

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

in

**Central America and
the Caribbean Region**

**Final Report
Summary**

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Contents

Chapter 1	Background and Objectives of the Survey	1
Chapter 2	Survey Methods.....	3
Chapter 3	Survey Results.....	6
3.1	Current Status and Barriers to Promote EE and SPG in the CAC Region.....	6
3.2	EE and RE Policies and Incentive Mechanisms	6
3.3	Solutions to Solve the Barriers to Promote EE and RE in the CAC Region	10
3.4	Partner for Tackling Issues in EE and SPG Promotion.....	11
3.5	Consideration of IIC-JICA Collaboration and their Contribution Methods for Realizing the Solutions to Barriers for Promoting EE and SPG.....	14

List of Tables

Table 1 Applicability by Country of the Proposed Loan Schemes..... 15

List of Figures

Figure 1 Proposed IIC-JICA Collaborative Technical Assistance Programs..... 16
Figure 2 Bottlenecks and Necessary Actions for EE Project Formation 17
Figure 3 Work Flow for Formulating IIC-JICA Collaborative Loan & TA Scheme 19

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
BAC	Banco de America Central
CAC	Central America and Caribbean
CCP	Santo Domingo Chamber of Commerce
CGPL	Centro Guatemalteco de Produccion Mas Limpia (GT)
CIG	Guatemala Chamber of Industry
CNE	National Energy Commission (DR)
CORE	Co-financing for Renewable Energy and Energy Efficiency
DBoJ	Development Bank of Jamaica Limited
DRGBC	Dominican Republic Green Building Council
EE	Energy efficiency
ESCO	Energy Service Company
FI	Private Financial Institution
GB	Green Building
HIPC	Heavily Indebted Poor Countries
IDB	Inter-American Development Bank
IIC	Inter-American Investment Cooperation
JICA	Japan International Cooperation Agency
LAC	Latin America & Caribbean
LG	Lucky Goldstar (Korean Company)
MEM	Ministry of Energy and Mines (NI,DR)
NCEE	National Commission of Electric Energy (GT)
PNESER	National Program of Sustainable Electrification and Renewable Energies (NI)
PPP	Public Private Partnership
RE	Renewable Energy
PV	Photovoltaic
SG	Sovereign guaranteed
SME	Small and Medium size Enterprise
SPG	Solar Power Generation
TA	Technical Assistance
VRF	Variable Refrigerant Flow

Chapter 1 Background and Objectives of the Survey

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.

Chapter 2 Survey Methods

(1) Workflow and selection of target countries

Four field surveys and pre and post works in Japan were conducted in the Survey term. 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.

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.

(2) 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 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 needs for promoting EE and SPG

(3) 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 improvements 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.

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 air conditioners

The most energy consuming equipment in commercial buildings in the CAC region is air conditioners (ACs), and thus the reduction of electricity consumed by ACs is the biggest issue. However, high-efficient inverter and VRF (Variable Refrigerant Flow) ACs which are the standard in Japan 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

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.

Prominent Japanese manufacturer: MYCOM

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 systems (which enables non-technical electricity distribution loss reductions) is expected to solve the issue.

Prominent Japanese manufacturers: EDMI

(4) 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.

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)

Chapter 3 Survey Results

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

Through the field surveys conducted, it was 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/kWh¹. These countries are strongly promoting RE use since the solar power radiation in the CAC region is more abundant than those of top SPG leading countries. CAC countries have introduced various kinds of incentive mechanisms 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 preventing the usage of SPG in the region is the lack of adequate financing to meet the emerging demand.

In the CAC region, it was 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 was confirmed that the number of Green Buildings (both new construction and retrofitting) 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 for GBs construction 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.

As for financing scheme promoting EE in Guatemala and Dominican Republic, ESCO or ESCO-like businesses are becoming popular. The biggest bottleneck that prevents the dissemination 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.

3.2 EE and RE Policies and Incentive Mechanisms

(1) EE policy

In each of the four countries, namely, Guatemala, Nicaragua, the Dominican Republic and Jamaica, EE Law has not been established. In this section, important points on EE policy in each country are

¹ An average of industry and commercial tariffs

described.

