United Nations Decade of Sustainable Energy For All (2014-2024)

SIDS DOCK WORK PROGRAMME BRIEFING NOTE

"TOWARD THE DEVELOPMENT OF AN ORGANIC WASTE MANAGEMENT SUB-SECTOR IN SMALL ISLAND DEVELOPING STATES"

ENERGY SERVICES FROM ORGANIC WASTE:
INTEGRATED WASTE MANAGEMENT SOLUTIONS FOR COASTAL, MARINE AND FRESHWATER PROTECTION

1. INTRODUCTION

The *"Energy Services from Organic Waste: Integrated Waste Management Solutions for Coastal, Marine and Freshwater Protection in Small Island Developing States (SIDS) Programme"* is a SIDS DOCK Initiative initially developed in 2015, in Partnership with the Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE), the Caribbean Community (CARICOM) Secretariat, the Energy Branch of the United Nations Industrial Development Organization (UNIDO), and the Swedish Energy Agency (SEA), in close coordination with interested CARICOM Member States, and other international partners.

From the 20-23 January 2016, at the *First Caribbean Regional Waste-to-Energy (WtE) Technology Expo and Conference,* 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 Small Island Developing States (SIDS). The Conference was deemed a "tremendous success" by the delegates, as over four days, they worked collectively to frame the main pillars of a regional programme to upscale WtE investments, markets and industries. Delegates also expressed the need to transform untapped waste potentials and fossil fuel import dependency into local value creation and jobs. 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.

Resulting from the Conference, several potential projects have been identified and support continues from the SIDS DOCK Secretariat to further develop these potential projects as well as identify new ones. In this regard, the Secretariat is desirous of beginning the process of developing

SIDS DOCK Secretariat
C/o Caribbean Community Climate Change Centre

2nd Floor, Lawrence Nicholas Building
P.O. Box 563, South Ring Road
Belmopan, BELIZE

Tel: (501) 822-1104 or 1094
Fax: (501) 822-1365
www.sidsdock.org
secretariat@sidsdock.org

a strategic plan, *"Toward The Development Of An Organic Waste Management Sub-Sector in Small Island Developing States (SIDS)".*

Additionally, in June 2017, SIDS DOCK and its Partners participated in the first UN Oceans Conference and staged a Side Event*: "Energy services from organic waste for productive uses – integrated waste management solutions for coastal, marine and freshwater protection in Small Island Developing States (SIDS)."* The Side Event was jointly organised by the CCREEE, SIDS DOCK, UNIDO and the CARICOM Energy Programme, and is a concrete contribution to Partnership Dialogue 2: Managing, protecting, conserving and restoring marine and costal ecosystems. The event was intended to raise the awareness on the important nexus between energy, waste management and costal, marine and freshwater protection in Small Island Developing States – particularly in the Caribbean. The event was organized with support of the Governments of Austria and Spain, and was in follow up on the outcomes of the First Caribbean Waste to Energy Technology Expo and Conference, held in St. George's, Grenada from 20 to 23 January 2016.

The Grenada Conference 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, but significant work is still to be done to achieve effective waste 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 generated small- and medium-sized industries, catalysing investments leading to local markets and a new industrial sector. Liquid waste from sewerage and effluents from agricultural run-off, including agro-waste was identified as a high-priority area of intervention.

Current waste and sanitation practices in SIDS are having significant negative impacts on the fragile ecosystems that are the basis of livelihoods, economies and social cohesion. This is particularly true for coastal and marine areas. With almost 70 per cent of the SIDS population living in coastal cities, towns, and villages, there is need for significant investment in improved solid and effluent waste management systems to increase efficiency. Land-based pollution and over-extraction of marine resources has taken its toll on the quality of marine biodiversity, and the resulting consequent impacts on the economies of coastal communities in terms of reduction or loss of fisheries resources and reduction in recreational diving and other economic opportunities. Coastal areas are being contaminated with solid waste, sewage, industrial effluents, chemical run-off from agriculture, and waste 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, all of which negatively impact the national economy and quality of life for many islands. In addition to the pollution, coastal areas are increasingly challenged through the impacts of climate change.

According to a recent UN Environment report, every year, about 8 million metric tons of plastics ends up in the ocean, and it is estimated that companies produce about 5 trillion plastic bags each year. One plastic bag can take more than 1,000 years to decompose, and few are recycled[1]. The report also noted that as of July 2018, one hundred and twenty-seven (127) out of 192 countries reviewed (about 66%) have adopted some form of legislation to regulate plastic bags. The growing global concerns about plastic waste in light of its manifesting negative impact on marine life has

[1] https://www.unenvironment.org/resources/report/legal-limits-single-use-plastics-and-microplastics

resulted in a number of SIDS DOCK Countries passing legislation to end the use of single use plastics, particularly plastic bags: Antigua and Barbuda, Bahamas (in 2020), Barbados, Belize Cabo Verde, Dominica, Grenada, Guinea-Bissau, Jamaica, Marshall Islands, Mauritius, Micronesia - regional ban; Palau, Samoa, Seychelles, Solomon Islands – regional ban; and Vanuatu.

