buildings / 35% Existing Building Renovations	10
			Credit 2	On-Site Renewable Energy	1 to 3
			Credit 2.1	2.5% Renewable Energy	1
			Credit 2.2	7.5% Renewable Energy	2
			Credit 2.3	12.5% Renewable Energy	3
			Credit 3	Enhanced Commissioning	1
			Credit 4	Enhanced Refrigerant Management	1
			Credit 5	Measurement & Verification	1
			Credit 6	Green Power	1

Source: U.S. Green Building Council

Figure 3 Evaluation Indicators and Grading for EE/RE Technologies Implementation in LEED Certificate

Draft 2: Utilization of energy-saving levels of major EE equipment as lending criteria

This is an idea to utilize an eligible equipment list as the lending criteria. (See Table 1)

The candidate of eligible Japanese technologies are high-efficient air conditioners (provided by several manufacturers), heat pump hot water supply (“Eco-cute” by MYCOM), high-efficient elevators (provided by Mitsubishi Electric), solar power generation systems (provided by Panasonic) and low-e glass (provided by Asahi Glass and Nippon Sheet Glass etc.).

By applying this measures as lending criteria, from 30-60% energy reductions are estimated to be realized compared with the conventional technologies.

Table 1 Evaluation Criteria to User EE Equipment List (Draft)

Item for evaluation	Eligible technology	Check	Building Type			Note
		With or Without	Office	Hotel	Others	
Air conditioning	COP>3.0 (EER>10.2) and with inverter	■ □	If at least one ■, then count 1			
	Variable Refrigerant Flow (VRF)	■ □				
Lighting	LED lamp	■ □	If at least one ■, then count 1			
	FL T8 or T5 with electronic ballast	■ □				
	CFL (life time over 10,000h)	■ □				
Hot water supply	By heatpump	■ □	/	If at least one ■, then count 1		
	By solar heating	■ □				
Elevator	With PM motor, regenerative converter and LED lamp	■ □	If ■, then count 1			
Solar generation	12.5%< Solar	■ □	If ■, then count 1			LEED
Design	With insulation and Low-e Glass	■ □	If ■, then count 1			
Green building for low interest loan		Number of ■ is over	4	5	5	

The president of the Dominican Republic GB Council (DRGBC) agreed to set a new evaluation tool like the one presented here under Draft 2, mentioning that it is much simpler and less costly evaluation tool compared with the LEED and more suitable for the CAC region. Nevertheless, the president proposed to set the following three (3) additional conditions:

- a) In the Dominican Republic, the most important issue is conducting measurement and verification. At present, there is less data to be referred to. In this context, installation of energy consumption data collecting system should be added as lending criteria.
- b) It is not considered the best operation if high-efficient equipment is managed individually. Therefore, the installation of a group management / control system should also be evaluated. VRF air conditioning is one example of group management system. For lightings as well, installation of control system should be scored highly.
- c) It would be better if acquiring an approval of the IIC-JICA collaborative loan program would automatically provide higher scores for the social and environmental certificate to be evaluated by IIC-JICA for the owner of GBs .

And it is recommended to implement pilot projects on solar power generation and high-efficient air conditioners in order to confirm the energy reduction and cost benefit effect; and the results should be shared in seminars, etc. The package of solar power generation and high-efficient air conditioners is considered to be the most effective target for pilot projects. These technologies are also applicable for on-lending and leasing scheme. As for the implementation of such pilot projects, universities / the academy are the best for distributing reliable data and information. The period needed for the implementation of the pilot projects is at least 6 months. The results of the pilot projects should be shared with the construction sector, hotel association and other potential users through the seminars co-hosted by IIC and GB Councils in each country. With the cooperation of GB Councils and the universities, the result of the pilot projects can be utilized to further promotion of GBs construction in the CAC region.

Finally, to find out a pipeline of GB projects, it is recommended to catch GB projects information at an early stage, confirm their financial needs, evaluate their eligibility for IIC loan according to the screening sheet and, if necessary, implement an additional small FS.

To find out the pipeline projects effectively, it is recommended to distribute leaflets, which describe the outline of IIC loan (i.e. the first stage screening), and ask GB Councils, construction associations and hotel associations to submit them to the potential GB borrowers at the end of each year.

3) Anti-tampering metering system

As for metering system, end-users are limited to electric distribution companies. Therefore, it is recommended for IIC consultant to visit target distribution companies directly (instead of holding seminars) accompanied by EDMI personnel. Technical part should be treated by EDMI and financial part should be treated by IIC consultant. It is becoming the standard to implement a pilot project, before the implementation of a full-fledged project.

