



THE OCEAN CONFERENCE 2017

Input Paper for Partnership Dialogue 2: Managing, protecting, conserving and restoring marine and coastal ecosystems

“Addressing the Nexus: Energy Services from Organic Waste - Integrated waste management solutions for coastal, marine and freshwater protection and productive uses in the Caribbean”

A. Introduction

The following input paper was **jointly prepared by SIDS DOCK, CCREEE, UNIDO and the CARICOM Energy Programme** and is a concrete contribution to Partnership Dialogue 2: Managing, protecting, conserving and restoring marine and coastal ecosystems. The paper would like to raise the awareness on the important nexus between energy, waste management and coastal, marine and fresh water protection in Small Island Developing States – particularly in the Caribbean. The role of organic waste to energy (WtE) solutions to reduce environmental stress on coastal ecosystems is not very well acknowledged in the Ocean Conference so far. The nexus has a broad impact throughout different SDGs, namely: 7, 9, 13, 14 and 15. The input paper will be also the basis for the **side event “Energy Services from Organic Waste – Integrated waste management solutions for coastal, marine and freshwater protection in the Caribbean”**, to be organized by SIDS DOCK, CARICOM and UNIDO with support of the Governments of Austria, Sweden and Spain on 9 June 2017 back-to-back to the main conference.

The input paper is **based on the outcomes of the First Caribbean Waste to Energy Technology Expo and Conference, which was organized in St. George’s, Grenada from 20 to 13 January 2016**. The conference was jointly organized by the Government of Grenada, CCREEE, SIDS DOCK, the Caribbean Community (CARICOM) Secretariat, UNIDO and GIZ. Over 100 senior professionals with expertise in energy, climate change, environment and waste management gathered at the Grenada Trade Centre to share lessons learned and perspectives on Waste-to-Energy (WtE) solutions that are appropriate for SIDS. Delegates also expressed the need to transform untapped waste potentials and fossil fuel import dependency into local value creation and jobs. The clear link of WtE to coastal protection, marine and freshwater protection was made. The Expo showcased technology solutions and case studies via presentations by technology providers from the Caribbean, Austria, Germany, Norway, Sweden, Switzerland and the United States. The outcomes of the conference can be viewed at: <http://sea.sidsdock.org/wte-expo-conference/> (the password to view/download the documents is Ymk%Q7K7).

The objectives, components and activities of a regional WtE program were discussed in interactive working groups comprising energy, environmental and waste experts from the public and private sector. The proposed program will promote the up-scaling of organic WtE and other waste valorization solutions with the objective to reduce negative environmental, social and economic externalities of current waste



and sanitation practices on coastal and marine livelihoods, as well as freshwater resources. The program was presented by the Interim-Director at the GEF Caribbean Constituency meeting, held in Port of Spain, Trinidad and Tobago, from 2-4 March 2016, at the Radisson Hotel.

B. Status and trends

Several current trends are further increasing the urgency to address the water-energy nexus in an integrated and proactive way:

