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CARIBBEAN CLEAN ENERGY PROGRAM FINAL PERFORMANCE REPORT

REPORTING PERIOD
October 1, 2015 – July 31, 2018



August 1, 2018

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CARIBBEAN CLEAN ENERGY PROGRAM
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USAID/DOMINICAN REPUBLIC OFFICE OF
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COR: GERALD LINDO
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TABLE OF ACRONYMS

Acronym	Description
AEE	Association of Energy Engineers
AMI	Advanced Metering Infrastructure
BOJ	Bank of Jamaica
BREA	Barbados Renewable Energy Association
BSJ	Bureau of Standards
CARCEP	USAID Caribbean Clean Energy Program
CAREC	Caribbean Renewable Energy Community
CARICOM	Caribbean Community and Common Market
CARILEC	Caribbean Electric Utility Services Corporation
CDB	Caribbean Development Bank
CE	Clean Energy
CEADIR	Climate Economic Analysis for Development, Investment, and Resilience
CEFF-CCA	Clean Energy Financing Facility for the Caribbean and Central America
CEM	Certified Energy Manager
CHEMI	Caribbean Hotels Environmental Manager Initiative
CHENACT	Caribbean Hotel Energy Efficiency Action
CHENACT-AP	Caribbean Hotel Energy Efficiency Action – Advanced Program
CHIEF	Caribbean Hospitality Industry Exchange Forum
CHTA	Caribbean Hotel and Tourism Association
CO	Country Office
COP	Chief of Party
COR	Contracting Officers Representative
COTR	Contracting Officers Technical Representative
CREEEM	Caribbean Renewable Energy and Energy Efficiency Matrix
C-SERMS	Caribbean Sustainable Energy Roadmap & Strategy
CSGWG	Caribbean Smart Grid Working Group
CTO	Caribbean Tourism Organization
CWEEL	Council for Women in Energy and Environmental Leadership
DBJ	Development Bank of Jamaica
DCA	Development Credit Authority
DCOP	Deputy Chief of Party
DFID	UK Department for International Development
DG	Distributed Generation
DOMLEC	Dominica Electricity Services Limited
DSM	Demand Side Management
DTT	Deloitte Trinidad & Tobago
EAST	Environmental Audits for Sustainable Tourism
EBT	Energy Benchmarking Tool
ECERA	Eastern Caribbean Energy Regulatory Authority
ECS	Eastern Caribbean States
EDL	Company Name – Energy Dynamics Ltd
EE	Energy Efficiency
EEIF	Electricity Efficiency Improvement Fund
EPC	Energy Performance Contract
EPE	Company Name – Electric Power Engineers
ESC	Eastern and Southern Caribbean
ESCO	Energy Service Company
ESET	Electric Sector Enterprise Team
EU	European Union
EXIM	Export Import

Acronym	Description
FGB	First Global Bank
GCC	Global Climate Change
GDP	Gross Domestic Product
GEI	Government Electrical Inspectorate
GESI	Gender Equality and Social Inclusion
GHG	Greenhouse Gases
GIZ	Gesellschaft für Internationale Zusammenarbeit
GOJ	Government of Jamaica
GRENLEC	Grenada Electricity Services Ltd
HEART Trust/NTA	Human Employment and Resource Training Trust, National Training Agency
IDB	Inter-American Development Bank
IFI	International Financial Institutions
IPP	Independent Power Producer
IRP	Integrated Resource Planning
IRRP	Integrated Resource and Resilience Planning
JAMALCO	Jamaica Alumina Company
JHTA	Jamaica Hotel and Tourist Association
JMA	Jamaica Manufacturers Association
JNSBL	Jamaica National Small Business Loan
JPC	Jamaica Productivity Centre
JPS	Jamaica Public Service Company
JSEE	Jamaica Society of Energy Engineers
JSIF	Jamaica Social Investment Fund
JUTC	Jamaica Urban Transit Company Limited
KEMA	Keuring van Elektrotechnische Materialen te Arnhem (now DVN)
kWh	Kilowatt Hours
LEDS	Low Emission Development Strategies
LOE	Level of Effort
LSGWG	Local Smart Grid Working Group
LUCLEEC	Saint Lucia Electricity Services Limited
M&E	Monitoring and Evaluation
MIPEL	Saint Lucia's Ministry of Infrastructure, Ports, Energy and Labour
MoF	Ministry of Finance
MoH	Ministry of Health
MOU	Memorandum of Understanding
MSET	Ministry of Science, Energy, and Technology
MW	Megawatt
MWLECC	Ministry of Water, Land, Environment and Climate Change
NABCEP	North American Board of Certified Energy Professionals
NARUC	National Association of Regulatory Utility Commissioners
NDA	Non-Disclosure Agreement
NETS	MIPEL's National Energy Transition Strategy
NEVLEC	Nevis Electricity Company Limited
NGO	Non-governmental Organization
NHTA	National Hotel & Tourism Association
NURC	National Utility Regulatory Commission, Saint Lucia
NWC	National Water Commission
OAS	Organization of American States
ECS	Eastern Caribbean States
OECS	Organization of Eastern Caribbean States
OLADE	Latin American Energy Organization
OOCUR	Organization of Caribbean Utility Regulators

Acronym	Description
OPIC	Overseas Private Investment Corporation
OUR	Office of Utilities Regulation, Jamaica
PAHO	Pan American Health Organization
PCJ	Petroleum Corporation of Jamaica
PIOJ	Planning Institute of Jamaica
PMO	Project Management Office
PPA	Power Purchase Agreement
PSOJ	Private Sector Organization of Jamaica
PV	Photovoltaic
RE	Renewable Energy
RE/EE	Renewable Energy/Energy Efficiency
REDLab	Renewable Energy Design Laboratory
SEKLEC	St. Kitts Electricity Company
SRUC	Sector Reform and Utility Commercialization
SSM	Supply Side Management
SVG	Saint Vincent & the Grenadines
TA	Technical Assistance
TAPSEC	Technical Assistance Program for Sustainable Energy in the Caribbean
TOCOR	Task Order Contracting Office's Representative
TOR	Terms of Reference
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USG	United States Government
USTDA	US Trade and Development Agency
UTech	University of Technology
UWI	University of the West Indies

EXECUTIVE SUMMARY

The United States Agency for International Development's Caribbean Clean Energy Program ("CARCEP" Contract Number: AID-OAA-I-13-00018; Task Order Number: AID-532-TO-15-00003) was executed with Deloitte Consulting LLP on October 1, 2015. The purpose of CARCEP is to assist certain countries of the Caribbean – with emphasis on Jamaica and the Eastern Caribbean – in establishing effective policy and regulatory environments including incentives for greater energy efficiency as well as for low-emission growth in the energy sector. This program also works with the public and private sectors in these countries to increase investment in Clean Energy (CE) development.

The program has six major task areas:

1. Improve Enabling Environment for Clean Energy Development
2. Optimizing Variable Renewable Energy Integration
3. Accelerating Private Sector Clean Energy Investment
4. Energy Efficiency Benchmarking in the Hotel and Tourism Sector
5. Coordination and Promotion of USAID and United States Government (USG) Inter-Agency Activities in the Energy Sector and Sharing Lessons Learned with other Island Nations
6. Coordination with the Caribbean Community (CARICOM)

In addition to these specific Tasks, the program focuses on cross-cutting areas, such as the Innovation Fund (grants), the promotion of gender equality, measurement and evaluations, and communication. This document serves as the CARCEP **Final Report**. This report is divided into seven sections, consisting of the six tasks listed above as well as a section on cross-cutting activities including the project's Innovation Fund, a list of communications, trainings, and events, and performance monitoring and evaluation. This report also includes a summary of deliverables as an annex.

On March 8, 2018, USAID sent Modification 8 of the CARCEP Task Order to CARCEP. This modification shortened the project's period of performance from March 31, 2020, to August 31, 2018, and reduced the total estimated contract funding from USD XXX to USD XXX. Due to USAID's timely and transparent communications regarding funding limitations beginning in September 2017, CARCEP expected the modification and was therefore able to plan the execution of a range of activities for its final year of the project and cement the project's long-term impact in the region, despite the shortened period of performance.

Task 1: Improve Enabling Environment for Clean Energy Development

Jamaica

For Task 1 activities, CARCEP worked closely with stakeholders in the Jamaica electricity sector, including the Ministry of Science, Energy, and Technology (MSET), the Office of Utility Regulation (OUR), the Jamaica Public Service (JPS), the newly-reconfigured Climate Change Division within the Office of the Prime Minister, the Ministry of Transport and Mining, the Ministry of Economic Growth and Job Creation, UNDP GEF, the High Commission of Canada, and the Caribbean Development Bank (CDB). As part of these collaborations, the team assisted government entities in meeting their clean energy and energy efficiency policy goals as well as in discharging their regulatory responsibilities. Key achievements in Jamaica include assisting the drafting and promulgation of a book of Grid Codes for the Jamaican power sector, supporting the development of the proposed Net Billing, Power Wheeling, and Auxiliary Interconnections rules, working with government stakeholders on the emerging Integrated Resource Planning (IRP) process, and providing technical

assistance training plans to support the proper implementation of the 2015 Electricity Act and the 2016 JPS license process.

Eastern Caribbean Region

Under Task 1, CARCEP implemented detailed work plans for engagement in the Eastern Caribbean countries that focused on creating the enabling legislative and regulatory frameworks needed to support Renewable Energy/Energy Efficiency (RE/EE) development. The team worked with numerous regional organizations including the Organization of Caribbean Utility Regulators (OOCUR), the Caribbean Electric Utilities Corporation (CARILEC), the Caribbean Renewable Energy Community (CAREC), and the Caribbean Community and Common Market (CARICOM). CARCEP conducted technical assistance in-country and remotely in support of government regulators and ministry personnel as well as utility personnel in Barbados, Dominica, Grenada, Saint Lucia, and Saint Vincent and the Grenadines. Key accomplishments include drafting Grid Codes and working with technical working groups in Grenada, conducting an EV workshop connected to a private sector pilot project launch in Saint Vincent and the Grenadines, and assisting in a review of laws and regulations in Saint Lucia.

Task 2: Optimizing Variable Renewable Energy Integration

Jamaica

Under Task 2.1, CARCEP worked in Jamaica to address utility loss reduction, renewable energy integration, and energy efficiency promotion. After overcoming some initial challenges associated with completing a non-disclosure Agreement (NDA) with JPS, key technical assistance activities included grid integration training focused on steady state and short circuit and dynamic stability, training and utilization of forecasting software, engaging public and private partners in Jamaica to encourage the use of electric vehicles in the region, advising JPS on the potential of adopting an Energy Services Company (ESCO) business model under a revised Integrated Utility Service (IUS) model, and launching a Smart City pilot program in collaboration with the CARCEP Caribbean Smart Grid Working Group (CSGWWG).

Eastern Caribbean Region

Under Task 2.2, which focused on Optimizing Variable Renewable Energy Integration, CARCEP established CSGWWG, which included participation and support from regional organizations, such as CAREC, and governments as well as regulators, utilities and financial institutions. To maximize resources and impact, CARCEP coordinated closely with Task 1 on regional workshops including, for example, a workshop in Grenada where both Tasks sought to address regulatory and technical issues to allow for greater integration of renewable energy into the grid. CARCEP held regular CSGWWG meetings on the margins of regional conferences hosted by CARILEC, worked with the Electric Power Engineers (EPE) subcontractor to develop a Smart Grid Roadmap for each counterpart country, and provided additional technical advisory support to partner countries to support utilities in their efforts to move towards a smarter grid.

Task 3: Accelerating Private Sector Clean Energy Investment

Jamaica

Under Task 3, CARCEP engaged actively with several organizations in Jamaica to increase investment capability and interest in energy efficiency, including the University of the West Indies (UWI), the University of Technology (UTech), the Human Employment and Resource Training Trust, National Training Agency (HEART Trust/NTA), the Council for Women in Energy and Environmental Leadership (CWEEL) Jamaica Chapter, the YMCA, and the Jamaica Society of Energy Engineers (JSEE). With JSEE, the team ran Certified Energy Management (CEM) training courses that led to 34 participants successfully gaining

certification. There are two additional successful engagements under Task 3 in Jamaica that are worth highlighting specifically; the first being the YMCA Board of Directors voting to secure financing to implement energy efficiency measures outlined in a previously conducted CARCEP energy audit. The second is CARCEP's assistance to the Eight Rivers Project, a USD 50 million, 37 MW solar PV project. In addition to supporting the Project in general, CARCEP conducted multiple trainings in the local community to build up workforce safety and PV installation skills that could support the Project.

Eastern Caribbean Region

In the Eastern Caribbean, the Task 3 team met with banks and donor entities to build institutional capacity in support of improving the investment environment for clean energy projects. The team provided trainings and technical advisory support to key financial institutions, particularly through two workshops: Advance Financing Lending Models and Photovoltaic Basics Project Development. Regionally, the team coordinated with the IDB, the CDB, the Development Bank of Jamaica, and the Caribbean Hotel and Tourism Association to produce a pipeline of projects properly developed with good financial and risk-management data to assist banks in making easier decisions.

Task 4: Energy Efficiency Benchmarking in the Hotel and Tourism Sector

Eastern Caribbean Region

Coordinated through CARCEP's satellite office in Barbados, CARCEP engaged in eight countries (Jamaica and 7 Eastern Caribbean states) to promote EE and RE adoption in the hotel and tourism sector. Collaborating closely with the Caribbean Hotel and Tourism Association (CHTA), the National Hotel and Tourism Associations (NHTAs), and the Caribbean Tourism Organization (CTO), the team developed and trained members on an Energy Benchmarking Tool (EBT). The EBT, which is now housed on the CHTA website, enables individual hotels to gauge their energy and water consumption as well as compare their energy consumption to other hotels in the region. It will also assist hoteliers on how best to address their energy consumption challenges in low and no-cost ways. CARCEP also engaged subcontractor EDL to conduct energy audits in the region and held EBT workshops and consultations in Antigua, Dominica, Grenada, Barbados, Jamaica, Saint Lucia, Saint Vincent, and St. Kitts and Nevis.

In addition to its engagement with the hotel and tourism sector, Task 4 sought to develop a USD 10 million energy efficiency fund to develop the ESCO industry in the region, including with the Caribbean Development Fund (CDF). Worth noting are CARCEP consultations in Saint Lucia, where the team met with government entities and stakeholders to advance the development of funding packages to encourage the private sector to access funds to implement EE projects and to improve the legislative environment for the adoption of RE in the country. Finally, during the last five months of the project, the Task 4 team collaborated with the Pan-American Health Organization (PAHO) to develop and implement the EBT throughout the Caribbean in its 1,000 member health facilities.

Task 5: Coordination and Promotion of USAID and USG Inter-Agency Activities in the Energy Sector and Sharing Lessons Learned with other Island Nations

Under Task 5, CARCEP coordinated and engaged with USG agencies, other donors and programs, and regional island nations through regular consultations and an annual donor and stakeholder roundtable meeting. Partner entities included: Organización Latinoamericana de Energía (OLADE), the Export-Import Bank of the United States, the Overseas Private Investment Corporation, the USAID Clean Energy Finance Facility for the Caribbean & Central America Program, the World Bank, the Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS) Platform, the Caribbean Community Secretariat, the Climate Economic Analysis for Development, Investment, and Resilience (CEADIR), the Inter-American Development Bank (IDB), CHTA, CARILEC, CARICOM, the International

Renewable Energy Agency (IRENA) Sustainable Energy Marketplace Program, the Atlantic Council, and CAREC.

Task 5 also coordinated with other CARCEP programs, including helping launch the Smart Grid Regional Stakeholder's Working Group, which included engaging with the University of Hawaii, and played a major role at CARILEC Renewable Energy Conferences at which the team organized a panel of USG agencies including OPIC and USAID DCA who participated via teleconference. Task 5 also helped drive collaboration with the IDB (on integrated resource planning and resiliency) and CHTA (on an innovative new investment fund to support EE projects). The team also facilitated a webinar, in collaboration with the US Department of Energy Office of Energy Efficiency and Renewable Energy that focused on the Energy Benchmarking Tool (EBT), for twenty-three attendees representing four different USG entities. Toward the end of the period of performance, the team met with the European Union (EU)'s Eastern Caribbean office in Barbados to discuss the handover of CARCEP Innovation Funds Grants Program, the Caribbean Smart Grid Working Group (CSGWG), and the Energy Benchmarking Tool's hotel and PAHO iterations.

Task 6: Coordination with CARICOM

Task 6 was an additional work stream added to CARCEP's scope and contract by USAID in Year 2 of the project to focus on collaboration with CARICOM activities. Key activities included delivering a Business Plan for the CARICOM Integrated Renewable Energy Atlas, co-hosting a workshop on renewable resource forecasting and integration, and conducting workforce development trainings in conjunction with the Eight Rivers PV Project, the last of which resulted in 37 community members taking the Human Employment and Resource Training Trust for a Caribbean Vocational Qualification (CVQ) test in solar project workplace safety. Furthermore, the Task 6 team spearheaded training of Certified Energy Managers (CEMs) in Kingston by fully sponsoring the training and certification of 25 participants from 11 institutions. Similar efforts were successful in Barbados with collaboration from BREA, CDB, and the Canadian Government.

TASK 1: IMPROVE ENABLING ENVIRONMENT FOR CLEAN ENERGY DEVELOPMENT

Key Achievements

- Working with each CARCEP country, developed a Work Plan tailored to address needed upgrades in legal framework and in technical capacity of public and private sectors to move forward with clean energy development.
- Helped each CARCEP country to achieve significant improvement in both legal framework and technical capacity to implement clean energy solutions, implementing significant portions of the Work Plans before early project termination, and transitioning remaining tasks to other donors.
- At regional level, partnered with OOCUR to provide extensive technical training for Caribbean regulatory commissions and provided OOCUR with a business model to provide regional technical services on regulatory issues to OOCUR members, addressing critical resources gap for all Caribbean regulators who are underfunded and lack skilled staff to address complex issues.
- In Jamaica, provided extensive support to OUR on clean energy development, including tariffs, net billing, and power wheeling.
- In Jamaica, pioneered a low-cost peer-to-peer exchange between the Jamaican OUR and the State of Maine Public Utilities Commission to provide long-term staff training and development.
- In Barbados, provided extensive training for FTC Commissioners and staff, significantly improving the technical capacity to address clean energy regulatory issues.
- In Barbados, partnered with GIZ to introduce an Integrated Utility Service model to initiate EE/RE project financing through utility-administered opt-in, on-bill refinancing mechanism funded by tariffs to Barbados FTC and Barbados Light & Power, providing detailed implementation support and technical working paper for model use in other countries.
- In Dominica, before severe damage caused by Hurricane Irma, assisted IRC with PPA development for clean energy projects and facilitated solution to long-stalled interconnection of solar farm developed by indigenous Kalinago Community.
- In Jamaica and Barbados, developed detailed Grid Codes that serve as models for the Caribbean.
- In Saint Lucia, provided analysis of extensive draft law/rule package and provided a detailed workplan to enable the GoSL to move forward on collaborative basis to update/enact package.