Island people understand that oceans are the life support system of the Earth. Our oceans produce half of the oxygen we breathe and cycle over 93 percent of carbon dioxide in the atmosphere. Oceans store over half of all naturally sequestered carbon and absorb 80 percent of the heat added to the global system in the last 200 years. While relatively small in landmass, SIDS govern over and serve as the "Blue Guardians" of their Exclusive Economic Zones (EEZs), vast ocean territories extending up to 200 nautical miles from their coastlines. These ocean areas are vital 'blue carbon' sinks that also help mitigate global climate change. SIDS DOCK now moves forward with a bold plan of action with its all its member nations in the Caribbean, Pacific and AIMs regions through the following urgently needed initiatives to address climate change threats to our survival.

2. IMPLEMENTING THE SIDS DOCK WORK PROGRAMME: WASTE-TO-ENERGY (WtE) PROGRAMME (2020-2023)

The SIDS DOCK Work Programme (2016-2021), identified four (4) major activities for development, and which have informed the SIDS DOCK Foundation Strategic Plan (2018-2028), the main fundraising vehicle to support implementation of the Work Programme and promotion of the SIDS DOCK Indicative Project Pipeline. The following specific goals and objectives, as reflected in the Strategic Plan and Work Programme have been identified for implementation in the programming period of 2020-2023:

(a) Support the Development of a Regional Organic Waste Conversion Sub-Sector to Increase Coastal Resilience and Climate Change Impacts and Protect Freshwater Resources in SIDS.
(b) Support the organisation of the First Pacific Waste-to-Energy (WtE) Technology Expo and Conference.
(c) Support SIDS Biomass Research and Development Projects that has the potential to utilize non-crop producing lands for Bioenergy production using high nutrient wastewater as irrigation, and portions of the Municipal Solid Waste (MSW) for fuel.
(d) The SIDS DOCK Indicative Project Pipeline: Development of an Indicative Sub-Project Pipeline: Waste Management to Energy.

The transformation of the energy sectors of the various SIDS to be low-carbon, energy efficient, and primarily based on renewable energy sources represents a unique opportunity to achieve sustainable development as well as generating financial resources to invest in adaptation to climate change and continued sustainable development. The WtE Work Programme also seeks to contribute to meeting the SIDS DOCK goal of *25 percent (2005 baseline) increase in energy efficiency by 2033*, and focused on building the capacity needs of the UNIDO-supported network of SIDS Regional Centres which are funded by the Austrian Development Agency (ADA), namely the Barbados-based Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE), the Tonga-based Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE), and the SIDS Unit located in Cabo Verde, at the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE). The network is acknowledged as an official Sustainable Development Goal (SDG 7: Affordable and Clean Energy) partnership of the SAMOA Pathway. The SIDS Sustainable

Regional Centres, established in partnership with UNIDO, act as technical implementation and innovation hubs of the international SIDS DOCK Organisation and the respective regional organisations. Moreover, the centres facilitate SIDS-SIDS cooperation on common issues and adapted island solutions.

The Secretariat's work on transitioning the energy sector away for dependence on costly imported fuel has a critical component that promotes improved management of waste through generation of energy as the preferred option to provide environmental protection, strengthening coastal resilience to climate change impacts and, to improve understanding that effectively managed waste can be a *renewable* resource, particularly for the provision of energy services (e.g., electricity and transportation fuel) and fertilizer, rather than a nuisance and a threat to irreplaceable coastal ecosystems critical to the survival of the population.

2.1 Support the Development of a Regional Organic Waste Conversion Sub-Sector to Increase Coastal Resilience and Climate Change Impacts and Protect Freshwater Resources in SIDS

Resulting from the First Caribbean Regional Waste-to-Energy Technology Expo and Conference, in 2016, in Grenada, a number of potential projects have been identified and support continues from the Secretariat of SIDS DOCK to further develop these potential projects as well as identify new ones for incorporation into the SIDS DOCK Indicative Project Pipeline. For example, Solid Waste Characterization Studies have been completed in Antigua and Barbuda, and one is planned for Dominica. The work represents a partnership between UNIDO, the Swedish Energy Agency, CARICOM Energy Unit, and the CCCCC. It is planned to have similar activities in the Pacific in partnership with the regional organizations to develop a regional programme in collaboration with the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE), in Tonga, as a partnership between the SIDS DOCK and UNIDO, with funding from the Government of Austria, and led by the Secretariat of the Pacific Community (SPC). Support includes development of project concept papers and pre-feasibility studies to access next stage and seed funding from development partners and multi-lateral institutions in order to access grant/concessionary/commercial financing for implementation.