- Unsustainable waste and sanitation practices undermine increasingly the Caribbean livelihood, economies and societies. This is particularly true for coastal and marine areas. Although almost 70% of the Caribbean region population lives in coastal cities, towns and villages, there is only limited investment in improved waste management systems. Land-based pollution and over-extraction of marine resources has taken its toll on the quality of marine biodiversity and consequent impacts on economies of coastal communities in terms of reduction or loss of fisheries resources and reduction in recreational diving economic opportunities. Coastal areas are being contaminated with solid waste, sewage, industrial effluents, chemical run-off from agriculture, and wastes from the transportation sector (lubricants, coolants, battery acid, tires). Liquid waste such as sewerage and effluents from agricultural run-off are harming coral reefs, and degrading touristic beaches and fisheries, which are major sources of income for many islands. In addition to the pollution, coastal areas are increasingly challenged through the impacts of climate change.
- It is estimated that as much as 60% of wastewater entering the Caribbean Sea is currently untreated (UNEP TR-52 report, 2010) and 65% or 275,000 tons of solid waste is disposed in open dumps, rivers or the Caribbean Sea¹. The numbers of people with access to improved sanitation in the Caribbean exceeds 90 percent, in most cases. However, the numbers with access to centralized wastewater service systems, which collect and treat wastewater are low, ranging from 3 percent in Saint Vincent to 30 percent in Trinidad and Tobago. According to the Pan American Health Organization (PAHO) 51.5 percent of households in the Caribbean region lack sewer connections of any kind and only 17 percent of households are connected to acceptable collection and treatment systems (2001).² Access to improved sanitation remains a challenge for lower-income communities across all the countries in the Caribbean with implications for maintenance of adequate health standards and occurrence of water-borne disease in particular.
- The poor disposal of sewage sludge from both on-site domestic and other water treatment systems is of concern. It is well-known that wastewater sludges are often disposed of illegally in watercourses or in and around landfill areas thereby posing further risks to the downstream environment. In the Caribbean, the most common scenario is that the tourist resort provides and maintain their own collection and treatment facilities. In fact, half of the wastewater plants in the Caribbean are operated by the tourism sector. According to studies by the Caribbean Environmental Health Institute, 75% of these plants do not comply with the criteria for good

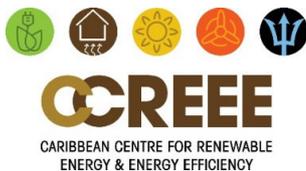
¹ Gap Analysis and Regional Best Practices in Wastewater Management CEP Technical Report 64, February 7, 2010

² PAHO Report 2001

operation, i.e. an effluent quality of 30 mg/l Biochemical Oxygen Demand (BOD) and Suspended Solids (SS) or 85% removal of BOD and SS. A study in 1991 revealed that 75% of the wastewater treatment plants Caribbean do not meet effluent criteria of 30 mg/l BOD and 30 mg/L suspended solids. Additionally in 60% of the cases, the effluent is discharged into the aquatic environment (35% are marine and 25% fresh water bodies). There are also big organic waste producers like rum distilleries Jamaica, Bahamas, Barbados, Bermuda, Dominica, Grenada, St. Lucia, Vincent, Trinidad. Still significant quantities of molasses rum distillery effluent are being dumped into the sea.

- Another key constraint in the Caribbean is the issue of availability and reliability of waste and sanitation data. Today, data on estimated volumes by different waste streams are not systematically available and the dispersed data is not aggregated at regional level. There is potentially usable waste streams of vinasse, Elephant Grass, Lemon Grass, Leucaena in Antigua and Barbuda; pig manure, wastewater, poultry droppings, vinasse, sugar cane leaves and Bagasse in Barbados, Slaughterhouse waste, Septage and vinasse in Grenada; water plants green matter, poultry dropping and rice waste in Guyana; Banana Leaves; Spank grain and Vinasse in St Lucia; banana leaves and elephant grass in St Vincent and the Grenadine. Most countries do not compile annual statistics on the total volume of municipal wastewater generated, transported and treated. However, we do not know about waste availability or composition at regional level.
- Moreover, increasing pollution as well as climate change impacts challenges the freshwater resources of Caribbean islands. Available freshwater in the Caribbean SIDS is considerably less than that in oceanic islands. In 2002 freshwater resources (that is, internal renewable water resources) in the Caribbean (not including LLCS) were 2 532 m³ per capita, compared with 17 607 m³ in the Western Indian Ocean and 127 066 m³ in the South Pacific. The situation is critical in the low limestone islands of the Eastern Caribbean, where rainfall seasonality is very pronounced. In islands such as Anguilla, Antigua and Barbuda, Grenada, and Barbados, more than 65 per cent of total annual rainfall may be recorded in the wet season from June to December.
- Similarly, solid waste management continues to be an increasing challenge. Landfilling is the most common method of waste disposal. Solid waste generation for the Caribbean was estimated at between 27,000 to 945,000 metric tons in 2005, with daily per capita waste generation rates ranging from 0.7kg to 2.8kg³. Increasing consumption patterns, mimicking developed countries result in ever increasing waste streams including hazardous wastes such as electronic, chemical, radioactive wastes. The composition of the solid waste generated in the Caribbean continues to change from mostly organic to inorganic material. Tourism, which is the main income earner for many countries leads to the generation of significant quantities of waste, which threaten to pollute the product and spoil the experience being offered. Solid waste generated by shipping (cargo straps, dunnage), commercial fisheries (outboard-oil containers, mono-filament fishing line, floats, polyethylene line, cyalumes) and the offshore petroleum industry (hard hats, pipe thread protectors) is affecting the coastal areas. At the 2008 Fourth Annual International Coastal Cleanup Conference held in Montego Bay in Jamaica, it was reported that a total of 6,781, 537