Overview

CARCEP's work began in FY 2016 by laying the groundwork for subsequent activities in Jamaica and the Eastern Caribbean through extensive scoping trips and engagement with key public and private sector stakeholders in the electricity sector. CARCEP prepared an initial scoping report to USAID recommending the CARCEP countries to be included and the work needed in each. The Task 1 team then developed summary analyses of the gaps, challenges, and opportunities in the legal and regulatory framework for clean energy development and began engagement with key electricity sector stakeholders in public and private sectors to identify their priorities for technical assistance.

CARCEP concluded that there were two key impediments to RE/EE projects in its focus countries nations. First, lack of regulatory certainty had impeded development of RE/EE projects by utilities, businesses, and individuals, as well as private sector project financing. Second, lack of technical capacity within each of the key stakeholder institutions and their staff had delayed progress on the refinement of a stable framework of policies, laws, and

rules essential for an enabling regulatory environment to support RE/EE projects. While most of the CARCEP nations had first generation RE/EE policies and laws to support RE/EE projects, each nation recognized the need for regulatory refinement and developing new incentive programs to remove obstacles to RE/EE integration. However, the key public and private sector institutions in each CARCEP nation were challenged by the lack of staff and financial resources to undertake this work themselves or to engage with CARCEP to plan and implement technical assistance projects.

CARCEP laid the groundwork during Year 2 to overcome these obstacles, developing detailed work plans in collaboration with CARCEP country partners to enable revisions to legislative and regulatory frameworks needed to support CE development and provide public and private sector stakeholders with the technical skills needed to implement the framework and to accelerate RE and EE initiatives. During Years 2 and 3, CARCEP made strong progress in the Eastern Caribbean and Jamaica to implement these Work Plans and also explored new regional platforms to share the Task 1 lessons learned and to provide technical assistance training through regional partners throughout the Caribbean.

Regional

Selecting Eastern Caribbean Countries for technical assistance – The FY 2016

Workplan required that CARCEP make a recommendation to USAID on which three of the seven candidate Eastern Caribbean countries identified by USAID would receive technical assistance from the project. To inform this decision-making process, CARCEP:

1. Selected Antigua and Barbuda, Barbados, Grenada, St. Kitts and Nevis, and Saint Lucia for a Scoping Study trip after having determined that Dominica and Saint Vincent and the Grenadines would be unlikely to fulfill the CARCEP M&E objectives due to their size. CARCEP established working relationships key stakeholders in each country, identified high priority interventions for future work, and collected data on policies, regulations, government processes, utilities, and hotel industry practices.
2. Conducted scoping trips to each of the above five nations during the spring of 2016, during which CARCEP met with over 50 stakeholders to assess each country's status and needs and introduce the project and its scope of support services.
3. Presented a Scoping Report to USAID recommending that all seven ECS countries be included in the CARCEP project, providing services on a semi-annual rotating basis for three countries for Tasks 1 through 3, and providing the Task 4 hotel benchmarking services to all countries throughout the project.

Assessment of CARCEP Country Obstacles and Opportunities for Clean Energy – To maximize the effectiveness of CARCEP assistance, and as anticipated by the CARCEP Project Workplan, the Task 1 team undertook three detailed assessments on the gaps, overlaps, challenges and opportunities for clean energy development in the CARCEP countries, including:

1. "Jamaica Renewable Energy Framework Streamlining Recommendations." This report, an internal document, served as an appraisal of the areas requiring streamlining for Jamaica to progress on RE/EE issues and was used to design our technical assistance work.
2. "Assessment of EC Best Practices in PPA RE Integration Provisions." This report served as a baseline assessment of the PPA status in the EC CARCEP countries and how best to proceed on the Work Plan PPA tasks. Please note that we conducted intensive workshops on PPA provisions in Dominica and in the regulator training workshops for Barbados and St Lucia, as well as the multiple OOCUR trainings, sharing examples of PPA RE provisions.

3. “Assessment of Eastern Caribbean Best Practices Concerning Net Billing, Competitive Procurement, Grid Codes and Renewable Energy/Energy Efficiency Initiatives.” This report is a broad profile of EC country practices in certain key areas for the legislative and regulatory framework development and included a detailed table providing a status report on these topics by country.

Since extensive international donor funded work had already been completed to create template PPAs through CARILEC and CARICOM, CARCEP focused its work on the development of RE/EE provisions and competitive procurement platforms in the PPA arenas with regulators, ministries and utilities. CARCEP also determined that a harmonized regional approach to net billing was not likely in the near-term given the different political and legal status of the CARCEP countries. Therefore, the project focused its technical assistance on common issues and best practices to enable streamlined, less costly solutions which also reflected equitable costs of grid service.

The project’s assessment of regional grid codes allowed CARCEP to identify the need to train regulators and utilities on the best practices in Grid Code development, and to work with Jamaica on development of a code for a more complex grid system, and with Grenada on development of a code for a smaller, less complex grid, providing two templates for other Caribbean countries. We also identified the nearly universal absence of attention to organized public sector EE regulatory programs and incentives in Jamaica and the Eastern Caribbean, and the financial penalties suffered by utilities with EE implementation, and developed work plans to prioritize EE technical training, tariff adjustments, and finance sector training to ensure EE projects could be prioritized.

Regional OOCUR Regulator Training/Regional Services Model – At the 2017 and 2018 OOCUR annual meetings, the Task 1 team made extensive presentations and offered special side training workshops for regulators. At OOCUR’s request, in May 2018 the Task 1 team provided a first ever OOCUR regional training workshop for Caribbean and CARICOM regulators, conducting a four-day introductory and intermediate technical assistance workshop in Barbados to build regulatory skills for OOCUR and CARICOM regulators, with an emphasis on renewable energy/energy efficiency transition, resilient grids, and opportunities for regional cooperation. CDB and IDB representatives also attended this workshop.

At the conclusion of the workshop, participating regulators expressed support for a CARCEP concept proposal that CDB and IDB fund a service center at OOCUR to provide technical regulatory assistance on tariff, legal, and regulatory issues to all OOCUR countries. The center would eventually become self-sustaining by transitioning into a fee-for-service model. This model would address the need of all regulators, especially those in smaller countries with limited staff and budgets, for prompt and ongoing access to highly skilled technical consultants familiar with Caribbean island issues and regional practices to assist in regulatory proceedings. CDB and IDB expressed interest in providing funding for this project as the most efficient mode of providing high quality technical support to regulators. OOCUR staff plan to develop the concept with OOCUR members and to pursue a funding proposal to CDB and IDB.

The Task 1 team created an external database of all presentations to enable all OOCUR members to access the workshop materials and OOCUR plans to maintain a library of OOCUR training materials.

Jamaica

MSET Technical Assistance – During FY 2016 and again in FY 2017, CARCEP worked with MSET to develop a detailed Work Plan to meet MSET’s articulated priorities and issues. Unfortunately, MSET was not responsive to repeated CARCEP offers to implement many of the Work Plan items, noting that all their staff resources needed to be focused on

development of an Integrated Resource Plan (IRP) under an IDB-funded project. While CARCEP provided direct support to MSET on the net billing rules, noted below, the project determined that its efforts would be better utilized if directed to support OUR, JPS, and other electricity sector stakeholders, who engaged actively with CARCEP.

MSET Net Billing, Power Wheeling and Auxiliary Interconnection Rules – In April 2016, at MSET’s request, CARCEP provided detailed commentary to MSET on the Drafting Instructions for the Net Billing, Power Wheeling, and Auxiliary Interconnections rule, which was essential for developing a sustainable distributed generation program. CARCEP’s commentary described the need to streamline governmental review processes and the need to engage private sector and utility resources to expedite the approvals process. MSET recognized CARCEP’s valuable contribution and noted MSET’s plans to incorporate several of the suggestions in the ultimate rule.

Facilitating JPS & OUR Engagement with MSET – In FY 2016 and 2017, given that MSET IRP preparations under the new Electricity Act had stalled and had caused considerable concern among electricity sector stakeholders, CARCEP provided technical assistance to JPS and OUR to explain their technical and project management concerns to MSET to improve the IRP development process. MSET had formulated plans to conduct a top-down, siloed planning process, using IDB funds to hire six new MSET staff members to replicate the core competencies in planning already existing at OUR and JPS. ESET convened a meeting between GOJ stakeholders, MSET, OUR, and JPS where JPS delivered a presentation, prepared with assistance from CARCEP, on the purpose of IRPs and the need to develop streamlined data collection to support MSET IRP, JPS utility business plan and OUR tariff proceedings that depend upon the IRP deliverable.

MT&M Technical Assistance on EV Pilot Project and Cabinet Memo – Working with a collaborative inter-Ministerial Working Group led by the Office of the Permanent Secretary of the Ministry of Transport and Mining (MTM), with representatives from the Ministry of Economic Growth and Job Creation (MEGJC), MSET, and the Planning Institute of Jamaica, as well as the Caribbean Sustainable Energy & Innovation Institute (CSEII) School of Graduate Studies, Research and Entrepreneurship University of Technology, responsible for Jamaica’s participation in the UNDP-sponsored Global Fuel Economy Initiative (GFEI), CARCEP conducted research and analysis on the policy, legal, and economic impacts of a proposed pilot project to assess the impacts of passenger EVs on Jamaica. CARCEP drafted a Cabinet Memo with the pilot project proposal and provided presentation materials on the quantitative analysis for use by the Working Group and MoTM. CARCEP anticipates that the MoTM will submit the memo to the Cabinet before the end of 2018. Unfortunately, early project termination prevented ongoing CARCEP support to the Working Group in obtaining Cabinet approval and in implementing the pilot project, but CARCEP has worked to facilitate coordination of JPS, IDB, and GIZ resources to support this ongoing work.

OUR Grid Code Technical Assistance – CARCEP also responded to OUR’s request for assistance to meet its deadline for publishing five Grid Codes by August 27, 2016. CARCEP provided project planning support by establishing an innovative project management model for organizing and monitoring work and by providing guidance on the overall architecture of the Grid Codes, best practices on renewable energy and energy assistance projects, and drafting several provisions of the Codes. CARCEP successfully facilitated two public workshops that incorporated public comments in the draft rules, establishing an important precedent for public participation in rulemaking. CARCEP also facilitated meetings between MSET, OUR, and JPS to resolve many of the technical regulatory issues that had caused conflict among the parties in the past. With CARCEP’s assistance, OUR was able to meet its statutory deadline for finalizing the Generation, Transmission, Distribution, Dispatch, and Supply Codes.

OUR Tariff Workshop and Ongoing Technical Assistance – In September 2017, CARCEP organized a session with OUR to discuss OUR’s project planning for the upcoming

rate base tariff proceeding. At CARCEP's suggestion, OUR agreed to plan a workshop of key electricity sector stakeholders for an informal exchange of views concerning the upcoming tariff proceeding and the key issues likely to be encountered. The resulting two-day workshop on December 2017 featured attendance and presentations by MSET, ESET, JPS, and the Consumer Advocate's Office on their issues of concern, enabling OUR to identify the issues that could be resolved prior to the tariff proceeding.

CARCEP supported the OUR Office Secretary in his work with NARUC to establish such a working relationship under a different USAID-funded NARUC program, but ultimately NARUC did not respond to OUR's request. At OUR's specific request, CARCEP directly contacted the Maine Public Utilities Commission to explore a new peer-to-peer ongoing exchange model between the two Commissions on a low- or no-cost basis, and an introduction conference call took place in July 2018. The Task 1 team drafted a Memorandum of Understanding for the parties' review, outlining how the two Commissions would proceed with the exchange, share information on issues of joint concern, engage in peer-to-peer exchange on issues of mutual concern, and host staff visits to observe proceedings or customer service/dispute resolution proceedings, or otherwise use the extensive electronic docket and meeting streaming of the Maine PUC with supportive input from the Maine PUC staff. Both the Maine and Jamaica Commissioners and staff have expressed enthusiasm for this exchange.

Jamaica Solar Energy Association Presentation – At the invitation of USAID, CARCEP made a presentation on the legal and regulatory issues concerning electrical storage and the Jamaican electrical grid at the December 2017 membership meeting of the Jamaica Solar Energy Association. The meeting provided a forum to discuss the regulatory opportunities and challenges presented by increasing affordable and technologically feasible storage systems and involved several small business entrepreneurs interested in new business opportunities. A representative of Jamaica's rural electrification agency also attended and expressed interest in working with CARCEP to address renewable energy and energy efficiency issues affecting rural customers lacking access to the JPS grid. CARCEP later coordinated with JPS to encourage ongoing microgrid options with this agency but was not able to pursue this option further due to early project termination.

Emerging Issues in Regulations Workshop – In February 2018, CARCEP partnered with OUR, the CDB, and the High Commission of Canada to offer a workshop on the emerging issues in regulations. On the first day of the workshop, the CARCEP was invited to participate with OUR and DNV-GL to conduct a focused, in-depth review of the methodology and results of DNV-GL's draft tariff productivity report in anticipation of the rate base tariff review in 2018, with multiple focusing on the establishment of productivity targets for rate setting, the methodology of the benchmarking assessment, and the various analyses able to be used to evaluate tariff performance. This was an internal OUR session.

During the second day of the workshop, 36 participants from nine different institutions attended, including representatives from OUR, JPS, the Jamaican MSET, the Barbados FTC, the Saint Lucia National Utilities Regulatory Commission (NURC), the Dominica IRC, the Cayman Utility Regulation and Competition Office (OfReg), and the Organization of Caribbean Utility Regulators (OOCUR). Representatives from private sector companies also participated, who detailed their portfolios in emerging renewable energy technologies such as solar PV technology, energy storage, and electric vehicles. The workshop allowed the parties to share experience and best practices on the productivity issues, and CARCEP presented on RE/EE issues to be considered in the productivity analysis.

Private Sector Engagement – Throughout FY 2017, CARCEP worked with the private sector through multiple engagements with JPS, potential IPP parties, RE/EE equipment and installation vendors, utility customers, and financial institutions to better understand their insights on the obstacles to the CE sector in Jamaica and folded these lessons into the Jamaica Work Plans for both the public and private sectors.

During Years 2 and 3 of the CARCEP project, the Task 1 and Task 2 teams worked together to provide technical assistance to JPS to support RE integration, support JPS business plans for utility operations, and to remove barriers to RE/EE project financing. Intensive efforts by CARCEP were required throughout 2016 and early in 2017 to achieve consensus on NDA terms, with the parties finally executing the NDA in May 2017. CARCEP then moved forward to provide JPS staff with technical training on software and feasibility studies for RE integration and to explore how CARCEP could support JPS as they considered a new business model that included an EV program and a new energy services company. In response to JPS' interest in an initiative to promote reliable EE equipment, the Task 1 team shared information on the Energy Star program administered by US Environmental Protection Agency (EPA) and US Department of Energy (DOE). This initiative aimed to accelerate public access to needed information and labeling on EE equipment. CARCEP also planned and implemented a September 2017 "Let's Talk EV" workshop program in 2017, and planned a "Let's Talk Tariffs" program for December 2017, later postponed by the JPS CEO to first engage in direct customer focus sessions, and a "Let's Talk Storage" Workshop in February 2018, later postponed by JPS.

Training Material Library – The Task 1 team worked to collect and post all presentations made at the December 2017 OUR-CARCEP Workshop on Tariffs and at the February 2018 Productivity Workshop on either the OUR or a Deloitte external database, enabling attendees to access copies of all presentations.

Barbados

Regulatory Training Workshops – In June and July 2017, CARCEP provided two three-day regulatory training workshops to the Barbados FTC on introductory regulatory topics and RE/EE integration topics. Nineteen participants attended the first workshop and twelve attended the second. The participant evaluations were very positive, noting their improved technical skills to address these issues in future proceedings. The Task 1 team created an external database of all presentations to enable all OOCUR members to access the workshop materials.

Integrated Utility Service Model Workshop – CARCEP collaborated with the GIZ REETA and the Barbados FTC to develop and implement a workshop on a proposed Integrated Utility Service (IUS) business model. CARCEP provided regulatory expertise, insights gained from prior EE financing programs, and facilitated cooperation with the Barbados FTC. Together, the team developed a potential pilot program that could enable consumer access to financing for EE projects in Barbados, thereby addressing a critical market created by banking sector reluctance to finance such projects.

Dominica

PPA Training for Interconnection with Kalinago Community – In February 2017, CARCEP delivered training on PPAs for key electricity stakeholders in Dominica, with particular focus on geothermal PPA issues. The workshop was attended by representatives of the indigenous Kalinago Community, who raised the issue of the interconnection of the solar farm constructed by the Kalinago community and financed by international donors, to the DOMLEC grid, a project which had been stalled for over a year. CARCEP served as a neutral facilitator, working through the Dominica Ministry of Kalinago Affairs, providing the stakeholders with optional models for interconnection, learning that a resolution had been reached. Unfortunately, Hurricanes Irma and Maria struck Dominica later that year and caused heavy damage to Dominica and its grid.

Grenada

Grid Code Development – In FY 2017 and 2018, CARCEP made significant progress on the Grenada Grid Code drafting process, a collaborative effort that brought significant benefit

to the Grenada electricity system by creating clear guidance for grid operation to all sector stakeholders. CARCEP played the lead role in designing the architecture and in drafting the substantive provisions of a comprehensive code appropriate for Grenada's small island system, working to increase intermittent renewable energy generation capacity. The comprehensive code and has undergone review in public stakeholder workshops and by the Ministry and Grenlec Working Group. As of the end of the project, the draft Codes were being formatted for submission to the GoG by the Working Group by early August 2018.