Referring to the result of the pilot project, distribution companies, which have the needs to implement full-fledged project should be carefully followed by EDMI and IIC consultant. Finally, the pipeline projects will be formulated by confirming financial needs, evaluating their eligibility for IIC loan based on the screening sheet and, by implementing additional small FS, if necessary. IIC-JICA's participation can accelerate the implementation of the projects.

(3) On-lending through FIs

1) Business matching between manufacturers and FIs

In order to structure ESCO-alike financing scheme, it is needed to create a close relationship between manufacturers and FIs.

2) Development of an eligible equipment list / risk analysis / formulation of ESCO and ESCO-alike scheme

IIC is interested in formulating a financial scheme to promote ESCO and ESCO-alike businesses, taking risks of ESCO performance guarantees to some extent. For formulating this kind of guarantee mechanism, a functional eligible equipment list which can mitigate the performance risk should be prepared.

The equipment list should include not only EE performance information but also the data on the risks of frequency of failures and the risks of not-meeting-EE performances and many other risk factors related to the target equipment. (For providing reference data for financial appraisals)

The target size of projects is comparatively small and the number is large; and therefore the reduction of FI's transaction cost is the largest issue. In this context, it is recommended to focus only on solar power generation, high-efficient air conditioners and high efficiency compressors /

Eco-cute and prepare eligible equipment list only for them. In this equipment list, a) EE performance, b) their warranties and risks, and c) benefits for end users etc. should be described. The provision of the loan for purchasing the equipment, whose specification meets the TOR written in the equipment list, will be accelerated.

Formulation of a warranty / guarantee mechanism to promote ESCOs by IIC utilizing the revolving loan fund of IIC-JICA collaborative loan program is expected to contribute to the promotion of ESCO businesses in the CAC region.

3) Implementation of pilot projects

As described in the GB clause, the package of solar power generation and high-efficient air conditioners is considered to be the most effective target for the pilot projects. As for implementation organization, universities / the academy are the best for distributing reliable data and information. (Refer to GB clause)

Through seminars, not only about the results of the pilot projects, but also about the financial aspects (including applied financial schemes and the cost / benefit analysis) should be presented and shared with the participants. IIC-JICA, the academy, target sector associations, end-users and FIs should be invited to this seminar.

4) Seminars / sales support

Among surveyed four (4) countries, the countries which have tax benefits through leasing scheme are only Guatemala and Jamaica. The useful measures to support the formulation of leasing schemes are as the following:

- a) Arrangement of business matching meetings between manufacturers / distributors which can provide eligible Japanese EE equipment, and leasing companies. (Through IIC consultant and JICA consultant or by holding seminars inviting Japanese manufacturers).
- b) As the second stage, holding seminars for potential industrial associations and end-users to share the technical and financial benefits gained by the introduction of eligible Japanese technologies. These seminars should be held jointly by IIC consultant and leasing companies.

5) Energy audit / formulation of the pipeline projects

In order to implement EE projects under the IIC-JICA collaborative financing program as much as possible, additional supplementary energy audits and/or FS should be conducted for the potential end-users, who are not yet clearly confident about introducing EE measures. It is also recommended to conduct second round energy audits and/or FS by IIC energy auditors for these potential end-users. (The end-users, who have been audited under IIC TA programs, but have

not yet implemented EE measures are also the target of these second round audit and/or additional FS.)

6) Capacity development of loan officers

In the flow chart described in Figure 1, “Capacity Development of Loan Officers” is positioned prior to “Credit Appraisals.” However, in practice, it should be implemented at an earlier stage. For example, it is recommended to jointly implement capacity development of loan officers together with energy auditors’ capacity development program in Japan or training in each country by IIC consultant.

Proposed curriculum subjects include the following:

- a) Reliability (system warrantee) and cost reduction benefits by introducing Japanese solar power generation, EE equipment (presentation by Japanese manufacturers).
- b) Examples of ESCO, ESCO-alike and leasing scheme for EE product implementation. Roles of FIs in promoting EE investments.
- c) Risks in ESCO, ESCO-alike and leasing schemes (including both technical and financial risks). Points of evaluation of projects.
- d) Approaches to mitigate the risks: e.g. preparation of eligible equipment list for loan disbursement; advantages of Japanese technologies; system warrantee (not per equipment) and other IIC measures.
- e) Project examples abroad (presentation by Mitsubishi UFJ Leasing etc.)
- f) Site visits (Small or middle sized projects or Panasonic Center).

-The end-