³ Binger, A. (2011), "Economic Opportunities in Waste Management in Small Island Developing States (SIDS)", UNCSO, New York



items of garbage had been collected from Caribbean coastal areas, 90% of which were from land-based sources.

- Poor waste and sanitation management, in combination with increasing climate change impacts, impair public health and affect the productivity and well-being of the residents. Inadequately treated sewage waste contributes to health-related problems, both through contamination of drinking water supplies, and through the presence of pathogens in the watershed and coastal water environment as a whole. Local public health agencies have documented increases in reports of ear, nose and throat infections from tourists and residents alike as the quality of coastal waters degrades. Untreated domestic wastewater resulted in increased sea-fish mortality and had negative effects on commercial fisheries, declines in coral reefs and posed a threat to human health and tourism. It has recently been estimated that 70% of Caribbean beaches are eroding at rates of between 0.25 and nine metres per year (CARSEA). According to the Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), contamination of the coastal marine environment by sewage leads to significant numbers of infectious diseases linked to bathing and swimming in marine waters and to the consumption of seafood. Pathogenic bacteria can survive in the sea from a few days to several weeks; viruses can survive in water, fish or shellfish for several months while the hepatitis virus can remain viable in the sea for over a year.
- At the same time, the countries are facing the challenges of energy security, energy affordability and climate change mitigation and adaptation. The high energy consumer tariffs in the Caribbean lead to affordability issues particularly for low income groups and diminish the competitiveness and productivity of the local private sector and small-scale industry. The continued dependence on diesel imports at fluctuating price levels is a major energy security concern of Governments and a major factor in public spending. Fossil fuel spending has high opportunity costs, as valuable resources for climate change adaptation, health care, education or economic development are lost. Several countries spend 15 to 30 percent of their export earnings, inclusive of revenues from tourism, on oil products. This results in electricity prices of between 20 and 35 cents per kWh, much higher than in the United States or Europe. Energy affordability is an issue for particularly low-income groups. The high energy costs lower the productivity and competitiveness of local companies and small-scale industries. The continued use of fossil fuels in the energy sector is also interrelated with environmental issues such as local air, soil and water pollution.
- Apart from local impacts, the energy, waste and water/sanitation situation in the Caribbean also contributes to climate change. Globally, the major GHG emissions from the waste sector are landfill CH₄ and, secondarily, wastewater CH₄ and N₂O. However, there is no reliable data on emissions generated by water waste or effluents or any organic waste stream (CO₂eq/year) in CARICOM. The continued use of fossil fuels in the energy sector is interrelated with an increase of GHG emissions. Total annual electricity consumption of CARICOM is estimated at approximately 18,000 GWh, with annual emissions of approximately 13 million tons of CO₂eq/year.
- Proven waste-management practices are available: a wide range of mature, environmentally-effective technologies can be used to mitigate GHG emissions and provide public health,



environmental protection, and sustainable development co-benefits. Collectively, these technologies can directly reduce GHG emissions (through landfill gas recovery, improved landfill practices, engineered wastewater management) or avoid significant GHG generation (through controlled composting of organic waste, state-of-the-art incineration and expanded sanitation coverage). In addition, waste minimization, recycling and re-use represent an important and increasing potential for indirect reduction of GHG emissions through the conservation of raw materials, improved energy and resource efficiency and fossil fuel avoidance.