A significant challenge to CARCEP's work in Grenada consisted of an ongoing dispute between the GoG and Grenlec over the amendment of the Grenlec license and dilution of its monopoly in the generation, transmission, and distribution sectors. This matter is now in arbitration and we understand that there is minimal communication between the government and Grenlec on electricity sector issues. GIZ indicated that it will continue to support adoption of the Grid Code after CARCEP termination, given its importance to the electricity sector and to RE integration. CARCEP had hoped to be able to eventually support the development of an Energy Efficiency law, but early project termination prevented such support. CARCEP referred the project to TAPSEC for completion.

Saint Lucia

Technical Assistance to the National Utilities Regulatory Commission – In June 2017, CARCEP provided technical assistance training to the National Utilities Regulatory Commission (NURC). CARCEP supported the participation of four NURC commissioners and staff to join the second July 2017 RE/EE training workshop in Barbados and supported their participation in the June 2018 OOCUR training workshop in Barbados. CARCEP also met with the Saint Lucian ministry responsible for energy, the ministry responsible for sustainable energy, and NURC to resolve uncertainty regarding ministry responsibilities and priorities for work plan projects. CARCEP also laid the foundation for priority assistance with several energy efficiency initiatives and an all-electric public vehicle fleet, but these projects could not be completed due to early project termination.

Legislative and Regulatory Review project – CARCEP reviewed a package of 15 draft laws and rules. The review identified internal inconsistencies of the laws and rules and noted both that the electricity law did not support the development of a viable electricity sector and that the EE law lacked substantive priorities. Comments from previous reviewers had not been incorporated in the laws or rules and the draft laws and rules did not reflect the subsequent Government of Saint Lucia National Energy Strategy (NETS), which is an integrated resource plan for transition to a clean energy economy.

CARCEP presented its findings to the Ministry of Energy and worked with the Attorney General's Legislative Drafting Unit to prepare an action plan to revise the laws and rules. The action plan recommended the use of a Legal Drafting Working Group that could tailor the laws and rules to local requirements while simultaneously building capacity to implement the laws and rules once adopted. The CARCEP also designed a proposal for MIPEL to the World Bank to finance the retention of a professional drafter to service the working group and to support the Attorney General's Legislative Drafting Office. The World Bank approved support through the end of 2018.

Saint Vincent and the Grenadines

Revision of Electricity Law – In 2016 and 2017, CARCEP worked with the Energy Unit of the Ministry of National Security, Air and Sea Port Development to develop detailed work plans for revision of the 1973 Electricity Supply Act and for a public-private partnership between the Energy Unit of the Prime Minister's Office and the Chamber of Commerce to accelerate electrification of private sector fleets using RE generation sources. The SVG Energy Unit also contacted CARCEP in FY 2018 for assistance in drafting an RFP on the revision of the SVG Energy Law to modernize the law and enable transition to renewable

energy. CARCEP provided extensive revisions to the draft and continued assistance on feasible project timelines and deliverables.

Electric Vehicle Seminar and Cabinet Memo – In December 2017, CARCEP, in collaboration with the Chamber of Commerce and Energy Unit of Saint Vincent and the Grenadines and UNDP, held a seminar on electric vehicles. Thirty-two participants from private and public organizations attended the seminar, and the event was broadcast live online. Barbados Light & Power sent representatives to share insights on passenger EVs and the specific benefits of EVs in Eastern Caribbean nations.

Following the seminar, the Energy Unit requested the preparation of a Cabinet memo requesting approval of a public private partnership pilot project to deploy passenger electric vehicles in SVG and to gather data on the EV performance and economic impacts. CARCEP worked with the Energy Unit to develop the economic and regulatory framework analysis and CARCEP completed the financial analysis and drafted the final Cabinet memo proposing a 250-vehicle pilot program financed primarily by the private sector and a government waive of import taxes to make the EV price competitive to traditional gasoline-fueled vehicles.

CARCEP has emphasized the importance of maintaining momentum on the pilot project, which, moving forward, can serve as an important data collection opportunity to inform the ongoing EV policy development. The Energy Unit believes that the draft policy will be ready for Cabinet presentation with a draft EV policy now under development, sometime during the summer of 2018, and will inform USAID CAREP when the pilot proposal is submitted to Cabinet.

Issues and Lessons Learned

Issue	Lessons Learned
Various Caribbean countries take different and limited approaches to incentivizing RE and distributed generation (DG) domestically. No USAID CARCEP country prioritized EE initiatives to foster demand- or supply-side management (DSM and SSM). These factors were an initial hurdle to CARCEP efforts at engagement.	CARCEP assisted partner countries in focusing and prioritizing EE issues, including through existing and new policies, laws, and incentive programs to advance greater adoption of RE, DG, SSM and DSM by utilities and governments. This initial effort was a key first step to obtaining buy-in for future technical assistance work (such as the Grenada Energy Efficiency Laws)
Initially, no CARCEP countries had established comprehensive, long-term incentives, mandates, and public-private cooperative projects to overcome the existing barriers to RE and EE acceleration/market penetration.	To ensure the sustainability of technical assistance activities, CARCEP developed IRP processes and established clear roadmaps to support long-term efforts to achieve RE and EE goals related GHG reduction targets.
CARCEP countries possessed variable levels of experience, capability, and interest in implementation of PPAs and using competitive procurement practices for RE generation. The result was various approaches to similar challenges with RE integration.	CARCEP worked closely with regional organizations (CARILEC, OOCUR and CARICOM) to improved and share the current CARILEC template PPA which provided a modular toolkit focused on RE integration and provided public procurement guidelines to minimize costs/quality of new RE generation in the region.

Issue	Lessons Learned
It is difficult to maintain momentum on initiatives spread across geographically isolated target nations.	CARCEP opened a satellite office in Barbados and engaged an expert in Saint Lucia, to better pursue a broad range of technical assistance opportunities with public and private partners throughout the region.

Next Steps

- CARCEP has developed a significant knowledge base of leading practices in regional competitive procurement. CARCEP has shared this knowledge with CARILEC, CDB, UNDP, and national counterparts. Partners are encouraged to use this knowledge and to continue collaboration to avoid conducting duplicative assessments in the future.
- CARCEP shared publicly available Grid Codes with CAREC, CARILEC, OOCUR, and OECS, and partners are encouraged to continue Grid Code development momentum.

TASK 2: OPTIMIZING VARIABLE RENEWABLE ENERGY INTEGRATION

Key Achievements

- Assisted the creation of the Caribbean Smart Grid Working Group, which in turn supported the creation of Local Smart Grid Working Group initiatives.
- Developed and worked toward implementation of Grid Codes for Grenada.
- Evaluated and provided guidance to JPS on the development of micro-grids as a feature of the new IUS model.
- Engaged JPS in IRP training, energy storage, IUS, RE forecasting, and other initiatives.
- Implemented EV initiatives with public and private partners in Jamaica and Saint Lucia.
- Conducted training workshops on Energy Forecasting and RE Integration and Energy Storage and Modelling for Integration Studies.

Overview

Task 2 supported and benefitted from the Task 1.3 scoping activities at the start of the project, which created linkages between CARCEP and the major utilities around the region. Many of the same issues in Task 1 concerned with the overall policy framework significantly overlapped with Task 2 and focused on the implementation of these policies at the utility level, especially with regard to the capacity of utilities to effectively integrate renewable sources of energy in the context of small island nations.

Regional

Caribbean Smart Grid Working Group – Under Task 2.2, one of CARCEP’s first strategies to assist regional utilities to integrate renewable sources of energy into their grid systems was to encourage the establishment of a regional organization that could overcome the highly variable net billing policies and interconnection standards at that time in use in Jamaica and ESC nations. Toward this goal, in June 2016 CARCEP assisted CARILEC in hosting the three-day Caribbean Smart Grid Working Group (CSGWG) workshop in Barbados. During the first two days of the workshop, CARILEC and CARCEP worked in collaboration with Clarke Energy to conduct a Smart Grid Workshop training session. The purpose of the meeting and training was to convene high-level professionals from utilities, regulators, and ministries to understand the concept of a smart grid, what steps could be taken to implement a smart grid, and how to maximize benefits for rate-payers. At the conclusion of the training session, CSGWG was officially established with senior, professional-level participation from across the region.

CSGWG’s first official meeting was held in Saint Kitts in September 2016 as part of the CARILEC Renewable Energy Conference, during which participants discussed several key Smart Grid focus areas and the resource requirements for participating countries. During the meeting, CARCEP country representatives shared their respective Smart Grid initiatives, discussed the proposed CSGWG structure, and established the need for each country to form a Local Smart Grid Working Group (LSGWG). The second CSGWG meeting took place at the 2017 CARILEC Engineering Conference in Jamaica. During the conference, CARCEP country representatives presented an update on Smart Grid development in their respective countries, and a representative from EPE launched the Smart Grid Road Map development process and outlined a framework for engaging stakeholders over the ensuing months.

In the first and second quarters of FY 2017, CARCEP worked with CSGWG to finalize contractual arrangements for CARILEC to take the lead role on the Steering Committee for CSGWG. This was challenging due to funding constraints at CARILEC, the replacement of

CARILEC's CEO, and other staff uncertainties. Nevertheless, CARCEP successfully assisted CARILEC through these challenges, and CSGWG members were then expected to develop country-level specific Terms of Reference and identify stakeholder members, especially through local-level working group meetings.

USAID-CARILEC Smart Grid Symposium – In October 2017, CARCEP convened the third meeting of CSGWG in Trinidad. This meeting, specifically structured to serve as a Smart Grid Symposium, carried the theme of “Digital Transformation: The Modern Utility.” The symposium provided an opportunity for smart grid suppliers and service providers to connect with Caribbean power sector representatives and stakeholders, including members of Barbados Light and Power, JPS, SKELEC, the Trinidad and Tobago Electricity Commission (TTEC), GRENLEC, LUCELEC, and the Grand Bahama Power Company.

The symposium established a foundation for the smart grid roadmap process by identifying areas of focus for smart grid engagement, including smart meters, renewable integration, and electric vehicles (EVs). A preliminary gap assessment was conducted by members of the working group for regional utilities to be able to determine next steps for progressing towards a smarter grid. CARCEP's support for this initiative included the staging of an EV panel discussion during the main conference and a post-conference meeting with CSGWG members.

Caribbean Renewable Energy Forum and OOCUR Conferences – CARCEP identified the Caribbean Renewable Energy Forum (CREF) as a key medium through which it could advance Task 2 goals, and at the October 2016 CREF, CARCEP met with several regional energy sector counterparts and stakeholders. CARCEP also developed a partnership with OOCUR and conducted several presentations and seminars at OOCUR's 2016 conference.

These two meetings helped to establish CARCEP's visibility within the region and led to several new initiatives across CARCEP countries, including the development of grid codes and energy efficiency legislation in Grenada, support for energy regulators in Dominica and Saint Lucia, and technical support in several areas in Saint Kitts and Nevis and Saint Vincent and the Grenadines. CARCEP continued momentum begun in 2016 by also attending CREF in October 2017, during which CARCEP again met with several energy sector counterparts and stakeholders.

Regional Conferences on Renewable Energy Integration, Energy Forecasting, and Energy Storage – In July 2017, at the CARILEC Engineering Conference in Jamaica, CARCEP conducted a panel discussion on renewable energy integration and a workshop on energy forecasting and energy storage and at the September 2017 Renewable Energy Conference in Paramaribo, Suriname, CARCEP conducted a training workshop on energy forecasting and renewable energy integration for over 40 participants from across the Caribbean. The workshop provided an overview of the procurement process and best business practices involved in energy forecasting and renewable energy integration and outlined the integration, planning, and design of energy storage into an electrical network.

Jamaica

Supporting JPS IRP Planning – During FY 2016 and FY 2017, CARCEP helped JPS manage its planning in the context of the IRP process that was responsibility of MSET. CARCEP helped support baseload capacity decisions taken by the Energy Sector Enterprise Team (ESET) and the restructuring of ESET's planning and system operations teams.

JPS GIS Training – In the second quarter of FY 2018, CARCEP advised the selection of software and system models to help JPS rebuild its capacity to conduct grid operations and medium- and long-term planning, while also improving its database and software systems.

CARCEP also supported JPS with their proposed “Smart City” pilot within the Smart Grid Initiative to be designed and developed in New Kingston area in partnership with stakeholders from the private sector.

JPS Energy Storage Initiative – In FY 2017, CARCEP assisted the development of JPS' Energy Storage Initiative to support grid stability issues resulting from the addition of over 80MW of intermittent renewables in 2016. This support culminated in JPS' installation of over 18,000 LED street lights. The CARCEP provided technical assistance to the JPS storage acquisition team on how to manage this initiative.

JPS Integrated Utility Service Model – In FY 2017, CARCEP advised JPS on the feasibility of adopting an energy service company (ESCO) model under a revised Integrated Utility Service (IUS) model following revisions to the Electricity Act 2015 and the Electricity License 2016. Pending the publication of a new Integrated Resource Plan (IRP) by MSET, CARCEP met with JPS managers and discussed the merits of distributed generation and the Energy Services Company (ESCO) model, which could see the utility transitioning from a wholly sales-based revenue model to a more diversified services-driven revenue model. This discussion informed CARICOM's later initiative to partner with GIZ and the utilities of Jamaica and Barbados to explore the IUS model under Task 6. CARCEP assisted both JPS and CARICOM with these processes.

JPS Smart City Pilot – In FY 2017, CARCEP supported JPS with their proposed Smart City pilot within the Smart Grid Initiative for the New Kingston neighborhood of Kingston. This pilot was developed by the Jamaican Local Smart Grid Working Group (LSGWG), instituted with the help of CARCEP and the CSGWG. CARCEP also provided assistance directly and through the CSGWG on specific smart grid components such as energy storage and EVs.

JPS Renewable Energy Forecasting Pilot – In FY 2017, JPS determined that an expanded forecasting capacity could help the utility and its customers save money and reduce carbon emissions by giving the utility greater lead time to manage its response to variable renewable energy. To help this initiative, CARCEP demonstrated to JPS staff the use of wind and solar generation modeling software and provided technical guidance for a JPS project aiming to increase the utility's forecasting capabilities through the deployment of new weather stations across Jamaica.

JPS Energy Management Training Workshop – In March 2018, CARCEP held a training workshop on the "Strategies for Improving Energy Efficiency" with JPS staff. The course provided training on the concepts of energy efficiency and conservation and guidance for JPS to recommend energy management solutions to homes and businesses. Specifically, the training focused on energy audit types and benefits, standards of energy audits, basic financial tools for project assessments, components of PV systems, and safety practices for working on PV installations.

JPS Electric Vehicle Initiative – CARCEP identified the deployment of EVs as a key component of several of its main objectives in support of increasing the penetration of renewables in the energy sector. This effort aimed to reduce Jamaica's dependence on imported oil and GHG emissions from transportation, in addition to encouraging the development of services for a smart grid through better frequency and voltage management.

CARCEP collaborated with JPS to pursue this goal and in FY 2017 engaged local coach bus company Knutsford Express in a joint partnership for an EV Bus Pilot. All parties were interested in moving forward, subject to specific research on the components proposed for implementation and the development of an execution plan. As of the date of this writing, Knutsford Express reports that they are in negotiations to buy an electric bus.

In an effort to expand public awareness of the EV initiative in Jamaica, CARCEP also supported JPS in holding the "Let's Talk Electric Vehicles" forum in September 2017. The forum engaged approximately 200 participants from government ministries and stakeholder groups in the new and used vehicle industry. The forum was led by regional and international experts brought in by CARCEP to share their experiences and to guide the local stakeholders in the initial stages of development of an EV Roadmap for Jamaica. Several follow up discussions, articles, and media reports were generated from this forum.

As of the date of this writing, the key stakeholders were prepared to undertake a pilot project for 500 vehicles. However, it is not clear what partner will continue this effort following the end of CARCEP.

Barbados

Megapower Electric Vehicle Initiative – As part of CARCEP’s EV initiative, CARCEP considered a grant to the Barbadian EV and RE solutions firm Megapower to support their investigation of the repurposing of EV batteries as a strategy to maximize their use and, as a result, the lifecycle cost of acquiring and maintaining EVs. CARCEP jointly promoted with Megapower the case for EVs at several regional events, including the CARILEC CEO’s conference in Saint Lucia in May 2017, the “Let’s Talk EV” forum in Jamaica in September 2017, and the Smart Grid Symposium in Trinidad in October 2017. However, due to CARCEP’s early closure, a grant for Megapower was not executed.

Grenada

Grenada Grid Code – In May 2017, CARCEP hosted the “Preparation and Promulgation of Electricity Sector Codes” workshop in Grenada with the Grenada Ministry of Communications, Works, Physical Development, Public Utilities, ICT, and Community Development. The workshop combined Task 1’s legal and regulatory work with Task 2’s technical advisory work, and following the workshop, CARCEP’s Task 2 Lead continued to provide technical assistance to GRENLEC to develop the draft Grid Codes for Grenada.

Saint Vincent and the Grenadines

Electric Vehicle Initiative – As part of CARCEP’s EV initiative, in March 2018 CARCEP delivered to the Ministry of National Security, Air, and Seaport Development of Saint Vincent and the Grenadines a proposal to help increase demand for EVs in the country while simultaneously facilitating the collection of data on the impact of EVs on fossil fuel consumption, the suitability of EVs for the country’s topography and road network, and the ownership cost of EVs compared to internal combustion vehicles.

The project focused on four key elements. Specifically, it sought to lead to import duty relief, collect data, install additional EV charging stations in the country, and implement a public outreach program. As of the date of CARCEP’s closure, the proposed pilot project specifically, and an EV strategy more generally, were in the final stages to send from the Energy Unit to the Prime Minister for signature.

Issues and Lessons Learned

Issue	Lessons Learned
There is a high variability of standards used in net billing and interconnection policies among Jamaica and ESC nations, which presents challenges to greater regional integration and streamlining of protocols.	CARCEP tailored its engagement with JPS and other regional utilities to include a more unified set of leading practices in new regulations and policies especially when it comes to metering and interconnection policies, grid codes, and establishing incentives.
There is no shared understanding of what the term “Smart Grid” represents in the Caribbean which will impact the success of regional efforts and approaches.	Through the Caribbean Smart Grid Working Group CARCEP worked at both the regional and country levels to define the “Smart Grid” concept and encourage a uniformed understanding among countries.