1) Guatemala

- a) 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.
- b) For the delay of establishment of EE Law in contrast with the momentum of EE, the establishment of EE Platform, Public and Private Partnership scheme, is under preparation in 2014. 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.
- b) In addition to this, tax exemptions for introduction of EE equipment, as well as subsidies for energy audits have been provided; but these measures have not yet contributed to realize any EE projects.
- c) It is not a legal framework, but in the program of PNSER 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) EE Law (draft) has been tabled in the Diet, but there seems to be no prospect for the enactment.
- b) Tax exemptions for introduction of EE equipment and low interest loans have been partially provided, but not yet applied very much.
- c) 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) The government intends to lead EE in the public sector, after then 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 initiatives are described in it:
 - 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 (although 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.

(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 solar power generation):

- 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/month.

- 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 operations.

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 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 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 years.

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 deduced over three years (i.e. 1/3 of 40% of the total investment costs will be deduced each year) from annual income tax payment.
- b) Import tax exemption for solar panels, inverters and cables, etc.
- 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 thus sold, 75% will be paid a year later after deducing 25% set aside for the purpose of improving the grid's RE facilities.

4) Jamaica

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

- a) Import tax exemption for solar panels
- b) Introduction of net metering system is only at the conceptual stage

- c) Net billing program, 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 legislature 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 power through the electric grid to their local hotel branches.

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

In order to break through the barriers mentioned before, 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 outreaches 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 schemes 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 loans 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 years 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 the CAC region, this section will analyze the significance and effectiveness of partnering with IIC, which has abundant experience in providing finance and technical assistance to the CAC private sectors being a member of the IDB Group which maintains a strong alliance with JICA.

(1) Current status of IIC lending 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 financial institutions. Especially focusing on energy and infrastructure sectors, IIC mainly provides long-term finance and advisory services to SMEs in each of the LAC countries.

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 finance institution 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 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'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. IIC's portfolio breakdown by sector (as of end-2012) 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.

(2) Issues on IIC lending

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 divisions of which debt and equity division, IIC's core banking business division, has around thirty (30) (including five (5) officers at branch offices) personnel allocated. Among the four survey 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 Program. 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 FI.

3) Features of SMEs in the CAC regions

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 investments. Despite all these needs, TA budget is limited and depend largely on donor funding.

(3) Current status of IIC 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). Prior to SME loan project formulation, for instance, IIC considers it important to provide technical assistances to give advices for the improvements of management skills, operations, corporate governance, business ethics education, prevention of illegal transactions and portfolio management.

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 Rika, El Salvador, Guatemala, Honduras and Nicaragua), and many other regions including Bahamas, Belize, Trinidad Tobago, Jamaica and Columbia (approved in January 2013)

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.

(4) Issues on IIC 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 volume.

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

(1) IIC-JICA collaborative EE & SPG promotion financing

Practical IIC-JICA collaborative measures to realize the five (5) financial schemes (introduce in section 3.3), which intended to provide solutions to overcome the bottlenecks for promoting EE and SPG in the CAC region will be proposed in this section.

Each of the three IIC direct lending schemes, namely, Mega SPG, New GBs and Anti-tampering Metering System Promotions Loans, 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 schemes to be formulated through IIC-JICA collaboration.

On the other hand, in order to promote the two IIC on-lending schemes through FIs, namely, those to support ESCO / ESCO-alike businesses and EE equipment finance leases, the following bottlenecks need to be solved in order to see further business expansions:

- a) Lack of 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.

Taking into account the current status and bottlenecks, if JICA in collaboration with IIC may technically and financially support innovative EE initiatives (such as ESCO / ESCO alike businesses and EE equipment finance leases) currently emerging in the CAC region, it would contribute significantly to EE promotion in the region.