- There's a clear need to upscale organic WtE and other waste valorization solutions with the objective to reduce negative environmental, social and economic externalities of current waste and sanitation practices on coastal and marine livelihoods, as well as freshwater resources.

C. Challenges and opportunities

- The First Caribbean Waste to Energy Technology Expo and Conference, held in St. George's, Grenada from 20 to 13 January 2016, demonstrated that a significant number of countries have made considerable progress in the creation of an enabling policy and regulatory framework for sustainable energy, waste and sanitation management. Many Caribbean islands have adopted ambitious targets, policies and protocols on renewable energy and energy efficiency, as well as waste management and sanitation. However, in many areas the technical implementation of these commitments is still lacking and has not turned into real investments or a vibrant local market and industrial sector. Liquid waste from sewerage and effluents from agricultural run-off (incl. agro-waste) was identified as high-priority area of intervention.
- Organic waste to energy (WtE) technologies were discussed by the country representatives and private sector as an important feasible and viable option to address the waste, energy, water/sanitation, coastal and marine protection challenges simultaneously and in an integrated way. Modern wastewater treatment integrated with biogas plants for sorted and pre-treated organic waste fractions, different agro industry waste fractions such as waste from sugar cane and banana production, different waste materials from rum production and breweries, treated sewerage sludge, grass cutting of elephant grass, leguminous leaves and leuceana, slaughterhouse waste, fish waste can represent effective and tailor-made solutions for organic waste management and energy production for different states in the Caribbean. For example, the choice of rum refinery effluent disposal technique is important in fisheries management, coastal zone management and biodiversity conservation. Examples have shown that distillery effluent can be converted to useful commodities, such as fuel, stock feeds and fertilizers. Hence, the options for handling distillery effluent include both disposal and conversion into useful products.
- Adapted WtE solutions can be a tool to promote economic development, mitigate coastal and marine pollution and reduce diesel based energy generation. The dumping of waste is interrelated with considerable economic opportunity costs. Utilizing organic waste for the provision of energy services can have substantial co-benefits such as safeguarding public health and fresh water resources, as well as reduction of GHG emissions. At larger scale, WtE can also contribute to balancing the integration of intermediate renewable energy sources into island grids. In some



countries (e.g. Haiti) decentralized waste to energy solutions could provide access to affordable and reliable electricity services to low-income groups.

- However, the *First Caribbean Waste to Energy Technology Expo and Conference* revealed also that the current WtE markets and industries in the Caribbean are rather underdeveloped. In 2015 there was no major WtE project in operation. With the exception of some (pre-)feasibility studies and small-scale biogas projects (e.g. Jamaica), investments in WtE solutions remain low and are not harnessed systematically.
- Similar to other renewable energy technologies, WtE faces key barriers and constraints (e.g. technical limitations, lack of institutional coordination, policy, legal and regulatory bottlenecks, lack of tailored financial schemes, limited professional experience knowledge and (real-time) data gaps, lack of access to adapted technology, weak capacities on different levels). Moreover, WtE competes with various other fossil or renewable energy technology options with various advantages, disadvantages and economics. Its interconnection to energy, environment (waste management and recycling), water and sanitation, agriculture (e.g. biomass waste) and agro-industry (as effluent producer and energy consumer) makes WtE a complex nexus-issue. There exist limited lessons learned, best practices on the use of these technologies (in small-scale) under island conditions (there are several ongoing efforts in SIDS in Africa, Pacific and Caribbean). However, the issue of WtE is discussed also in the Pacific and Africa (e.g. Cape Verde).
- During the conference the participating country representatives highlighted the importance of regional cooperation to upscale ongoing national efforts. Each country of the region is too small – and several lack enough capital – to tackle such complex issues on its own. The conference revealed major opportunity gaps in the current regional support framework of the Caribbean Community (CARICOM). Whereas the Secretariat has succeeded in addressing the energy challenges through enhanced regional cooperation and capacities, the waste and water/sanitation sector did not get sufficient attention so far.
- Despite efforts, the regional level governance of the water/sanitation and waste management sector remains loose and peripheral in the Caribbean. This although in their country statements to the First CARICOM Ministerial Conference on the Environment (CARICOM 1989), the top priorities of CARICOM member states were solid waste management and disposal, water quality and supply, and disposal of domestic sewage, liquid waste, and toxic and hazardous waste. These issues were also targeted for priority action at the national level by the Environmental Health Strategy of 1978. However, although waste management was one of the priority areas of the Barbados Programme of Action (BPoA) for the Sustainable Development of SIDS, back in 1994, and the Mauritius Strategy for its Further Implementation (MSI) in 2005, no elaborated strategy has yet been developed to help guide SIDS in the implementation of sustainable waste management systems.
- The Caribbean Environment Programme (CEP) is one of the UNEP-administered Regional Seas Programmes and managed by and for the countries of the Wider Caribbean Region through the Caribbean Action Plan (1981) outlining regional environmental challenges. The Action Plan led to