Issue	Lessons Learned
Due to perceived roles and responsibilities as well as overlapping priorities, regional entities were initially hesitant to provide full support to some of CARCEP's activities, including the Smart Grid initiative.	CARCEP worked to strengthen its working relationships with key regional entities (such as CARICOM) through regional and bilateral workshops and regular meetings, with a hope to reconcile CARCEP's near-term objectives with partners' long-term visions.
The change in the Jamaican government during the beginning of the program necessitated formal introductions with new government officials seeking different policy priorities.	CARCEP persistently engaged with government officials and eventually convinced MSET to collaborate. This is demonstrated by CARCEP's work with MSET on EV's
JPS underwent significant organizational changes in FY 2017 (including a new CEO and new senior staff); this effected the speed of execution of various proposed support efforts.	In an effort to advance engagement during this transition, CARCEP assisted JPS in smoothing its organizational changes and recalibrated its strategy to focus on providing technical assistance on highly technical matters that were not policy-related (such as forecasting, system planning, and grid integration studies).

Next Steps

- CARILEC is a long-standing Caribbean institution that deserves significant support to help transform electric power utilities to sustainable practices and to assist Caribbean utilities address their most pressing issues, especially coping with distributed renewable generation, coping with variable generation, and exploiting new markets in transportation. Donors should continue assistance to anchor CARILEC as the principle organization best positioned to help utilities devise solutions and create opportunities.
- CARICOM, as a governmental multilateral body, operates with significantly more deliberation and under more constraints than does CARILEC or OOCUR. Still, CARICOM deserves significant support due to the opportunities for intervention and information sharing that can benefit multiple countries on key initiatives such as smart grid technology and the IUS model.
- Electrification of transportation is an issue that cuts across ministries, utilities, and private companies but could also significantly reduce government tax revenue. Its potential to cut carbon use and increase resilience on small islands, however, warrants continued donor and government effort in support of transportation electrification.

TASK 3: ACCELERATING PRIVATE SECTOR CLEAN ENERGY INVESTMENT

Key Achievements

- Developed a pipeline of 50 MW of RE projects and USD 10 million in CE retrofits.
- Strengthened certification programs for Certified Energy Managers (CEMs) and PV installers.
- Supported the development of regional ESCOs and encouraged regional financial partners to work with ESCOs.
- Trained Jamaican banks on RE and EE financing towards the creation of DCA mechanisms for project financing.
- Conducted training workshops for the hotel sector in Jamaica and Saint Lucia for the newly-deployed Energy Benchmarking Tool (EBT), and provided general training on EE and RE basics, development, deployment and financing.
- Conducted training workshops for the Eight Rivers Project community on workforce preparation, safety, and PV installation.

Overview

The major objective of Task 3 was to accelerate private sector investments in clean energy. To begin this work, CARCEP conducted a scoping mission to determine which Eastern Caribbean countries, in addition to Jamaica, should receive assistance. The scoping mission, discussed in more detail above in Task 1, concluded that all seven Eastern Caribbean Countries could benefit from assistance to develop policies on the utility legal and regulatory framework, grid integration, resiliency, and financial policy support.

One of CARCEP's first tasks was to assess the capacity of Jamaican financial Institutions to implement lending to meet the expected demand for loans to fund clean energy projects. CARCEP also met with all the major commercial banks to determine their readiness for clean energy investment and to determine whether they had made funds available to this emerging market. CARCEP utilized a set of energy audits of hotels in Jamaica and the ECS previously conducted by the IDB-funded CHENACT program as important data for banks to assess the feasibility of loans to the hotel sector.

Building off the CHENACT energy audit initiative, CARCEP developed an energy benchmarking tool (EBT) to assist hotels record, monitor, and control their energy use in real time, an activity which overlapped significantly with Task 4 and is discussed in greater detail in that section of this report.

Regional

Project Financing Pipeline – Following the scoping mission, CARCEP collaborated with the IDB, CDB, the Development Bank of Jamaica (DBJ), and the Caribbean Hotel and Tourism Association to produce a pipeline of projects properly developed with good financial and risk-management data to assist banks in making easier decisions. By the end of the project's first year, this pipeline consisted of over 50 MW of RE projects and USD 10 million in EE retrofits, all of which were expected to close within CARCEP's original lifetime. Just in Jamaica, these projects included biogas generation from organic hotel and farm waste in Montego Bay, and the retrofitting of public sector buildings, hospitals, and schools with energy efficient materials.

CARILEC NABCEP Training – To strengthen CARCEP staffs' capacity and instructor certification status, in May-June 2017 CARCEP's Task 3 Advisor completed the North

American Board of Certified Energy Practitioners' (NABCEP) Certified PV Installation Training in Saint Vincent. With this bolstered ability to teach installers and financial institutions to manage project funding, CARCEP's Task 3 Advisor then completed and passed the NABCEP PV Associate Credential, the first in a three-part requirement for training others in solar installation, operation, and maintenance.

Jamaica

Advanced Financing Lending Model and Photovoltaic Project Development

Workshops – In March and June 2016, CARCEP led workshops on an Advanced Financing Lending Model and Photovoltaic Project Development to build the capacity of financial stakeholders in properly modeling CE/EE investments.

Caribshare Biogas Technical Assistance – In FY 2017, CARCEP provided technical assistance to Caribshare Biogas, a project that removes organic waste from hotels in Montego Bay and pig farmers in Trelawny to produce 100 kW of power to operate its own power plant. CARCEP supported Caribshare by assisting with plant operations and securing a USD 160,000 loan utilizing the Development Credit Authority.

National Education Institute Technical Assistance – In FY 2016, CARCEP provided technical assistance to a pilot project to retrofit 30 schools with solar power panels. The project was developed by the National Education Institute of the Ministry of Education and DBJ. CARCEP supported the project by demonstrating how to conduct physical structural appraisals for the installation of photovoltaic panels on school building roofs.

Energy Service Company (ESCO) Sector Technical Assistance – CARCEP provided technical assistance to develop an Energy Service Company (ESCO) sector, an essential intermediary operating between financial institutions and technology end-users. Four main companies were identified as candidates for successfully adopting an ESCO business model, including the Jamaica Public Service Company, the Petroleum Corporation of Jamaica, Sagicor Real Estate, and SOFOS Jamaica.

USAID Development Credit Authority – In FY 2017, CARCEP met with the Director of the Office of Program, Policy & Management and the Portfolio Manager for the Latin America and Caribbean and Europe and Eurasia Regions regarding the Development Credit Authority's (DCA) presence in Jamaica. DCA provided an overview of the relationships it maintains with several local banks in Jamaica and noted the existence of an untapped USD 4 million in loans available to banks for renewable energy projects. CARCEP committed to work with the DCA to help identify potential borrowers and to follow up with the First Global Bank regarding their comfort with energy-related financing. However, it was acknowledged that the DCA's 50% guarantee was less favorable than the terms offered by the DBJ, which offers energy sector loans at an 85% guarantee.

Alquimi Solar Greenhouse Company – In FY 2017, CARCEP signed a letter of support with Alquimi Solar Greenhouse Company, a company that develops innovative greenhouse projects operating on self-sustainable renewable energy. The letter highlighted potential engagement with CARCEP in several key areas, including access to financing, local community outreach (including local farm integration and labor force readiness), and stakeholder coordination among central and local government levels as well as outreach to potential partners.

Petroleum Corporation of Jamaica (PCJ) – PCJ executed a USD 30 million IDB-funded EE and RE project aimed at reducing energy consumption in public buildings. CARCEP developed a training curriculum to improve their capacity to meet their program funding requirements and ensure project success. Similar support was offered to PCJ in another USD 12.2 million project funded through United Nations Development Programme (UNDP) grant funds provided by DNV-GL, PCJ and UNDP. This project focused on the six public hospitals May Pen, Black River, Chest, Sir John Golding, Sav-La-Mar, and Bellevue.

Eight Rivers Project Community Training – In an effort to support utility-scale developers adding renewable energy sources to the Jamaican grid, in the first quarter of FY 2018, CARCEP conducted two training workshops for the Eight Rivers Project Community in Westmoreland. The first training was held in collaboration with the Clinton Climate Foundation, where 63 participants were trained on the importance of and various implementation methods for energy conservation, as well as general workforce training.

CARCEP also partnered with the Human Employment and Resource Training (HEART) Trust, the premier training and certifying body in Jamaica for technical industries, to offer the second training. 53 participants were trained in occupational safety and PV installation, 37 of which earned the official Level I HEART Trust Certification. The certification increased the employability of these individuals.

At the request of Eight Rivers, CARCEP offered an additional training workshop for the Eight Rivers Project Community in March 2018 in Westmoreland. 18 participants completed the course, which focused on occupational safety and housekeeping in the workplace and took the Human Employment and Resource Training’s (HEART) official unit exam on workplace safety. All participants passed the exam and earned the Level I HEART Trust Certification.

PCJ Energy Management Training – In December 2017, CARCEP conducted a training in energy management for 25 participating PCJ staff. This activity was aimed at encouraging uptake of energy efficiency and renewable energy best-practices at the PCJ Facility. The workshop, led by CARCEP’s Task 3 Advisor, aimed to identify improved strategies for improving existing energy processes and equipment and to assist participants to capitalize on EE opportunities.

YMCA Energy Presentation – In May 2017, CARCEP presented the results of an energy audit of the Jamaica YMCA’s Kingston Branch. The presentation focused on critical energy conversion opportunities and assessed the financial impact of implementing the recommendations. The audit identified a potential 85% reduction in YMCA’s electricity bill, with an investment capital requirement of JMD 8.3 million and a project internal rate of return of 28%.

Renewable Energy Financial Modelling Workshop with First Global Bank – In January 2018, CARCEP conducted a training workshop for First Global Bank, which exposed participating staff to basic financial tools and project assessment and development techniques. The training gave participants a better understanding of the concepts of measurement and verification, baselines, risk assessments, and letters of credit.

Certified Energy Manager (CEM) training – In March 2018, CARCEP partnered with JSEE to sponsor 25 participants for the Certified Energy Manager (CEM) training course, which prepares participants for an exam to obtain the internationally-recognized CEM certificate. Eleven different Jamaican institutions participated in the training course, including the Government Electrical Inspectorate, Jamaica Public Service, the Office of Utilities Regulations, and the Ministry of Science, Energy & Technology.

Issues and Lessons Learned

Issue	Lessons Learned
The Caribbean ESCO market is limited in size and capacity to provide sufficient attraction to commercial banks, lacking the proper legal and regulatory support to advance significant activity.	CARCEP first provided training and opportunities for potential ESCOs to develop their corporate and financial structures in line with regulatory standards to better enable RE and CE financing while also developed a pipeline of projects that were particularly sensitive to banks’ capacity to model risk in the RE and CE industry.

Issue	Lessons Learned
Utilities were unlikely to willingly cede their exclusive control over power sales, thereby stifling growth of the ESCO sector.	CARCEP developed the appropriate legal and regulatory framework with JPS, OUR and MSET while reassuring all of the stakeholders that they have a distinctive place in the market.
Regarding EE and RE loans, national and commercial banks use standard risk assessment models, not industry-specific models, which makes them reluctant to invest significantly in the RE and EE industry.	CARCEP worked to familiarize banks with the importance, size, and value of the clean energy market and trained bank staff on industry-appropriate risk models. In Jamaica, CARCEP worked with the Ministry of Finance to encourage a resolution that would allow commercial banks to classify RE loans as secured loans.
A lack of a secondary market for clean energy equipment meant that banks would have difficulty liquidating seized assets from defaulted or foreclosed loans.	CARCEP worked with solar equipment suppliers to develop a resale market for used RE equipment and encouraged utility companies and regulators to adjust their business models to include RE solutions to domestic and commercial customers.

Next Steps

- CARCEP developed a significant pipeline of CE and EE projects, for which CARCEP was providing advisory service, technical assistance, and capacity building. CARCEP turned over this pipeline to TAPSEC and provided recommendations on how to most effectively proceed. Continued resource investments from partners will be needed to ensure successful conclusion of this work.
- CARCEP initiated strong momentum into the development of technical specifications and certification protocols for distributed energy installers via several training programs. Moving forward, HEART will certify PV installers according to the framework initiated by CARCEP and will deliver NVQ training, and TAPSEC and CDB will continue CEM training. Continued resources and dedicated technical focus will be needed to further develop regional technical capacity.

TASK 4: ENERGY EFFICIENT BENCHMARKING IN THE HOTEL AND TOURISM SECTOR

Key Achievements

- Completed gap analysis of local institutions' EE benchmarking capabilities.
- Conducted sample energy audits for hotels, in Saint Lucia, Antigua, Grenada and Dominica during Q1 and Q2 of FY 2017. Information gathered from audits was used as baseline information in the creation of the Energy Benchmarking Tool (EBT).
- Conducted energy audits at the Jamaica Manufacturer's Association's (JMA) headquarters in and for two JMA members.
- Presented the EBT to regional hotel and tourism associations.
- Conducted workshops for members of regional CHTA bodies to assist them in adopting EE and RE solutions in their operations, and provided ongoing support in adopting the EBT;
- Adapted the EBT for the PAHO Smart Hospitals project.
- Collaborated with IDB to develop a revolving fund in support of the ESCO industry in the region. CARCEP developed an implementation strategy to develop the nascent ESCO industry to enable them to implement EE projects on a performance based contracting basis, bypassing the regional banks who were identified by the CHENACT program to be a major impediment to deployment of EE & RE initiatives.
- Worked with the Barbados Renewable Energy Association, (BREA) the most active and advanced RE association in the region, on several initiatives. CARCEP assisted BREA in providing public feedback to the Barbados Ministry of Energy Draft Final National Energy Policy.

Overview

In FY 2016, CARCEP conducted a scoping mission to meet with hotels and tourism institutions in the five Caribbean countries of Barbados, Antigua and Barbuda, Saint Lucia, Saint Kitts and Nevis, and Grenada. The information gathered during the mission through meetings with local tourism representatives and stakeholders led to the formation of strong relationships with both the Caribbean Hotel and Tourism Association (CHTA) and CHENACT. The scoping mission informed the decision to seek a scope change to the original task order requirement of working in Jamaica and 3 ESC countries to working in all 8 CARCEP countries with no budget increase. This was achieved through the signing of collaboration agreements with both CHTA and IDB, the sponsors of the CHENACT program. By working through these existing networks, CARCEP was able to expand their reach and penetration in all countries capitalizing and building on prior efforts.

The scoping mission also determined that Barbados was best suited to host a satellite CARCEP office in the Eastern and Southern Caribbean (ESC). CARCEP's Task 4 Lead relocated to Barbados in June 2016 and opened the CARCEP office in Christ Church in October 2016. The Barbados CARCEP office focused on the implementation of Task 4 activities along with providing support to all other CARCEP activities. This structure provided a level of operational efficiency that could not have been achieved by the other Task Leads based in Kingston working alone. The Barbados CARCEP office operated continuously throughout the project until its closure on February 28, 2018 as a result of the early curtailment of project funding. Following the office's closure, the Regional Project Coordinator was demobilized, and the Task 4 Lead relocated back to his primary residence in Jamaica to finish the program from the Kingston office.

Despite the early curtailment of project funding, CARCEP made significant progress in supporting the hotel sector with their EE implementation strategies and deployment of energy efficiency benchmarking in the hotel and tourism sector especially, in the Eastern

Caribbean countries.

Regional

EE Benchmarking Tool – In September 2016, CARCEP completed the Energy Benchmarking Tool (EBT) for the hotel sector and officially launched it at the Caribbean Hospitality Information Exchange Forum (CHIEF) in Puerto Rico, with the signing of a Collaboration Agreement between CHTA and CARCEP. The tool is a dynamic web-based modeling tool hosted on CHTA’s website that enables hoteliers monitor their energy consumption in real time and immediately see the impact of any intervention efforts made. The EBT also allows hoteliers to easily assess their hotel’s performance and gauge how effective their energy use is relative to regional counterparts. The tool was designed so that CHTA would receive the benefit of providing value added to their membership at little cost and allows the tool to be maintained and used beyond the end of the CARCEP program.

Pan American Health Organization Regional Meeting and Agreement – Following an initial meeting with the Pan American Health Organization (PAHO) in 2017, in the first quarter of FY 2018 CARCEP discussed regional strategy and planning with PAHO’s Technical Implementation Team at a two-day SMART Hospital project. During the session, PAHO presented their SMART Hospitals project, and CARCEP agreed to work to adapt its EBT to the “Baseline Assessment Tool” (BAT) produced by PAHO. The tool would help medical facilities implement energy-efficiency measures to reduce their operations and maintenance costs, allowing critical funds to be redirected to the improvement of healthcare services for patients.

Development of PAHO Energy Benchmarking Tool and Site Visits – CARCEP began the technical development of the PAHO-adapted EBT in late 2017 and completed it in the following quarter. In March 2018, CARCEP participated in PAHO’s SMART Hospital Technical Implementation Team meeting in Barbados to meet with key PAHO leadership and present the framework of the EBT. Following the meeting, the tool was further refined and handed over to PAHO in May 2018. DFID expressed enthusiasm for the completion of the tool and immediately began its incorporation into the SMART Hospitals program energy conservation efforts. PAHO EBT workshops with regional health care facility managers were held in June in Saint Lucia and in Jamaica in July 2018.

Jamaica

Jamaican Manufacturer’s Association Training and Energy Audits – After meeting with the Jamaican Manufacturer’s Association (JMA) in FY 2017, in November 2017 CARCEP held a two-day training for association members on EE and RE. CARCEP conducted an audit of the facility before the workshop and used the audit as a case study during the training to help association members understand the importance and impact of EE and RE for the manufacturing sector. Reducing electricity use in the manufacturing sector, the largest consumer of electricity in Jamaica, held significant potential in reducing energy demand in Jamaica.

In the second quarter of FY 2018, CARCEP conducted two energy audits requested from JMA members following the workshop. The audits identified a combined potential USD 29,911 in annual energy savings, representing an average 28.5% reduction in energy consumption with an IRR of 30%. These findings would be considered typical findings and similar or better results would be expected among the broader manufacturing sector. Members of the JMA identified utility costs as one of the biggest obstacles to profitability, along with security costs. The importance of maintain the efforts to improve EE for the manufacturing sector cannot be understated.

Barbados

Barbados Renewable Energy Association (BREA) – Throughout FY 2017, CARCEP had multiple meetings with BREA leadership to discuss collaboration initiatives, including BREA's hotel greening initiative, creating an umbrella organization for regional RE associations, and providing regional Certified Energy Manager (CEM) trainings. Additional information is included above in Task 3 and below in Task 6.