As a summary, Table 1 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 1 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	○	×	×	○

(2) Expected positive impact of IIC-JICA collaboration

In order to make functional the proposed five loan schemes, 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 1)

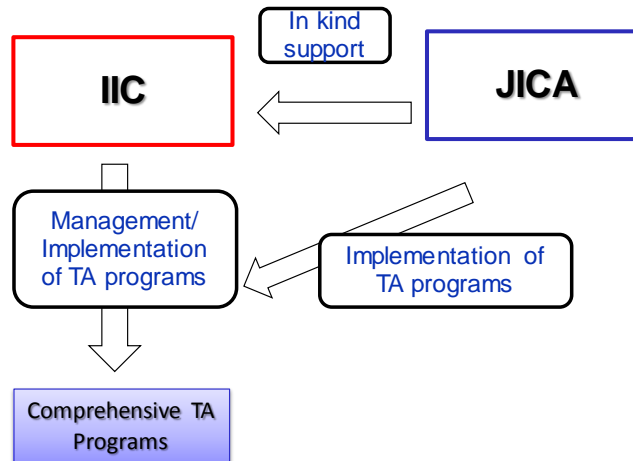


Figure 1 Proposed IIC-JICA Collaborative Technical Assistance Programs

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 2 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 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.

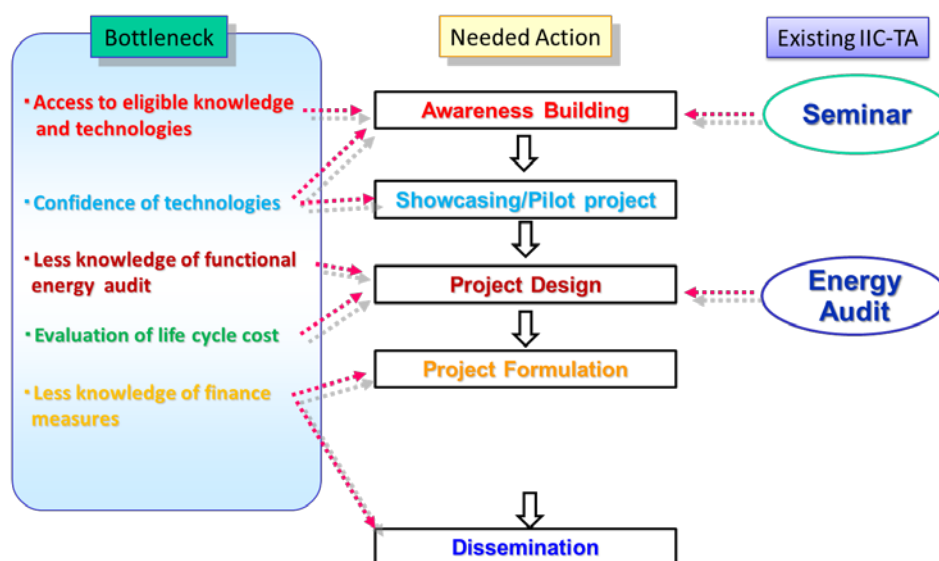


Figure 2 Bottlenecks and Necessary Actions for EE Project Formation

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.
- 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.
- 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 exemption

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) Proposed IIC-JICA collaborative loan scheme

In order to materialize the five loan schemes proposed earlier for promoting EE and SPG in the CAC region, Figure 3 show the detailed workflow of what need to be done through IIC-JICA collaboration. This flow chart illustrates the overall work flow 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 GB 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 IIC-JICA collaborative loans.

There are some differences in components among the five lending schemes, but the general work flow is similar as shown below:

- 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

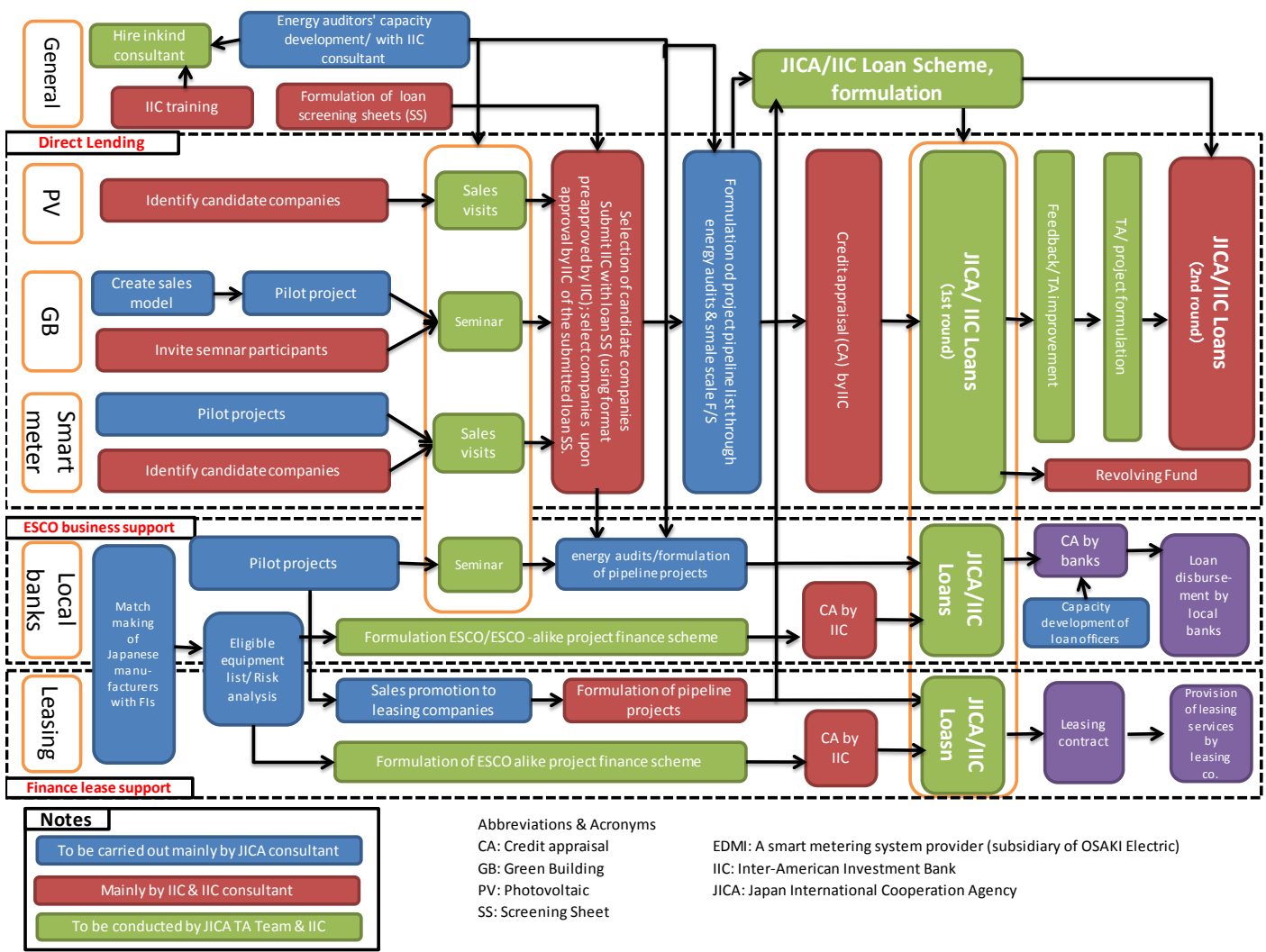


Figure 3 Work Flow for Formulating IIC-JICA Collaborative Loan & TA Scheme

(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.

- a) TA to promote new construction of GBs (Cooperation with GB Councils)
- b) Implementation of pilot project for high-efficient ACs and SPG package
- c) Implementation of pilot project of anti-tampering metering system
- d) Implementation of TA programs to promote ESCO / ESCO-alike schemes
- e) Implementation of TA programs to support formulating pipeline projects

3.6 Summary

Compared with top SPG leading countries, CAC countries have higher electricity tariffs, more abundant sun shine, incentive mechanisms to promote SPG and large cooling demand. 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 program, Japanese EE technologies will be able to contribute to enhance the energy efficiency in the CAC region.