the 1983 adoption of the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention), which provides the legal framework and comprises of several protocols.

- The Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) to the Cartagena Convention was adopted in Oranjestad, Aruba, on 6 October 1999. This Protocol came into force in 2010 with the objective of protecting the natural resources of the Caribbean Sea (fish stocks, coral reefs, fragile ecosystems, and recreational waters) from harm arising out of activities taking place on land. The objective of the Protocol is to deal with the sources of pollution through the use of appropriate technologies and by setting pollution standards and water quality objectives. By 2020 all existing domestic wastewater systems (other than community wastewater systems) must comply with the provisions of the Protocol, and all community systems other than individual household systems must comply by 2030.
- The LBS Protocol is a regional mechanism assisting the countries to meet the goals and obligations of two international agreements: The United Nations Convention on the Law of the Sea (UNCLOS) and the Global Plan of Action for the Protection of the Marine Environment from Land-Based Activities (GPA). In order to achieve this, all countries of the wider Caribbean region will have to establish the appropriate policies, legislation, and regulations to support the implementation of the Protocol, create the necessary institutional framework and capacities, and make available the finances to put in place the sewerage infrastructure. WtE activities making use of effluents and organic agro-waste will contribute to the implementation of the protocol.
- CARICOM has not been able to develop an overarching influence, though water matters are subsumed in the Sustainable Development Directorate. The initiative in 2008 to form the Consortium of CARICOM Institutions on Water, whose terms of reference were approved in 2010, had sought to develop a common water framework for the community for water resources management. However, failure to provide the necessary resources has meant that it has had little if any impact on the region. There are also linkages to environmental health in human dimension within CARICOM, the Regional Caribbean Cooperation Strategy Phase 3 (or the Caribbean Cooperation in Health Initiative III) is a regional cooperation framework that seeks to optimize the utilization of resources, promote technical cooperation among member countries, and to develop and secure funding for the implementation of projects in priority health areas.