PAHO invited CARCEP to conduct a presentation at their CHECK Consultants Meeting in June 2018. CHECK Consultants are structural engineers charged with oversight responsibility to ensure the SMART Hospital guidelines are adhered to when facilities are renovated. CARCEP was asked to provide this group with insights into EE best practices.

Saint Kitts and Nevis

Caribbean Tourism Organization (CTO) Climate Smart Sustainable Tourism Forum – In December 2017, CARCEP presented on the importance of EE and building for climate resiliency at the Climate Smart Sustainable Tourism Forum in Saint Kitts. The forum was sponsored by CTO for its membership in the Caribbean Nations Ministries of Tourism. Along with the presentation on climate resiliency, the forum was used to introduce the hotel EBT to the CTO as the kick off to expanding outreach to the greater hotel community beyond CHTA members. The intention was to present the tool at the workshop and conduct a second round of training throughout the CARCEP countries reaching out to all the hoteliers through the Ministry of Tourism in each country; unfortunately, the shortened project timeframe did not allow for this to occur.

Saint Lucia

Meeting with the Prime Minister and the National Utilities Regulatory Commission (NURC) – In FY 2017, CARCEP's EE Promotion Specialist met with the Prime Minister of Saint Lucia to encourage the adoption of RE and EE initiatives, particularly in the hotel and tourism sectors. The Prime Minister expressed interest in CARCEP activities, encouraged improvements within the hotel and tourism sectors, and asked to be informed of all planned CARCEP activities in the country.

The EE Promotion Specialist also met with the Saint Lucia National Utilities Regulatory Commission (NURC) to advance previous discussion on providing technical assistance, focusing on the National Energy Transition Strategy (NETS).

Hotel Audits – From May to December 2017, CARCEP engaged a private company to conduct energy audits of various hotels that had expressed interest in having energy audits performed on their properties. As CARCEP was able to obtain access to CHENACT's extensive audits in Jamaica and Barbados that were used to inform the baseline data for the EBT, CARCEP focused its auditing efforts on the six countries of the ESC, though selected hotels in Saint Vincent were ultimately unable to participate due to hurricane activity in late 2017. The participating hotels, selected based on size and prior participation in CARCEP's EBT workshops, were tasked with completing and balancing the EBT database. Counting an additional two audits performed for members of the Jamaica Manufacturers Association and one for the JMA headquarters, a total of 24 audits were conducted.

Issues and Lessons Learned

Issue	Lessons Learned
Hoteliers throughout the region frequently identify access to financing as the major barrier to adoption of recommended EE measures.	CARCEP worked with partners (such as IDB) to develop an ESCO funding model that could bypass the need for hoteliers to directly seek funding from banks by acting as an intermediary between the two.
Hoteliers did not find “snapshot” energy audits to be useful for making EE improvement decisions, and many in the industry lacked the capacity to constructively interpret the information.	CARCEP designed the Energy Benchmarking Tool to be user-friendly and updatable in real-time. CARCEP also provided frequent follow-on support and thorough instruction on the tool’s use and how to turn the information generated into investments.
EE challenges in the Caribbean are not unique to the hotel and tourism sector, with other industry groups in the region facing similar barriers. This potentially limited the impact of CARCEP engagement on this issue.	CARCEP worked effectively to tailor the Energy Benchmarking Tool to other industry groups. Specifically, CARCEP partnered with PAHO to develop a similar tool in support of health facilities. CARCEP also engaged with the Jamaican Manufacturing Association to conduct energy audits and identify EE solutions.

Next Steps

- CARCEP turned over the hotel EBT to CHTA and the medical facility EBT to PAHO and the EU. Efforts should be made to assist these entities in providing continuing support for the EBTs and establishing the tool as an industry standard for monitoring consumption and implementing EE measures. For hoteliers, continuing and expanding the use of the EBT will require additional support from partners and further outreach to the hotel community. Development of PAHO EBT, furthermore, was initiated just prior to being advised that funding for the project was going to be curtailed, so particular attention should be given to introducing the tool to medical facility managers to ensure adequate adoption.
- BREA’s initiative of creating national RE associations supporting mutual knowledge and information sharing efforts should be encouraged and supported. Creation of these centers of knowledge and expertise will greatly assist with the deployment of EE and RE throughout the region.
- The development of the ESCO model in collaboration with IDB originally planned that USD 10 million of seed capital would be provided by GIZ, but this funding never materialized. The Caribbean Development Fund (CDF) has a similar model and has funding that can be but toward a pilot project; CARCEP had agreed to collaborate with CDF and provide them with the technical assistance they require to develop the model, and these efforts should be pursued.

TASK 5: COORDINATION AND PROMOTION OF USAID AND USG INTER-AGENCY ACTIVITIES

Key Achievements

- Engaged USAID Missions in the region and with all major U.S. Government donors and stakeholders seeking to support renewable energy and energy efficiency in the Caribbean region:
 - Coordinated with USAID Missions in Jamaica and the Eastern and Southern Caribbean on the Grid Code and Electric Vehicle work active in both places.
 - Developed a strategy to facilitate support for private sector representatives interested in pursuing renewable energy and energy efficiency projects in the Caribbean.
- Engaged multilateral and international donor agencies active in the region:
 - Hosted the Donor Roundtables in FY 2017 and FY 2018 where international stakeholders and US agencies met to discuss key projects and progress towards RE in the Caribbean.
 - Coordinated webinar with the U.S. Department of Energy on CARCEP's energy benchmarking tool for over 25 representatives from four USG agencies.
 - Interacted with representatives from the EU's Eastern Caribbean office interested in continuing CARCEP's initiatives forward upon completion of the CARCEP program.
 - Secured funding from CDB for CEM training.
- Engaged stakeholders at CARICOM's Caribbean Sustainable Energy Forum (CSEF) and CARICOM's Regional Project Team (RPT) meeting to coordinate and establish a Regional Energy Efficiency Building Code (REEBC).
- Presented at the CARILEC Renewable Energy Conference.
- Hosted a delegation from Haiti on behalf of USEA and USAID and offered important advice and assistance around establishing a new regulatory agency.

Overview

CARCEP effectively coordinated with international donors and U.S. Government agencies towards promotion of renewable energy in the Caribbean. In particular, CARCEP worked closely with CEFF-CCA (a joint program of USIAD, OPIC, and USTDA) to realize the development of one of the largest solar power plants in the Caribbean. Additionally, CARCEP worked closely with USTDA to implement JPS' "Smart City" program that installed 18,000 LED street lights in 2017. Coordination with USAID's missions in the Eastern Caribbean and Jamaica exceeded contract expectations, by successfully engaging all seven countries of the ECS. Annual stakeholder coordination meetings were successfully conducted despite significant complications from partners.

Regional

Engagement with CEFF-CCA – CARCEP met with the Clean Energy Financing Facility for the Caribbean and Central America (CEFF-CCA) several times to discuss grants programs, new insurance products for the EE industry, and pipeline of prospective RE and EE projects. CEFF-CCA agreed to participate in the EBT that was developed with IDB.

Engagement with C-SERMS – CARICOM's Caribbean Sustainable Energy Roadmap & Strategy team visited Jamaica several times to meet with CARCEP and USAID. Discussions with CARCEP and USAID regarding CARCEP's ability and mandate to coordinate activities

with CARICOM eventually led to the addition of Task 6, discussed in greater detail in the Task 6 section of this report.

Smart Grid Stakeholders Working Group – As discussed above, the CSGWG was a cross-cutting initiative bringing together utility professionals, regulators and government officials. Two sessions were held, with one building upon a Smart Grid technical workshop and the second building on CARILEC’s renewable energy conference. The working group successfully earned the support of utility companies that had generally been reluctant to support renewable energy efforts.

U.S. Department of Energy Office of Energy Efficiency and Renewable Energy Webinar – As discussed above, in June 2017 CARCEP presented the EBT to the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy and to 23 participants from the U.S. Department of Energy, U.S. Department of State, USAID, and U.S. Trade and Development Agency (USTDA) via a webinar.

Collaboration with GIZ – Throughout FY 2017 CARCEP strengthened its collaboration with GIZ to better serve the CARCEP countries on a range of RE and EE issues. CARCEP worked closely with GIZ on the Grid Code and EE Law development in Grenada and the Renewable Energy and Energy Efficiency Technical Assistance (REETA) project that provides technical assistance to CARICOM.

Donor Roundtables at the Caribbean Renewable Energy Forum (CREF) – In September 2016 CARCEP hosted a day-long “Donor Roundtable” for USG entities and other international donors and in the following year, CARCEP hosted its second annual Donor Roundtable for donors and stakeholders to present USG offerings of technical assistance, grants, and project financing support in the region. The roundtable provided the opportunity to engage with other key non-USG donors involved in clean energy development activities in the Caribbean and to share information regarding work within the region and develop consensus on key themes. Representatives from CARICOM’s Energy Unit, USTDA, the Overseas Private Investment Corporation (OPIC), the Department of State’s Bureau of Western Hemisphere Affairs (DOS/WHA), the Department of State’s Bureau of Energy Resources (DOS/ENR), the National Renewable Energy Laboratory (NREL), and the Department of Commerce (DOC) gave presentations detailing their work in the region.

USEA/USAID Haitian Delegation – In November 2017, shortly after the passage of legislation in Haiti of legislation creating a new electricity regulatory authority, CARCEP met with a delegation of Haitian government and utility stakeholders to discuss Jamaica’s experience instituting a regulatory body and other best practices in the energy sector. At the USEA/USAID “Executive Exchange on Developing an Electric Regulatory Authority” conference, CARCEP offered insight into the role of independent regulators in the energy sector.

European Union Technical Assistance Facility – In October 2017, CARCEP met with the European Union Technical Assistance Facility (EU TAF) at CREF to discuss continuing elements of CARCEP’s work after the conclusion of the project. Following further discussions, EU TAF expressed interest in carrying forward the following programs:

- **Caribbean Smart Grid Working Group (CSGWG):** The EU expressed interest in continuing the CSGWG and have specifically mentioned discussing the matter with CARICOM’s Energy Unit Manager. CARICOM’s Energy Unit manager envisions that the Smart Grid Working Group will be constellated as a technical sub-group in the C-SERMS framework.
- **The PAHO Energy Benchmarking Tool:** The EU already has a contract with PAHO for its Smart Hospitals program and would be able to direct funding to support the PAHO tool through that mechanism. They are interested in continuing the hotel EBT as well, but contracting is unclear. It is likely that further work in that area would

require developing a new program concept, a process which is cumbersome and slow. In their place, DFID has expressed strong interest to move this benchmarking initiative forward, and multiple discussions on maintaining continuity occurred during CARCEP’s final days.

New Joint Initiatives and Linkages – CARCEP also established joint initiatives and linkages with the following entities:

- The International Renewable Energy Agency (IRENA) Sustainable Energy Marketplace Program, which is seeking to create a map of RE projects that are in the advanced stages of development but require additional assistance to initiate project implementation. The program, however, has not yet shown significant results.
- The Atlantic Council Global Energy Center, a DC-based think tank which has expressed a desire to host CARCEP experts for small group or panel discussions focused on clean energy in the Caribbean.
- The Clinton Global Climate Initiative-funded CAREC, which organized webinars showcasing CARCEP’s technical knowledge and regional expertise on IRP and smart grid and energy storage. CAREC established a platform from which additional technical assistance programs with Caribbean countries could be pursued.

Other International Organization – CARCEP also collaborated with several international donor agencies to establish or strengthen ongoing work, including:

- The United Nations Development Programme Global Environmental Facility Small Grants Program and its Deployment of Renewable Energy and Improvement of Energy Efficiency in the Public Sector project to provide assistance to their technical working program and other project components including energy training, legal and regulatory frameworks, and an ESCO model.
- The Latin American Energy Association (OLADE) to build capacity through training energy auditors and certified energy managers.
- PAHO, to develop initiatives in Jamaica and Barbados focused on improving energy efficiency of small hospitals and clinics throughout Jamaica and Barbados.

CARCEP also met with the World Bank, the International Renewable Energy Agency, and the United Arab Emirates (UAE) Clean Energy Investment Fund, as well as representatives from the Atlantic Council and U.S. private sector companies interested in pursuing renewable energy projects in the Caribbean.

Issues and Lessons Learned

Issue	Lessons Learned
CARCEP discovered that many of its activities overlapped with those of the CARICOM-led Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS).	CARCEP worked with CARICOM to develop a defined separate scope that ensured that there was no redundancy of efforts and that goals were met at no additional cost to USG.
Lack of unified web and social media presence between CARCEP and host-country initiatives made knowledge-sharing and coordination challenging.	CARCEP sought to maintain connection through regular participation in regional webinars and the creation of online portals through which partner countries could access presentations and other reports.

Issue	Lessons Learned
Financial institutions looking for assistance in making clean energy investments in the region find it difficult to navigate the many donor agencies active in the Caribbean focused on facilitating increased clean energy projects.	CARCEP developed a one-page memo that provided an overview of each USG donor and entity active in the Caribbean, including its capabilities and criteria for accepting projects. Furthermore, CARCEP's many meetings, conferences, and workshops were helpful to discuss donor activity, and donors found the annual donor roundtables particularly useful because of their size, focus, and seriousness.
Clean energy development activities in the Caribbean by donor organizations and regional organizations often overlapped and lacked coordination.	CARCEP sought to coordinate closely with the World Bank, the U.S. State Department, and regional entities, especially CARICOM, to improve regional collaboration. One success from this approach was on the cutting-edge topic of EV.

Next Steps

- The C-SERMS framework being undertaken by CARICOM is an excellent platform for knowledge sharing and can lead to more pressure for individual countries to uptake best practices, such as competitive procurement, net billing, and EVs.
- Regional stakeholders frequently express appreciation for knowledge sharing initiatives led by international donors on technical and commercially-proven approaches. Cross-island sharing is also critical due to wide regional variation in the development and sophistication of energy initiatives. Therefore, any future program in the region should include a vigorous communications element such as was prescribed in Task 5.

TASK 6: COORDINATION WITH CARICOM

Key Achievements

- Coordinated with CARICOM and GIZ on electric vehicle issues
- Began Implementation on Renewable Energy Atlas, an apprentice program, and continued work on CARCEP tasks in common with CARICOM including energy training and the IUS model
 - Reviewed proposals and conferred with GIZ/CARICOM on the IUS Model
- Significant progress on the National Vocational Qualification (NVQ) Training leading to Caribbean Vocational Qualification (CVQ) PV installation curriculum development with HEART
 - Conducted CVQ training for local community members to work in the solar industry
- Initiated Certified Energy Manager (CEM) training in Jamaica
- Scoped materials for Program for Integrating Variable Renewable Energy, using JPS training on forecasting and grid integration studies

Overview

Task 6 was added to CARCEP's scope by USAID in the third quarter of FY 2017 in order to address certain funding commitments made by US State Department to CARICOM but that were not reflected in CARCEP workplan. Many of CARICOM's objectives relative to the U.S. State Department funding had been already reflected in CARCEP's design but the tasks were not explicit. CARCEP made significant progress on critical technical areas important to CARICOM's programming.

Regional

Integrated Utility Service Model Implementation – An Integrated Utility Services (IUS) model is essential for utilities to expand business, promote energy efficiency, and develop distributed energy systems. CARCEP coordinated with CARICOM to support JPS in implementing IUS pilot activities and to prepare a regional report. CARCEP also provided CARICOM with advice on the legal and regulatory underpinnings of IUS implementation. The report was delivered in June 2018.

Obtaining CARICOM Observer Status – CARCEP worked with CARICOM to obtain observer status in the CARICOM-promoted process of setting standards for building codes in the Caribbean. At the time, CARICOM and development partners including CDB and GIZ were developing Regional Energy Efficiency Building Codes (REEBC) for non-residential buildings, and having observer status was critical for CARCEP to be able to provide technical guidance to draft grid codes. In addition, the technical guidance provided was used to inform the new building codes that were promulgated into law in 2017 in Jamaica.

Integrated Renewable Energy Atlas – At the end of the second quarter of FY 2017, CARCEP developed a conceptual business plan for CARICOM's Integrated Renewable Energy Atlas, which led to CARICOM seeking additional funding resources for the initiative. At the National Energy Transition Strategy (NETS) presentation in September 2017, CARCEP learned that UNDP and GEF had funded a similar exercise for Saint Lucia and coordinated with CARICOM to avoid duplication of work.

CARILEC CEO and Finance Conference – In May 2017, CARCEP attended CARILEC's CEO and Finance Conference in Saint Lucia. At the conference, CARCEP delivered a presentation on the current EV market, potential for wide-scale adoption, and the EV regulatory environment in the Caribbean.

EV Pilot Projects – As described in Task 2, CARCEP worked extensively on an EV Pilot Project proposal for Jamaica with a Working Group led by the Jamaican Ministry of Transport. CARCEP also provided MSET with information on Jamaica’s preparedness for EV deployment that would later be presented at CARICOM’s E-Mobility conference.

Certified Energy Manager training – The lack of Certified Energy Managers (CEMs) was identified as a major impediment to the adoption of EE and RE measures in the region. In discussions with the head of CARICOM’s Energy Unit, CARCEP determined that a parallel track for training be developed that was low-cost and accessible.

As described in Task 3, in March 2018, CARCEP hosted a CEM training in Jamaica for 25 people. The CEM training helped CARICOM work toward its strategic goal of improving energy efficiency in public and commercial buildings and strengthened CARICOM’s relationship with the Association of Energy Engineers. Approximately 20% of the training attendees were female.

Additionally, CARCEP engaged with the Barbados Renewable Energy Association (BREA) about CEM training and obtained approval and funding from CDB to offer a regional CEM training program. This training took place in Barbados in May 2018 with 25 participants.

Caribbean Vocational Qualification for Photovoltaic Installation – CARCEP determined that there was significant market demand for qualified and certified PV installers, but the region lacked national competency standards for this skill. As a result, in the first six months of 2018 CARCEP collaborated with HEART to develop a comprehensive training curriculum required to support the creation of a Caribbean Vocational Qualification (CVQ) course in PV installation, with the aim to eventually include three levels of certification.

CARCEP partnered with local institutions, including Petersfield High School in Westmoreland, the University of Technology in Kingston, Papine High School in Kingston, and the National Tool & Engineering Institute (NTEI) in Kingston, to offer Level 1 of the training programs.

CARCEP also developed the Level 2 curriculum for PV installers, which was presented to HEART during the second quarter of FY 2017. To continue the approval process, HEART will have to observe a sample training and conduct a sample testing.

Program for Integrating Variable Renewable Energy – In July 2017, CARCEP collaborated with CARICOM to offer a training in renewable energy forecasting at the CARILEC Engineering Conference in Jamaica. As a result, JPS requested help in designing their approach to renewable energy forecasting that will directly lower the amount of fossil fuel used for stand-by generation.

Issues and Lessons Learned

Issue	Lessons Learned
Collaboration with CARICOM on setting program goals and priorities is key to ensuring that regional engagement is not duplicative or delayed if there are any conflicts.	Recognizing this dynamic, CARCEP coordinated closely and communicated often with CARICOM to avoid misunderstandings and was flexible on non-critical issues.
CARCEP experienced inconsistent engagement with CARICOM’s Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE) due to staffing shortages and delays in launching.	CARCEP sought frequent communication with CARICOM and expressed constant commitment to the CCREEE vision. While CARICOM, by design, makes decisions more slowly and deliberatively than a bilateral program, the dedication to regional cooperation was useful, especially, for example, to develop building codes.

Next Steps

- The CEM training and NVQ training were highly useful and appreciated. Possible organizations to take over this activity include the CDB, TAPSEC, and for Jamaica, training institutes such as the Vector Technology Institute or the University of Technology. Additionally, CARCEP established a relationship between the Association of Energy Engineers and the Barbados Renewable Energy Association so that the latter could become accredited and able to provide CEM training on a continual basis.
- CARCEP's final report on IUS was delivered in June 2018. The organization best positioned to continue the IUS program currently being undertaken by GIZ under REETA would be TAPSEC. Since Barbados Light and Power (BLP) is implementing its pilot IUS program more quickly than is JPS, it would be beneficial to arrange a meeting of BLP and JPS so that the former can impart knowledge to the latter on their approach to IUS.
- Three final draft primers were provided in the final month of CARCEP to USAID: 1) forecasting, 2) Program for Integration of Variable Renewable Energy (PIVRE), and 3) Smart Grid. Upon USAID approval they should go to beneficiaries including CARICOM as they relate to Task 6, and to CAREC website.

CROSS-CUTTING AREAS

A. Innovation Fund – Grants

In FY 2017, CARCEP began implementing a grants program, The Clean Energy Innovation Fund, with the intention of administering it throughout the four and a half years of the project. With a funding total of USD 1.5 million, the Fund was structured so that individual recipients would be required to acquire and leverage outside funding, thereby unlocking a far larger pool of resources beyond its USD 1.5 million. Grants were to be awarded in fixed amounts ranging from USD 25,000 to USD 150,000, for any duration up to a maximum of two years.

The Fund aimed to encourage local communities, NGOs, and stakeholders to participate in and contribute local solutions toward the goals set by CARCEP. The Fund aimed to use grants and subcontracts to assist interested entities in the Caribbean to overcome barriers to project development, accelerate CE project financing, and bolster EE initiatives.

After receiving significant interest, CARCEP developed three Calls for Concepts and from over thirty applications, selected for evaluation. As part of this process, the Caribshare Company, Ltd. in Jamaica was selected for funding. In April 2017, CARCEP awarded a USD 149,876.75 grant to Caribshare to fund Phase II of the company's Waste to Energy Pilot Program, which was to run from April 2017 to March 2018.

By the end of FY 2017, approximately 27% of total funding to Caribshare had been disbursed. CARCEP closed its grant with Caribshare on February 12, 2018, after delivering a final amount of funding reflecting their work in waste collection. The termination was conducted because of the reduction in CARCEP's period of performance, and did not reflect on Caribshare's progress to achieve key technical achievements.

CARCEP also considered a grant to the Barbadian EV and RE solutions firm Megapower to support their investigation of the repurposing of EV batteries as a strategy to maximize their use and, as a result, the lifecycle cost of acquiring and maintaining EVs. However, due to CARCEP's early closure, a grant for Megapower was not executed.

Due to CARCEP's early closure, the Innovation Fund was unable to accept new grant applications in the second and third quarters of FY 2018.

B. List of Communications, Trainings, and Events

Event No.	Event Name	Venue	Date
01	CWEEL Launch Ceremony	Jamaica Pegasus Hotel, Kingston, Jamaica	March 10, 2016
02	Advance Lending Models Workshop	Alhambra Inn, Kingston Jamaica	March 22, 2016
03	Jamaica Alternative Energy Expo Booth	Jamaica Pegasus Hotel, Kingston Jamaica	April 7 & 8, 2016
04	Tour of JPS Old Harbour Power Station	Old Harbour Bay, St. Catherine Jamaica	April 15, 2016
05	Co-sponsorship of Smart Grid Training	Radisson Hotel, Barbados,	June 6 & 7, 2016
06	Inaugural Smart Grid Workshop	Radisson Hotel, Barbados	June 8, 2016
07	Certified Energy Manager Training and Certification Exam	CARCEP Office, Kingston, Jamaica	June 17 to 22, 2016 and August 5, 2016
08	Preparation and Promulgation of Electricity Sector Codes Workshop – Part I	Jamaica Pegasus Hotel, Kingston, Jamaica	June 20, 2016
09	Solar Photovoltaic (PV)-Basics Workshop	Courtyard Marriot, Kingston Jamaica	June 27, 2016
10	Preparation and Promulgation of Electricity Sector Codes Workshop – Part II	Spanish Court Hotel, Kingston, Jamaica	July 20, 2016
11	Caribbean Clean Energy Donor Roundtable	Jamaica Pegasus Hotel, Kingston, Jamaica	September 9, 2016
12	USG Clean Energy Financing Forum at CARILEC RE Conference	St. Kitts Marriot Resort, St. Kitts	September 12, 2016
13	Caribbean Smart Grid Working Group Meeting at CARILEC RE Conference	St. Kitts Marriot Resort, St. Kitts	September 15, 2016
14	Collaboration Agreement signing and benchmarking tool launch ceremony at CHIEF	Puerto Rico	September 30, 2016
15	Energy Benchmarking Tool Presentation Session at CHIEF	Puerto Rico	September 30, 2016
16	Caribbean Renewable Energy Forum	Intercontinental Miami Hotel, USA	October 17-19, 2016
17	OOCUR Conference – Training Course I	Secrets Hotel, Montego Bay Jamaica	October 26, 2016
18	OOCUR Conference – Training Course II	Secrets Hotel, Montego Bay Jamaica	October 27, 2016
19	OOCUR Conference – Training Course III	Secrets Hotel, Montego Bay Jamaica	October 28, 2016
20	OOCUR Conference – Workshop I	Secrets Hotel, Montego Bay Jamaica	October 26, 2016
21	OOCUR Conference – Workshop II & III	Secrets Hotel, Montego Bay Jamaica	October 28, 2016
22	CHENACT Wrap-up and CARCEP Introduction Meeting	Halfmoon Hotel, Montego Bay Jamaica	December 2, 2016
23	Grenada Grid Codes Workshop	Grenada	December 7-8, 2016
24	EE Training Workshop (Jamaica)	Half Moon Resort, Montego Bay, Jamaica	January 26-27, 2017
25	Dominica PPA Training	Dominica	February 1-2, 2017
26	EE Training Workshop (Saint Lucia)	CoCo Palm Resort, Rodney Bay, St. Lucia	March 16-17, 2017

Event No.	Event Name	Venue	Date
27	The Grenada Grid Code Public Workshop	Public Workers Union Building in St. George's, Grenada	May 17, 2017
28	Energy Efficiency Training Workshop (Antigua)	Halcyon Cove Hotel, Jamaica	May 25-26, 2017
29	Webinar: Planning for Energy Transitions in Electric Utilities on Islands	CAREC Online Platform	May 30, 2017
30	Barbados Fair Trading Commission (FTC) Training Workshop	Fair Trading Commission's Office, St. Michael, Barbados	June 26-28, 2017
31	Webinar on CARILEC's CAREC – Smart Grid	Online	July 6, 2017
32	Hotel EE Training	Grenadian by Rex Resorts, Grenada	July 5 and 6, 2017
33	Caribbean Smart Grid Working Group Meeting at the CARILEC Engineering Conference	Montego Bay Conference Centre, Jamaica	July 28, 2017
34	Engineering Workshop at the CARILEC Engineering Conference	Montego Bay Conference Centre, Jamaica	July 28, 2017
35	Barbados Fair Trading Commission (FTC) Training Workshop	Fair Trading Commission's Office, St. Michael, Barbados	July 24-26, 2017
36	Hotel EE Training	St. Vincent	August 9-10, 2017
37	Household Energy Conservation & Efficiency Workshop I	Greater Brown's Town, Kingston Jamaica	August 22, 2017
38	Household Energy Conservation & Efficiency Workshop II	Waterhouse, Kingston Jamaica	August 24, 2017
39	Certified Energy Manager (CEM) Training	Jamaica	6 Fridays: September 8 - October 13, 2017
40	Training: ESCO Financial Modelling for RE Project	Spanish Court Hotel, Jamaica	September 11, 2017
41	Rate and Planning Workshop	Courtyard Marriot, Jamaica	September 12 & 13, 2017
42	Energy Efficiency Workshop at CARILEC RE Conference	Royal Torarica Hotel, Suriname	September 17-21, 2017
43	Engineering Workshop at CARILEC RE Conference	Royal Torarica Hotel, Suriname	September 17-21, 2017
44	Presentation at Jamaica Institution of Engineers (JIE) Engineering Week Conference and Exhibit	Knutsford Court Hotel, Jamaica	September 18-20, 2017
45	Presentation at CARICOM, GIZ REETA and UNDP Workshop:	St. Vincent	September 20-22, 2017
46	Let's Talk Electric Vehicle Workshop	Jamaica	September 27, 2017
47	WEEC 2017 (World Energy Engineering Congress) Expo	Atlanta	September 27-29, 2017
48	St. Lucia & St. Vincent and the Grenadines National Energy Transition Strategies	Barbados	September 28, 2017
49	Donor and Stakeholder Roundtable	Miami	October 17, 2017
50	Caribbean Renewable Energy Forum 2017	Miami	October 18-20, 2017
51	Go Green Expo (Jamaica Youth Climate Change Council)	Kingston, Jamaica	October 21, 2017

Event No.	Event Name	Venue	Date
52	USAID/CARILEC Smart Grid Symposium (Trinidad)	Trinidad	October 23-26, 2017
53	Jamaica Manufacturer's Association (JMA) EE and RE Training	Kingston, Jamaica	October 26-27, 2017
54	OOCUR Conference	Tobago	November 8-10, 2017
55	Workplace Safety Training	Westmoreland, Jamaica	November 29-30, 2017
56	PCJ Energy Management Training	Kingston, Jamaica	December 4, 2017
57	Saint Vincent & the Grenadines (SVG) Electric Vehicle Seminar	Saint Vincent	December 6, 2017
58	Renewable Energy Financial Modelling Workshop with First Global Bank	Kingston, Jamaica	January 24, 2018
59	Energy Conservation and Efficiency Training Workshop (St. Ann)	St. Ann, Jamaica	January 30, 2018
60	'Emerging Issues in Regulations' Workshop	Kingston, Jamaica	February 6-7, 2018
61	Occupational Safety Training (8 Rivers)	Westmoreland, Jamaica	March 5-7, 2018
62	Scholarships and Certified Energy Managers Training	Kingston, Jamaica	March 6, 2018
63	Energy Management Training – JPS	Kingston, Jamaica	March 22-23, 2018
64	Energy Efficiency & Conservation Workshop – Mona Commons	Kingston, Jamaica	March 28, 2018
65	Energy Conservation and Efficiency Training Workshops	Nannyville, Heywood Hall, Santa Cruz, and Barret Town, Jamaica	April 18, April 24, May 9, May 17, 2018
66	PV Installer Training I & II	Westmoreland, Jamaica	April 9-14, May 29-June 1, 2018
67	USAID/CDB/BREA Scholarships and Regional Certified Energy Managers Training	Bridgetown, Barbados	May 7-14, 2018
68	Petersfield High School – Handover Training	Petersfield, Jamaica	May 28, 2018
69	Certified Energy Managers (CEM) Award Ceremony	Kingston, Jamaica	June 14, 2018

C. Performance Monitoring and Evaluation

1) EG 12- 6 Greenhouse gas (GHG) emissions, estimated in metric tons of CO ₂ e, reduced, sequestered, and/or avoided as a result of USG assistance																																																					
Program Target (3 years)	387 Metric tons CO ₂ e																																																				
Actual Achieved	425 Metric tons CO ₂ e																																																				
Comments	<p>The actual achieved of projected greenhouse gas emissions reduced or avoided through 2030 of 425 tons CO₂e, is based on the total projected GHG emissions reduced or avoided by several hotels implementing energy efficiency measures and JPS retrofitting 36,400 LED streetlights.</p> <p>The approximate amount of electricity consumed by each action was estimated and this value was entered into the CLEER Tool. The greenhouse emissions reduced or avoided was calculated and projected through 2030.</p> <p><i>GHG emission reduced from hotels in FY17 and FY18.</i></p> <table border="1"> <thead> <tr> <th>Projected Gas Emission</th> <th>Project</th> <th>Date</th> <th>Supporting Document</th> </tr> </thead> <tbody> <tr> <td>7.4 tCO₂e</td> <td>Rex Halcyon, Antigua</td> <td>November 15, 2017</td> <td>Financing Close Sheet</td> </tr> <tr> <td>28.80 tCO₂e</td> <td>St. James Morgan Bay Beach Resort</td> <td>December 15, 2017</td> <td>Financing Close Sheet</td> </tr> <tr> <td>19.28 tCO₂e</td> <td>Rondel Village, Jamaica</td> <td>December 2017</td> <td>Financing Close Sheet</td> </tr> <tr> <td>0.075 tCO₂e</td> <td>Coco Palm Resort, St. Lucia</td> <td>January 2018</td> <td>Financing Close Sheet</td> </tr> <tr> <td>8.32 tCO₂e</td> <td>Windjammer Landing, St. Lucia</td> <td>February 14, 2018</td> <td>Financing Close Sheet</td> </tr> <tr> <td>1.03 tCO₂e</td> <td>Jolly Beach Resort and Spa</td> <td>February 15, 2018</td> <td>Financing Close Sheet</td> </tr> <tr> <td>352.4 tCO₂e</td> <td>Jamaica Public Service Company Limited</td> <td>March 25, 2018</td> <td>Financing Mobilization Memo</td> </tr> <tr> <td>0.86 tCO₂e</td> <td>Hillside Apartments, St. Vincent</td> <td>October, 2017</td> <td>Financial Close Sheet</td> </tr> <tr> <td>1.38 tCO₂e</td> <td>Sugar Beach, St. Lucia</td> <td>March 2018</td> <td>Financial Close Sheet</td> </tr> <tr> <td>2.35 tCO₂e</td> <td>Round Hill, Jamaica</td> <td>January 2018</td> <td>Financial Close Sheet</td> </tr> <tr> <td>2.68 tCO₂e</td> <td>Hotel Blue Jou, St. Lucia</td> <td>February 2018</td> <td>Financial Close Sheet</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Projected Gas Emission	Project	Date	Supporting Document	7.4 tCO ₂ e	Rex Halcyon, Antigua	November 15, 2017	Financing Close Sheet	28.80 tCO ₂ e	St. James Morgan Bay Beach Resort	December 15, 2017	Financing Close Sheet	19.28 tCO ₂ e	Rondel Village, Jamaica	December 2017	Financing Close Sheet	0.075 tCO ₂ e	Coco Palm Resort, St. Lucia	January 2018	Financing Close Sheet	8.32 tCO ₂ e	Windjammer Landing, St. Lucia	February 14, 2018	Financing Close Sheet	1.03 tCO ₂ e	Jolly Beach Resort and Spa	February 15, 2018	Financing Close Sheet	352.4 tCO ₂ e	Jamaica Public Service Company Limited	March 25, 2018	Financing Mobilization Memo	0.86 tCO ₂ e	Hillside Apartments, St. Vincent	October, 2017	Financial Close Sheet	1.38 tCO ₂ e	Sugar Beach, St. Lucia	March 2018	Financial Close Sheet	2.35 tCO ₂ e	Round Hill, Jamaica	January 2018	Financial Close Sheet	2.68 tCO ₂ e	Hotel Blue Jou, St. Lucia	February 2018	Financial Close Sheet				
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2) EG 12-7 Projected greenhouse gas emissions reduced or avoided through 2030 from adopted laws, policies, regulations, or technologies related to clean energy as supported by USG assistance

Program Target (3 years) 62,046 Metric tons CO₂e

Actual Achieved 780,103 Metric tons CO₂e

Comments

The Actual Achieved of projected greenhouse gas emissions reduced or avoided through 2030 of 780,103 metric tons CO₂e, is based on the total projected GHG emissions reduced or avoided by three projects: The CaribShare Biogas Project (7,320 tons CO₂e), The National Education Trust School Solar and Energy Efficiency Project (10,646 tons CO₂e) and Eight Rivers Project (762,137 tons CO₂e).

The CARCEP used the Clean Energy Emission Reduction (CLEER) Tool (<https://www.cleertool.org/>) to quantify the projected GHG emissions reduced or avoided through 2030. The team made some assumptions and calculated the estimated amount of electricity each project will produce on a yearly basis. This estimated value was entered into the CLEER Tool and the greenhouse emissions reduced or avoided was projected through 2030.

The CLEER Tool reported 7,320 tons CO₂e for the CaribShare Biogas Project, stemming from an expected production of 600,000 kWh of electricity each year. The 600,000 kWh is based on CaribShare's estimations of 100kW of electricity for 20 hours a day for approximately 300 days in a year which results to 600,000 kWh a year.
The following equation was used to estimate the electricity produced per year for The CaribShare Biogas Project:

$$\text{Electricity Saving (kW)} = \text{Electricity Produce (kW)} \times \text{Hours of Operation (h)} \times \text{Days of Operation}$$

The CLEER Tool reported 10,646 tons CO₂e for The National Education Trust School Solar and Energy Efficiency Project, stemming from the production of 900,000kWh electricity each year. The 900,000 kWh is based on School Solar and Energy Efficiency Project's estimations of 30kW of electricity for 5 hours a day for approximately 200 days in a year for each school, which results to 900,000 kWh a year, when the 30 schools are taken into consideration.
The following equation was used to estimate the electricity produce per year for The National Education Trust School Solar and Energy Efficiency Project:

$$\text{Electricity Saving (kW)} = \text{Electricity Produce (kW)} \times \text{Hours of Operation (h)} \times \text{Days of Operation} \times 30 \text{ schools}$$

30 schools will be part of the National Education Trust School Solar and Energy Efficiency Project.