D. Existing partnerships

- **Are many existing partnerships covering the theme of the dialogue? Are there identified gaps in coverage?**
 - **Who are the main actors involved in existing partnerships?**
 - **Do we know how well existing partnerships are performing? What have been success factors? What are the main challenges identified with existing partnerships?**
 - **Have successful partnerships on the theme been narrowly focused in scope, or more holistic, encompassing several related areas?**
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- Over the last decade, several regional GEF funded marine and wastewater management projects were implemented by UNEP CEP (e.g. GEF-CReW - Caribbean Regional Fund for Wastewater Management, GEF-CLME - Caribbean Large Marine Ecosystem, GEF-IWCAM - Integrating Watersheds and Coastal Area Management, GEF-REPCAR - Reducing Pesticide Run-off into the Caribbean Sea) in cooperation with various institutions. The proposed regional program will closely link to the GEF-IWEco - Integrating Water, Land and Ecosystems Management in Caribbean SIDS project, which is currently in the inception phase.
 - In recent years, the CARICOM Secretariat has taken major steps to mainstream renewable energy and energy efficiency into its regional policies, programs and activities. This resulted in the creation of the CARICOM Energy Programme and Unit in 2008, and the adoption of the Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS) in 2013 that set up a renewable energy power penetration target of 20% in 2017, 28% in 2022 and 47% in 2027. WtE was included as important technology option in the C-SERMS targets. The CARICOM Energy Programme is supported by GIZ through the Renewable Energy and Energy Efficiency Technical Assistance (REEETA) Programme. WtE is an important activity stream of the programme.
 - CARICOM efforts were additionally backed by the creation of the Small Island Developing States (SIDS) Sustainable Energy and Climate Resilience Initiative (SIDS DOCK) through the Alliance of Small Island States (AOSIS), the Caribbean Community Climate Change Centre (CCCCC) and the Secretariat of the Pacific Regional Environment Programme (SPREP). The innovative mechanism promotes the scaling-up of technical and financial support, as well as SIDS-SIDS cooperation, for the transformation of the energy sector of SIDS in Africa, Caribbean, Indian Ocean and Pacific.
 - The latest step in the regional collaboration in the energy sector was the creation of the Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE) as technical implementation hub for the region in 2015. The Thirty-Sixth Regular Meeting of the Conference of Heads of Government of the Caribbean Community (CARICOM), 2-4 July 2015, endorsed the establishment of the CCREEE in Bridgetown, Barbados as the implementation hub for sustainable energy activities and projects within the region. The center was developed and established with technical and financial support of SIDS DOCK, UNIDO and the Government of Austria. It will support the CARICOM Energy Unit in the technical implementation of the policy commitment. The center is part of wider [SDG-](#)



[7 multi-stakeholder partnership](#), which aims at the establishment of a network of regional sustainable energy centres for small island developing states (SIDS) in Africa, Caribbean, Pacific and Indian Ocean. The network comprises also the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE), based in Tonga, as well as the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), based in Praia, Cabo Verde (www.se4allnetwork.org).

E. Possible areas for new partnerships

- **Given challenges, opportunities and gaps, how could new partnerships help with implementation?**
 - **What actors would need to be involved for new partnerships to succeed?**
 - **What would be critical success factors?**
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- As an outcome of the First Caribbean Waste to Energy Technology Expo and Conference, organized in St. George's, Grenada from 20 to 13 January 2016, and to address the important nexus between energy, waste management and coastal, marine and fresh water protection, SIDSDOCK, the CARICOM Energy Programme, UNIDO, interested CARICOM Member States and other partners (e.g. GIZ) are forming a multi-stakeholder partnership to promote the development and implementation of the regional program "Energy Services from Organic Waste: Integrated waste management solutions for coastal, marine and freshwater protection and productive uses in the Caribbean". The program is already supported by the Governments of Austria and Spain.
 - The program will promote the up-scaling of organic waste to energy (WtE) and other waste valorisation solutions with the objective to reduce GHG emissions and other social and economic externalities of current waste and sanitation practices on coastal and marine livelihoods, as well as on freshwater resources. In line with SDG-9 on *Inclusive and Sustainable Industrial Development*, the program will focus on the creation of vibrant WtE markets and industries as a tool to promote local economic value creation, social development and environmental protection at the same time.
 - The sectoral focus will initially be on liquid effluent waste and agro residues in the context of coastal, marine, as well as freshwater protection. The aim is not to deal with the entire waste management sector (e.g. solid waste, landfills) at once. It will equally promote advances in the following organic waste sectors:
 - i. Liquid effluents such as sewerage, and residues from breweries, distilleries or slaughter houses
 - ii. Organic residues from large farms & food processors, such as sugar cane bagasse
 - iii. Organic residues from small scale operators such as pigs and chicken farms, hotels and resorts

These sectors were selected due to their significance in the development of a green economy model in the region, environmental benefits and the potentiality for energy generation and/or other kinds of waste valorization, aiming at the mitigation of GHG.