The CLEER Tool reported 762,137 tons CO₂e for the Eight Rivers Project (a grid-tied solar project) stemming from an expected production of 37 MW of energy.

Projected GHG emission reduced from projects in FY17 and FY18.

Projected Gas Emission	Project	Date	Supporting Document
7,320 tons CO ₂ e	The CaribShare Biogas Project (Jamaica)	12/22/2016	Financial Mobilization Memo CLEER Output

	10,646 tons CO ₂ e	The National Education Trust School Solar and Energy Efficiency Project – Renewable Energy Component (Jamaica)	1/12/2017	Financial Mobilization Memo CLEER Output
	762,137 tons CO ₂ e	Eight Rivers Project (Jamaica)	December 2017	Financial Mobilization Memo CLEER Output

3) CUSTOM 1 Expected lifetime energy savings from energy efficiency or energy conservation, as a result of USG assistance

Program Target (3 years)	1,404 GJ
Actual Achieved	13,712 GJ
Comments	<p>CARCEP performed several energy audits and reports within the hospitality sector. Based on the energy audits conducted, several Energy Management Opportunities (EMOs) were recommended to save energy and reduce the cost of electricity at the resorts. The hotels that plan to implement EMOs are reflected for this indicator.</p> <p>The hotels are:</p> <ul style="list-style-type: none"> • St. James Club, Antigua • Antigua Yacht Club Marina and Spa • Jolly Beach Resort and Spa • Portsmouth Beach Hotel • Garraway Hotel • Sugar Beach Hotel • Hotel the Champs

4) EG 12-4 Amount of investment mobilized (in USD) for clean energy as supported by USG assistance

Program Target (3 years)	\$XXX USD														
Actual Achieved	\$XXX USD														
Comments	<p>With CARCEP technical assistance:</p> <ul style="list-style-type: none"> • CaribShare Biogas Project received a private sector loan of \$XXX USD from First Global Bank to conduct Phase I of its waste to energy project. This project consists of a biogas plant that takes organic waste from hotels in Montego Bay and combines it with waste from pig farmers in Trelawny to produce biogas that has high methane content. The biogas is then used as a fuel in a special generator to produce electricity for a waste treatment plant. CARCEP provided technical support related to the loan application. • Development Bank of Jamaica (DBJ) decided to invest \$XX million USD in the joint project between the Ministry of Education and the National Education Trust to install photovoltaic (solar) panels in 30 secondary schools across thirteen parishes in Jamaica. The objectives of this project include reducing electricity costs for the schools and encouraging a culture of energy conservation and energy efficiency. CARCEP provided technical support to conduct the structural analysis needed to safely hold solar panels on school roofs and advised on the financial proposal structure. • PetroCaribe Development Fund decided to invest \$XXX USD (\$X million JMD) in the Glenmuir High School Energy (Pilot) Project to enhance the schools energy management policy and build awareness on energy efficiency. • Eight Rivers Project received a private equity and debt investment, and grant of approximately \$XXX USD from CEFF-CCA to implement 37MW grid-tied solar energy project. CARCEP provided background technical support as Eight Rivers undertook closing on PPA and interconnection with Jamaica Public Service Company Limited, as well as, workforce training. • Several hotels invested approximately \$XXX USD in energy conservation and energy efficiency equipment and appliances. • JPS invested \$XX million USD for storage and \$XXX USD in a LED street lighting project to reduce the electricity cost for municipal customers. CARCEP provided background technical assistance to JPS and other stakeholders in writing a new grid code, training in regards to Grid Integration Studies, and frontline staff energy training and CEM training. <p><i>Investment mobilized on various energy projects in FY17 and FY18</i></p> <table border="1"> <thead> <tr> <th>Investment Mobilized</th> <th>Project</th> <th>Date</th> <th>Supporting Document</th> </tr> </thead> <tbody> <tr> <td>\$XXX USD</td> <td>The CaribShare Biogas Project</td> <td>January 10, 2017</td> <td>Financial Mobilization Memo</td> </tr> <tr> <td>\$XXX USD</td> <td>The National Education Trust School Solar and Energy Efficiency</td> <td>January 12, 2017</td> <td>Financial Mobilization Memo</td> </tr> </tbody> </table>			Investment Mobilized	Project	Date	Supporting Document	\$XXX USD	The CaribShare Biogas Project	January 10, 2017	Financial Mobilization Memo	\$XXX USD	The National Education Trust School Solar and Energy Efficiency	January 12, 2017	Financial Mobilization Memo
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		Project		
	\$XXX USD	Petro Caribe PV Project – Glenmuir High School	1/17/2017	Commenda tion Letter presented
	\$XXX USD	Eight Rivers Project	December 2017	Financial Mobilization Memo
	\$ XXX USD	Rex Halcyon Resort	November 2017	Financial Close Sheet
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	\$XXX USD	Sugar Beach, St. Lucia	March 2018	Financing Close Sheet
	\$XXX USD	Round Hill, Jamaica	January 2018	Financing Close Sheet
	\$XXX USD	Hotel Blue Jou	February 2018	Financing Close Sheet

5) EG 12-2 Number of institutions with improved capacity to address clean energy as a result of USG assistance

Program Target (3 years)	27
Actual Achieved	50
Comments	<p>(This indicator does not include hotels and financial institutions, which are accounted for in Indicator 8.)</p> <p>In FY 16, 24 institutions with improved capacity to address clean energy were reported. These institutions included public sector: MSET and OUR, private sectors including JPS, banks, equipment vendors, and service providers as well as six institutions that received training in AEE Certified Energy Manager (CEM) program thereby improving their capacity to implement RE and EE projects.</p> <p>In FY 17 – FY18, 26 institutions with improved capacity were reported.</p> <p>Below is a list of the 26 institutions with improved capacity in FY17-FY18:</p> <ul style="list-style-type: none"> • YMCA: Working closely with the YMCA staff, the CARCEP prepared an Energy Audit Report (“Audit Report”) to support the Kingston YMCA, Jamaica, in implementing energy efficiency measures to lower electricity costs for the facility. This Energy Audit report recommended a series of measures which, if implemented, will lower electricity costs in the near-term for the Kingston YMCA, and generate additional funds in the long-term after paying off the initial financing for the project. • Caribshare: Working closely with the CaribShare Biogas Project, the CARCEP provided technical support on the biogas plant operation. • NETS: Working with The National Education Trust School Solar and Energy Efficiency Project, the CARCEP provided technical support related to solar panel installation and energy conservation techniques specific to the project. • Government of Dominica: Working with Dominica Independent Regulatory Commission (IRC), Dominica Electricity Services, Ministry of Energy (Dominica) and Ministry of Kalinago Affairs (Dominica) staffs, the CARCEP provided technical assistance and regulatory review of Power Purchase Agreement (PPA). • FTC, NURC: Working with Fair Trading Commission (FTC) and National Utilities Regulatory Commission (NURC) staff, the CARCEP provided technical assistance to FTC and NURC in developing the pertinent skill sets for the approval and setting of renewable energy tariffs. • OUR, GPE, CACU, MSET and JPS: Working with the staff of Office of Utilities Regulation (OUR), Jamaica Public Service (JPS), Generation Procurement Entity (GPE), Jamaica Ministry of Science, Energy and Technology (MSET) and Consumer Advisory Committee on Utilities (CACU), the CARCEP supported and provided technical assistance in Rate and Planning. • GRENLEC, Grenada Division of Energy: Working with the staff of Grenada Electricity Services Ltd (GRENLEC) and the Ministry of Energy in Grenada, the CARCEP provided technical assistance in regards to the development Grid Code. • Petroleum Corporation of Jamaica (PCJ): Working closely with the PCJ staff, the CARCEP provided technical assistance to PCJ in

developing the pertinent skill sets for implementing IDB funded project.

- **Jamaica Manufacturer's Association (JMA):** Working closely with JMA, the CARCEP prepared an energy audit report to support JMA in implementing energy efficiency measures to lower electricity costs for the facility. This energy audit report recommended a series of measures which, if implemented, will lower electricity costs in the near-term for JMA, and generate additional funds in the long-term after paying off the initial financing for the project.
- **First Global Bank (FGB)**

CARCEP provided renewable energy financial trainings for the staff of First Global Bank to equip the staff with the necessary financial, technical and other risk assessment tools to rank and assess projects seeking finance for clean energy projects.

- **Office of Utilities Regulation (OUR) II**

Working closely with the OUR staff, the CARCEP provided technical assistance to OUR in developing the pertinent skill sets for Emerging Regulatory Issues.

- **Jamaica Public Service Company Limited (JPS) II**

Working closely with the JPS staff, the CARCEP provided technical assistance to write the new grid code, Grid Integration Studies, frontline staff energy training, CEM training, and scoping and implementing a forecasting system to better integrate variable renewable energy

- **Eight Rivers Project**

CARCEP, provided background technical discussions to Eight Rivers as they undertook closing on PPA and interconnection with JPS. CARCEP provided workforce training for Eight Rivers and local community in Workplace Safety, in collaboration with Clinton Climate Initiative.

- **Chas E Ramson Limited**

The CARCEP prepared an Energy Audit Report to support the Chas E Ramson Limited, Jamaica in implementing energy efficiency measures to lower electricity costs for the facility. This Energy Audit report recommends a series of measures which, if implemented, will lower electricity costs in the near-term for the Chas E Ramson Limited and generate funds in the long-term.

- **Ag Chem Limited**

The CARCEP prepared an Energy Audit Report to support the Ag Chem Limited, Jamaica in implementing energy efficiency measures to lower electricity costs for the facility. This Energy Audit report recommends a series of energy management opportunity measures which, if implemented, will lower electricity costs in the near-term for the Ag Chem Limited and generate funds in the long-term.

- **Mona Common Basic School**

- CARCEP provided energy conservation and energy efficiency training to members of the Mona Common Basic School and the Community so as to improve their electricity usage. CARCEP also provided technical assistance in installing LED tubes at the Mona Common Basic School.

- **Government of St. Lucia**

- The CARCEP reviewed review of the draft Saint Lucia

	<p>electricity laws and regulations document and made several recommendations to the document in the form of a written submission.</p> <p>Institutions such as OUR, JPS and MSET were recounted as these institutions received training in different capacity.</p>

6) GNDR 2 Proportion of female participants in USG-assisted programs designed to increase access to productive economic resources (assets, credit, income or employment)

Program Target (3 Years)	40%																																																								
Actual Achieved	41%																																																								
Comments	<p>The 41% Actual Achieved for gender participation reflects four types of activities offered by the CARCEP: technical assistance trainings, mentoring, public workshops, and working groups throughout the operation of the program.</p> <p>In FY16, FY17 and FY18, 32%, 38% and 53% female participated in USG-assisted programs respectively</p> <p><i>Percentage of female participants in energy programs in FY17 and FY18</i></p> <table border="1"> <thead> <tr> <th>Percentage</th> <th>Activity</th> <th>Date</th> <th>Supporting Document</th> </tr> </thead> <tbody> <tr> <td>38% (F-85, M-136)</td> <td>OOCUR Conference – Training and Workshops</td> <td>October 26, 2016</td> <td>Registration Sheet</td> </tr> <tr> <td>0% (F-0, M-10)</td> <td>Grenada Grid Code Workshop</td> <td>December 7-8, 2016</td> <td>Registration Sheet</td> </tr> <tr> <td>22% (F-10, M-36)</td> <td>Energy Efficiency Training workshop (Jamaica)</td> <td>January 26 - 27, 2017</td> <td>Registration Sheet</td> </tr> <tr> <td>57% (F-08, M-6)</td> <td>Dominica IRC regulatory review of power purchase agreement</td> <td>February 1 – 2, 2017</td> <td>Registration Sheet</td> </tr> <tr> <td>20% (F-05, M-20)</td> <td>Energy Efficiency Training Workshop (St. Lucia)</td> <td>March 16-17, 2017</td> <td>Registration Sheet</td> </tr> <tr> <td>1– Carol Lue (Female)</td> <td>Grant Awarded and Carol Lue signed agreement for Biogas Project</td> <td>April 26, 2017</td> <td>Grant contract signed</td> </tr> <tr> <td>16% (F-03, M-16)</td> <td>Grenada Grid Code Workshop</td> <td>May 17, 2017</td> <td>Registration Sheet</td> </tr> <tr> <td>21% (F-03, M-11)</td> <td>Antigua Energy Efficiency Training</td> <td>May 24-25, 2017</td> <td>Registration Sheet</td> </tr> <tr> <td>45% (F-05, M-06)</td> <td>Fair Trading Commission Training (Barbados)</td> <td>June 26-28, 2017</td> <td>Registration Sheet</td> </tr> <tr> <td>69% (F-09, M-04)</td> <td>Grenada Energy Efficiency Training for Hotel & Tourism Sector</td> <td>July 5-6, 2017</td> <td>Registration sheet and Feedback Sheet</td> </tr> <tr> <td>50% (F-06, M-06)</td> <td>Fair Trading Commission Training Session II (Barbados)</td> <td>July 24-26, 2017</td> <td>Registration sheet and Feedback Sheet</td> </tr> <tr> <td>24% (F-08, M-26)</td> <td>Engineering Workshop</td> <td>July 28, 2017</td> <td>Registration sheet and Feedback Sheet</td> </tr> <tr> <td>27% (F-04, M-11)</td> <td>Caribbean Smart Grid Working Group Meeting</td> <td>July 28, 2017</td> <td>Registration Sheet and Feedback Sheet</td> </tr> </tbody> </table>	Percentage	Activity	Date	Supporting Document	38% (F-85, M-136)	OOCUR Conference – Training and Workshops	October 26, 2016	Registration Sheet	0% (F-0, M-10)	Grenada Grid Code Workshop	December 7-8, 2016	Registration Sheet	22% (F-10, M-36)	Energy Efficiency Training workshop (Jamaica)	January 26 - 27, 2017	Registration Sheet	57% (F-08, M-6)	Dominica IRC regulatory review of power purchase agreement	February 1 – 2, 2017	Registration Sheet	20% (F-05, M-20)	Energy Efficiency Training Workshop (St. Lucia)	March 16-17, 2017	Registration Sheet	1– Carol Lue (Female)	Grant Awarded and Carol Lue signed agreement for Biogas Project	April 26, 2017	Grant contract signed	16% (F-03, M-16)	Grenada Grid Code Workshop	May 17, 2017	Registration Sheet	21% (F-03, M-11)	Antigua Energy Efficiency Training	May 24-25, 2017	Registration Sheet	45% (F-05, M-06)	Fair Trading Commission Training (Barbados)	June 26-28, 2017	Registration Sheet	69% (F-09, M-04)	Grenada Energy Efficiency Training for Hotel & Tourism Sector	July 5-6, 2017	Registration sheet and Feedback Sheet	50% (F-06, M-06)	Fair Trading Commission Training Session II (Barbados)	July 24-26, 2017	Registration sheet and Feedback Sheet	24% (F-08, M-26)	Engineering Workshop	July 28, 2017	Registration sheet and Feedback Sheet	27% (F-04, M-11)	Caribbean Smart Grid Working Group Meeting	July 28, 2017	Registration Sheet and Feedback Sheet
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	32% (F-07, M-15)	St. Vincent Energy Efficiency Training Workshop	August 9-10, 2017	Registration sheet and Feedback Sheet
	100% (F-27, M-0)	Community Workshop for women: Energy conservation in the household (Greater Brown's Town)	August 22, 2017	Registration sheet and feedback sheet
	96% (F-22, M-1)	Community Workshop for women: Energy conservation in the household (Waterhouse)	August 24, 2017	Registration sheet and feedback sheet
	38% (F-11, M-18)	ESCO Financial Modelling Workshop	September 11, 2017	Registration Sheet
	17% (F-7, M-34)	CARILEC RE Conference – EE Workshop (Suriname)	September 21, 2017	Registration sheet and feedback sheet
	31% (F-16, M-36)	Let's Talk EV Seminar	September 27, 2017	Registration Sheet
	50% (F-5, M-5)	St. Kitts and Nevis Energy Efficiency Training	October 31 – November 1, 2017	Registration Sheet and Feedback Sheet
	0% (F-0, M-6)	Jamaica Manufacturer's Association Energy Efficiency Training	November 8-9, 2017	Registration sheet and Feedback Sheet
	56% (F-35, M-28)	Energy Conservation Training (Jamaica)	November 21, 2017	Registration Sheet
	51% (F-27, M-26)	Workplace Safety Training (Jamaica)	November 29 & 30, 2017	Registration Sheet
	40% (F-10, M-15)	Petroleum Cooperation of Jamaica Energy Management Training	December 4, 2017	Registration Sheet and Feedback Sheet
	82% (F- 14, M-3)	First Global Bank RE Financial Modelling Workshop	January 24, 2018	Registration Sheet and Feedback Sheet
	65% (F-17, M-9)	Energy Conservation Training (Steer Town)	January 30, 2018	Registration Sheet and Feedback Sheet
	43% (F-12, M-16)	OUR Productivity Study Workshop	February 6-7, 2018	List of attendees and feedback sheet
	0% (F-0, M-4)	Grid Integration Training	February 28, 2018	Registration and Feedback