- The program would contribute to the technical implementation and institutional coordination of important regional energy, waste and sanitation policies and processes such as the Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS) and the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) to the Cartagena Convention. It will coordinate closely with other ongoing regional programs and projects, such as the GIZ Renewable Energy and Energy Efficiency Technical Assistance (REEETA) Programme and the UNEP-GEF Integrating Water, Land and Ecosystems Management Project (GEF-IWEco).
- The technical scope is largely limited to proven and mature organic WtE and waste treatment solutions (excl. incineration and landfill gas recovery). These include all biological treatment such as composting or anaerobic digestion for the production of biogas. Although in many parts of the world these technologies have reached the status of commercialisation and deployment on the technology innovation chain, the experiences in many Caribbean countries are still very limited. In particular, there is no promotion of waste valorization processes such as the use of sewage sludge, or organic fertilizer, livestock bedding, compost, fuel pellets from anaerobic digestion.
- The program will address the existing barriers for WtE markets, industries and innovation in the Caribbean. As a result, an enabling environment for WtE investments, markets and industries will be created by promoting integrated interventions in the areas of policy and regulatory frameworks, knowledge management and capacity development, as well as technology demonstration and investment and business promotion.
- As a result of the above mentioned activities, a regional integrated waste management task-force at CARICOM will be established, fiscal and non-fiscal WtE policy support mechanisms and various handbooks and documentation of lessons learned toolkits (e.g. resource assessments, appraisal tools) will support the strengthening of policy and regulatory frameworks and will stimulate institutional coordination. The task-force will closely coordinate with CEP and other key stakeholders.
- Moreover, a WtE center of excellence will be established at CCREEE. The center will promote information and data management, train the trainer workshops, applied research networks and awareness raising. The activities are expected to reach engineers, technicians, and relevant vendors to deploy waste to energy technologies, products, and equipment thus accelerating the intake of approached waste management procedures, waste valorisation and waste to energy projects. The centre will closely work with the CEP and other key players.
- The creation of a Support and Financing Facility (SFF) for Waste to Energy projects and businesses in partnership with other partners (e.g. CDB, IADB) is envisaged to fulfil the financing requirements needed to develop new waste to energy project, beyond the demonstration ones. A long-term partnership between the SFF and development/commercial bank(s) to offer non-grant financing instruments (revolving fund, loans) will be established.
- There's the aim to link up with various institutions and NGOs active in the sector such as: Caribbean Conservation Association (CCA), Island Resources Foundation (IRF), the Caribbean



Natural Resources Institute (CANARI), the International Coral Reef Action Network (ICRAN), the Institute of Marine Affairs the Caribbean Environmental Health Institute (CEHI), the Caribbean Institute for Meteorology and Hydrology (CIMH), and the Caribbean Agricultural Research and Development Institute (CARDI), as well as those outside of CARICOM, such as GWP-C, the Caribbean Water and Wastewater Association (CWWA), and Caribbean Water and Sewerage Association Inc. (CAWASA).

F. Guiding questions for the dialogue

- How the nexus between waste to energy, waste management and coastal, marine and freshwater protection can be addressed more effectively under the umbrella of a circular economy concept in the context of small island developing states (SIDS)?
- What can be done to better integrate waste to energy (WtE) into existing waste management and coastal protection policies and support programs?
- How investments into integrated waste management solutions (incl. waste to energy) for coastal, marine and freshwater protection and productive uses can be up-scaled?
- How regional organizations and centers can contribute to the upscaling of waste to energy markets, industries and innovation?
- How to better interlink SDG 14-*Life Below Water* with SDG 7-*Affordable and Clean Energy*, SDG-9 *on innovation and inclusive industrial development* and 13-*Climate Action*?

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