				Sheets
39%	HEART/Eight Rivers Workplace Safety Training	March 5-6, 2018	(F-7, M- 11)	Registration Sheet
20%	JSEE CEM Training	March 6 – April 10, 2018	(F-5, M-20)	Registration and Feedback Sheets
11%	Energy Management Training – JPS	March 22 -23, 2018	(F-5, M-40)	Registration and Feedback Sheets
100%	Mona Common Energy Efficiency and Energy Conservation Training	March 28, 2018	(F-35, M-0)	Registration and Feedback Sheets
13%	Photovoltaic Installation Training, (Petersfield High School)	April 10-13, 2018	(F- 4, M-26)	Registration and Feedback Sheet
75%	Energy Conservation Training (Nanny Ville)	April 18, 2018	(F-83, M-27)	Registration Sheet
74%	Energy Conservation Training (Heywood Hall)	April 24, 2018	(F- 26,M-9)	Registration and Feedback Sheet
20%	Barbados CEM Training	May 7-9, 2018	(F- 5, M-20)	Registration Sheet
53%	Energy Conservation Training (Santa Cruz)	May 9, 2018	(F- 17, M-15)	Registration and Feedback Sheet
93%	Energy Conservation Training (Brandon Hill, St. James)	May 17, 2018	(F- 41, M-3)	Registration and Feedback Sheet
16%	PV installation Training	May 29 – June 1, 2018	(F-12, M-61)	Registration and Feedback Sheet
20%	GIS Training	May 28-30, 2018	(F-2, M- 8)	Registration Sheet
50%	OOCUR Training Workshop	May 28 – 31, 2018	(F-12,M-12)	Registration Sheet
87%	PAHO EE Training	June 21-22, 2018	(F-13,M-2)	Registration Sheet
72%	Energy Conservation Training (Falmonth,	July 13, 2018		Registration Sheet

	(F-26, M-10)	Trelawny)		
	75% (F-21, M-7)	Energy Conservation Training (Standpipe, Kingston)	July 18, 2018	Registration and Feedback Sheet
	54% (F-15, M-13)	CARCEP/PAHO Benchmark Tool Training Workshop	July 18-19, 2018	Registration Sheet and Feedback sheet

7) EG 12-3 Number of laws, policies, strategies, plans or regulations addressing clean energy mitigation officially proposed, adopted, or implemented as a result of USG assistance

Program Target (3 years)	4
Actual Achieved	7
Comments	<p>CARCEP assisted:</p> <ul style="list-style-type: none"> • MSET in preparing Drafting Instructions for a draft rule on Net Billing, Power Wheeling, and Auxiliary Interconnections in FY16. • OUR in establishing the Electricity Grid Code. The code was created to govern the guiding principles, operational standards and established procedures for managing the generation, transmission, distribution, supply and dispatch of electricity across the nation in FY17. • Grenada in establishing the Electricity Grid Code. The code was created to govern the guiding principles, operational standards and established procedures for managing the generation and dispatch, transmission and distribution, and supply of electricity throughout Grenada in FY18. • Development of the Barbados National Energy Policy. The policy aims to significantly transform to Barbados’ production, distribution, and consumption of energy in FY18. • SVG Energy Unit in preparing Cabinet Proposal for EV Pilot Project and related financial analysis. The Pilot Program includes private sector purchase of 250 passenger EVs with reporting of mileage and charging information to assess transport electrification impacts in SVG, financed by the private sector and a government waiver of import taxes to make the EV price competitive to traditional gasoline-fueled vehicles (Energy Unit scheduled to submit to Cabinet in August 2018). • Jamaica Ministry of Transport & Mining-led inter-Ministerial EV Working Group in preparing a Cabinet Proposal for EV Pilot Project and related financial analysis. The Pilot Program includes private sector purchase, drafted by CARCEP, proposing a 500-vehicle EV Pilot Program to assess transport electrification impacts in JM, financed primarily by import duty and SCT waiver by GoJ and private sector vehicle and charging station purchases to make EVs cost competitive (MoT&M anticipated submitting to Cabinet in Q4FY2018). • Saint Lucia Ministry of Infrastructure, Ports, Energy, and Labour, Energy Unit proposal of fifteen energy laws and regulations. The package of laws and regulations needed updates and harmonization and CARCEP offered detailed guidance and time schedule for work and submittal to Cabinet/Parliament in FY 2018.

8) CUSTOM 2 Number of financial or hospitality sector institutions participating in green financing, capacity-building and/or publicity campaigns

Program Target (3 years) 100

Actual Achieved 98

Comments

The CARCEP Energy Benchmarking Tool is being well received by the hospitality sector.

In FY 16, 15 institutions from both the financial and hospitality sectors were engaged in green financing, capacity-building and/or publicity campaigns. These included;

- 9 Hospitality sector institutions. This figure was based on CARCEP’s engagement at CHIEF.
- 6 Financial sector institutions. These included; BOJ, PCJ, JNSBL FGB, DBJ and Sagicor.

In FY17-FY18, 83 financial and hospitality sectors participated in green financing, capacity-building and/or publicity campaigns (FGB and DBJ were not recounted in the actual achieved).

Following is a list of hospitality sector is using the Energy Benchmarking Tool and financial institutions that participated in the Energy Efficiency and Energy Conservation trainings for FY17 and FY18 of the program.

Activity	Institutions
ESCO Modelling Training	1. First Global Bank
	2. DBJ
	3. Marathon Insurance Brokers
St. Kitts and Nevis EE Training	4. Four Seasons Nevis
	5. St. Kitts and Nevis Ministry of Tourism
	6. Hotel and Tourism Association
	7. St. Kitts Tourism Authority
OUR Productivity Study Workshop	8. Caribbean Development Bank
	9. Hyatt Zilara Rose Hall, Hyatt Ziva , Rose Hall
Jamaica	10. Rondel Village
	11. Tryall Club
	12. Traveller’s Beach Resort
	13. Traveller’s Beach Resort
	14. Couples Sans Souci,
	15. Half Moon , Jamaica
	16. Jewel Dunn’s River Beach Resort and Spa
	17. Rockhouse Hotel
	18. The Boardwalk Village Negril Resort
	19. The Courtleigh Hotel and Suites
	20. Knutsford Court Hotel
	21. Round Hill Hotel & Villas
	22. Couples Negril

		23. Spanish Court Kingston
		24. Hedonism II
		25. Sand sand cove
		26. Sandals Montego Bay
		27. Sandals Royal Caribbean
		28. Palm View Guest House Ltd
		29. Couples Negril
	St. Lucia	30. Jade Mountain Resort
		31. Breezey Eco-lodge
		32. Sandals Regency La Toc Golf Resort and Spa
		33. StoneField Resort
		34. Coconut Bay Resort And Spa
		35. Sandals Grande St. Lucian Spa and Beach Resort
		36. Bay Gardens Beach Resort
		37. Bay Gardens Inn
		38. Bay Gardens Hotel
		39. St. James Club Morgan Bay,
		40. Habitat Terrace Hotel
		41. Rendezvous Bay
		42. Windjammer Landing
		43. Capella Marigot Bay Resort & Marina,
		44. Coyaba Beach Resort
		45. Sandals Halcyon Beach Resort
		46. Coco Palm Rodney Bay Village
		47. Arya Resorts
		48. Sugar Beach Resort
	49. Coconut Bay Beach Resort & Spa	
	Grenada	50. Kalinago Beach Resort
		51. Blue Horizons Garden Resort
		52. Spice Island Beach Resort
		53. Tropical Paradise View
	Antigua	54. Iberostar, St Lucia
		55. Blue Waters Resort & Spa
		56. Jolly Beach Resort & Spa
		57. Antigua Yacht Club Marina & Resort
		58. Galley Bay Resort and Spa
		59. St James Club
	St Vincent	60. Hillside apartments
		61. Haddon Hotel
		62. New Montrose Hotel

		63. Young Island Resort
		64. Grenadine House
		65. Beachcombers Hotel
		66. Fairview Guest House
		67. Clifton beach hotel
		68. Paradise Beach Hotel
	St Kitts	69. Four Seasons
		70. Ocean Terrace Inn
	Dominica	71. Amra hotel,
		72. Hotel The Champs
		73. Papillote Wilderness Retreat
		74. Anchorage Hotel Whale Watch & Dive Centre
		75. Portsmouth Beach Hotel
		76. Secret Bay
	Anguilla	77. Garraway Hotel
78. Highway Garden		
Let's Talk EV	79. Holiday Inn	
Others	80. CIBC First Caribbean International Bank	
	81. IADB	
	82. Grenada Development Bank	
	83. St. Vincent and Grenadines Chamber of Commerce & Industry	

9) CUSTOM 3 Number of studies, reports, tools, working groups, campaigns or events for advancement of clean energy or energy efficiency (“Activities”)

Program Target (3 years)

22

Actual Achieved

68

Comments

This indicator reflects CARCEP activities focused on studies, reports, tools, working group, campaigns and events.

In FY16, a total of 17 activities were reported for advancement of clean energy or energy efficiency; 5 were reports, 4 were tools, 4 working groups and 4 events.

In FY17-FY18, a total of 51 activities were reported. Below is a list of activities achieved.

Disaggregated activities.

	Actual Achieved
Studies	3
Reports	26
Tools	2
Working Groups	1
Campaigns	1
Events	18

Detailed list of activities for FY17 and FY18.

Activity	Name	Date
Studies	Forecasting Primer	July 11, 2018
	Renewable Integration Primer	July 11, 2018
	Smart Grid Primer	July 11, 2018
Reports	Gender Position Paper: Energy and Inclusion	December 30,2016
	Improved Electric Power Climate Resilience Paper	February 7,2017
	Jamaica Manufacturer’s Association Energy Audit Report	November 22, 2017
	Ag Chem Audit Report	April 6, 2018
	Chase E Ramson Audit Report	
	21 Hotel Energy Audit Reports	
Tools	Energy Benchmarking Tool	
	PAHO Energy Benchmarking Tool	May 24, 2018
Working Group	Smart Grid Working Group	

	Campaigns	Household Energy Conservation	August 22,2017
	Events	Caribbean Renewable Energy Forum Intercontinental (Miami Hotel, USA)	October 17-19, 2016
		CARICOM's Fifth Caribbean Sustainable Energy Forum (CSEF) (Bahamas)	January 23-25, 2017
		2017 Jamaica Stock Exchange's Regional Investments and Capital Markets Conference (Jamaica)	January 24-26, 2017
		US Embassy – “Jamaica’s Transition to a Green Energy Economy”	April 21,2017
		Chief of Party presentation at the Project Management Institute of Jamaica	May 9,2017
		CARILEC CEO and Finance Conference	May 16-19,2017
		Caribbean Smart Grid Working Group Meeting	July 28,2017
		Let’s Talk EV Seminar	September 27, 2017
		Donor Coordination Forum	October 17, 2017
		Go Green Expo (Jamaica)	October 21, 2017
		Caribbean Smart Grid Working Group	October 25, 2017
		UNDP ESCO Workshop	October 26, 2017
		OCCUR Conference – Legal and Regulatory Framework	November 8 – 10, 2017
		CHTA Webinar	December 6, 2017
		St. Vincent and the Grenadines Electric Vehicle Seminar	December 6, 2017
		Climate Smart Sustainable Tourism Forum (CSSTF)	December 11 – 14, 2017
		Handover Ceremony	May 28,2018
		Career Talk	May 30, 2018

10) EG 12-1 Number of people receiving training in global clean energy as a result of USG assistance

Program Target (3 years) 450

Actual Achieved 1,873

Comments This indicator reflects CARCEP activities focused on technical assistance trainings, mentoring, public workshops, and working groups.

In FY 16, a total of 264 individual were trained and, 1,609 individuals were trained in FY17-FY18 in activities geared towards clean energy, renewable energy and energy conservation.

Number of persons participating in training activities in FY17 and FY18.

Number of Participants	Training	Date	Supporting Document
221	OOCUR Conference – Training and Workshops	October 26-28, 2016	Registration Sheets
10	Grenada Grid Codes Workshop	December 7-8, 2016	Registration Sheets
46	Jamaica Energy Efficiency Training Workshop	January 26 -27, 2017	Registration Sheet and Evaluation Sheets
14	Dominica IRC regulatory review of power purchase agreement	February 1 – 2, 2017	Registration Sheet
25	St. Lucia Energy Efficiency Training Workshop	March 16-17, 2017	Registration Sheets and Evaluation Sheet
19	Grenada Grid Code Workshop	May 17, 2017	Registration Sheet
14	Antigua Energy Efficiency Training	May 24-25, 2017	Registration and Evaluation Sheet
44	CAREC Webinar 3: Energy Transition Planning for Island Utilities	May 30, 2017	List of attendees and CAREC Presentation
11	Fair Trading Commission Training (Barbados)	June 26-28, 2017	Registration and Evaluation Sheet
13	Grenada Energy Efficiency Training for Hotel & Tourism Sector	July 5-6,2017	Registration sheet and feedback sheet
59	CAREC Webinar – Grid Modernization	July 6, 2017	Registration Sheet and Poll questions
12	Fair Trading Commission Training Session II (Barbados)	July 24-26, 2017	Registration sheet and Feedback Sheet

	34	Engineering Workshop (Jamaica)	July 28, 2017	Registration sheet and Feedback Sheet
	22	St. Vincent Energy Efficiency Training Workshop	August 9-10, 2017	Registration sheet and Feedback Sheet
	27	Community Workshop for women: Energy conservation in the household (Greater Brown's Town)	August 22, 2017	Registration sheet and feedback sheet
	23	Community Workshop for women: Energy conservation in the household (Waterhouse)	August 24, 2017	Registration sheet and feedback sheet
	29	ESCO Financial Modelling Workshop	September 11, 2017	Registration Sheet and feedback sheet
	28	OUR Rate and Planning Workshop	September 12, 2017	Registration Sheet and Email Acknowledgement
	41	CARILEC RE Conference – EE Workshop (Suriname)	September 21, 2017	Registration Sheet and Feedback Sheet
	9	St Kitts and Nevis EE Training	October 31- November 1, 2017	Registration Sheets and feedback sheet
	6	JMA EE and RE Training	November 8-9, 2017	Registration Sheets and feedback sheet
	63	Energy Conservation Workshop (Westmoreland)	November 21, 2017	Registration Sheet
	53	Workplace Safety Training (Westmoreland)	November 29 & 30, 2017	Registration Sheet
	25	PCJ Energy Management Training	December 4, 2017	Registration Sheet and Feedback Sheet
	17	First Global Bank RE Financial Modelling Workshop	January 24, 2018	Registration Sheet and Feedback Sheet

	26	Energy Conservation Training (Steer Town)	January 30, 2018	Registration Sheet and Feedback Sheet
	28	OUR Productivity Study Workshop	February 6-7, 2018	List of attendees
	4	Grid Integration Training	February 28, 2018	Registration and Feedback Sheets
	18	HEART/Eight Rivers Workplace Safety Training	March 5-6, 2018	Registration Sheet
	25	JSEE CEM Training	March 6 – April 10, 2018	Registration and Feedback Sheets
	45	Energy Management Training – JPS	March 22 -23, 2018	Registration and Feedback Sheets
	35	Mona Common Efficiency and Energy Conservation Training	March 28, 2018	Registration and Feedback Sheets
	30	Photovoltaic Installation Training, Petersfield High School	April 10-13, 2018	Registration sheet and Feedback Sheet
	110	Energy Conservation Training (Nanny Ville)	April 18, 2018	Registration Sheet
	36	Energy Conservation Training (Heywood Hall)	April 24, 2018	Registration and Feedback Sheet
	25	Barbados CEM Training	May 7-9, 2018	Registration Sheet
	32	Energy Conservation Training (Santa Cruz)	May 9, 2018	Registration and Feedback Sheet
	34	GIZ Workshop	May 14-16, 2017	Registration and Feedback Sheet
	44	Energy Conservation Training (Brandon Hill, St. James)	May 17, 2018	Registration and Feedback Sheet
	73	PV Installation Training	May 29 – June 1, 2018	Registration sheet and feedback sheet
	10	GIS Training	May 28-30, 2018	Registration Sheet
	24	OOCUR Training	May 28 – 31,	Registration

		Workshop	2018	Sheet
	15	PAHO EE Training Workshop	June 21-22, 2018	Registration sheet
	37	Household EE Conservation Training (Trelawny)	July 13, 2018	Registration Sheet
	28	Household EE Conservation Training (Standpipe)	July 18, 2018	Registration Sheet
	28	CARCEP Energy Benchmark Tool Workshop	July 18-19, 2018	Registration Sheet
	37	Household EE Conservation Training (Hanover)	July 20, 2018	Registration Sheet

ANNEX

Summary of Deliverables

Date	Deliverable
FY16	Task 1.3 Scoping Assessment
FY16	Grants Manual (USAID approved)
FY16	Gender development action agenda
FY16	Annual Work Plan
FY16	Environmental Mitigation and Monitoring Plan
FY16	Monitoring and Evaluation Plan
FY16 Q1	Quarterly Accruals Report
FY16 Q1	Quarterly Expenditure Report
FY16 Q1	Quarterly Report
FY16 Q2	Quarterly Accruals Report
FY16 Q2	Quarterly Expenditure Report
FY16 Q2	Quarterly Report
FY16 Q3	Quarterly Accruals Report
FY16 Q3	Quarterly Expenditure Report
FY16 Q3	Quarterly Report
FY16 Q4	Quarterly Accruals Report
FY16 Q4	Quarterly Expenditure Report
FY16 Q4	Quarterly/Annual Report
FY17	Annual Work Plan
FY17	Communications Plan
FY17	Environmental Mitigation and Monitoring Plan
FY17	Monitoring and Evaluation Plan
FY17	Gender Plan
FY17 Q1	Quarterly Accruals Report
FY17 Q1	Quarterly Expenditure Report
FY17 Q1	Quarterly Report
FY17 Q2	Quarterly Accruals Report
FY17 Q2	Quarterly Expenditure Report
FY17 Q2	Quarterly Report
FY17 Q3	Quarterly Accruals Report
FY17 Q3	Quarterly Expenditure Report
FY17 Q3	Quarterly Report
FY17 Q4	Quarterly Accruals Report
FY17 Q4	Quarterly Expenditure Report
FY17 Q4	Quarterly/Annual Report
FY18	Annual Work Plan
FY18	Communications Plan
FY18	Environmental Mitigation and Monitoring Plan
FY18	Monitoring and Evaluation Plan
FY18 Q1	Quarterly Accruals Report

Date	Deliverable
FY18 Q1	Quarterly Expenditure Report
FY18 Q1	Quarterly Report
FY18 Q2	Quarterly Accruals Report
FY18 Q2	Quarterly Expenditure Report
FY18 Q2	Quarterly Report
FY18 Q3	Quarterly Report
FY18 Q3	Quarterly Accruals Report
FY18 Q3	Quarterly Expenditure Report
FY17	Success Story - "Professional Development of Women in the Energy Sector"
FY18	Success Story - "Champion of Clean Energy"
FY18	Closeout/Demobilization Plan

USAID Caribbean Clean Energy Program
4 Hopefield Avenue
Kingston 10, Jamaica W.I.