2.2 Support the Organisation and Staging of the First Pacific Waste-to-Energy (WtE) Technology Expo and Conference

Although waste management was one of the priority areas of the Barbados Programme of Action (BPoA), no elaborated strategy was developed to help guide Small Island Developing States (SIDS) in the implementation of sustainable waste management systems. Consequently, waste management is now emerging as a major concern for SIDS as the consequences become manifested in areas such as declining quality of the coastal environment, high levels of nutrients accelerating the growth of algae on coral reefs, pollution of coastal aquifers and reduced fisheries habitats, all of which pose major threats to tourism. It is therefore an urgent necessity for SIDS' waste management experience to be studied in order to identify approaches that are more socially equitable, less costly to operate, more environmentally-friendly and less demanding on the limited land resources. Furthermore, it must be done in a manner that will help the islands protect coastal biodiversity and help coastal communities minimise their vulnerability to water stress, by protecting freshwater lens in coastal communities from contamination. The Pacific WtE Expo and Conference is intended to initiate the development of an indicative pipeline of waste management projects having energy as a product.

2.3 Support SIDS Biomass Research and Development Projects that has the potential to utilize non-crop producing lands for Bioenergy Production using high nutrient wastewater as irrigation, and portions of the Municipal Solid Water (MSW) for fuel

The initial proof of concept project developed by the SIDS DOCK Secretariat in partnership with the Government of Belize, the Caribbean Community Climate Chang Centre (5Cs/CCCCC) and private sector partners with additional support from the Green Climate Fund (GCF), is for research on the feasibility of a Belize Bioenergy Project. The research is to determine the agricultural practices for growing indigenous, fast-growing grasses found in low coastal areas of Belize, on lands that are not viable for food production. The project would reduce the need for the importation of fossil fuel generated power and provide new employment for farming communities. Successful completion of the research project would provide valuable data to inform the second stage research focused on the use of high nutrient waste from sewage systems and agro-industry as irrigation to enhance biomass production and remove nutrients such as Phosphorus, which are already in high concentration in the coastal environment and serves as a stimulant to fast algae growth which negatively impacts reef growth and survival. A key determinant of maintaining coastal communities will be the quality of the marine environment. Given the current stress on these fragile ecosystems resulting from ongoing land-based pollution and increasing temperatures and carbon dioxide concentration of sea water along the coasts resulting from GHG emission, it is essential that maximum efforts be made by SIDS to minimize point source of Phosphorus and other nutrients from entering the coastal environment.

The 2016 WtE Conference in Grenada identified WtE projects as having the greatest potential to impact coastal environment quality and represents a system of agriculture with significant mitigation and adaptation potential, in addition to the socio-economic benefits, and a supplement/substitute for some farming communities who will be negatively impacted from factors such as sea level rise and water availability. This research project executed through partnerships with Government, regional organizations, development partners, and the private sector, is directly linked to the SIDS DOCK goals for increased green electricity generation - a 25 percent decrease in conventional transportation fuel use by 2033, and transportation fuels substitution as the biomass produced can also be converted to substitute fuel for compression ignition engines (diesel). The research project results will contribute to the potential for determining the scale at which projects based on this agriculture system would be feasible and the potential for other products from the farming of fast-growing grasses for production of char, activated carbon, plant growth stimulator, and animal feed. This represent options for different scales of biomass production and processing using available land not suitable for conventional farming and wastewater high in nutrient as fertilizer and irrigation for biomass production.

2.4 The SIDS DOCK Indicative Project Pipeline: Development of an Indicative Sub-Project Pipeline: Waste Management to Energy

Since the 2016 Grenada WtE Expo and Conference, the Secretariat has been advocating and assisting members with conceptualizing and mobilising resources for preparing Concept Papers and Pre- and Feasibility studies as part of the process of developing the indicative project pipeline to provide the basis for partnership formation to implement, on an aggregated basis, the various projects many of which would not be at a scale to attract support or effectively advocate for the required technology and to facilitate its deployment. The Partnerships being explored are focused on providing SIDS with access to new technologies with appropriate scale and level of

sophistication, and financing to support early stage project proposals and co-financing of demonstration projects.

Secretariat of SIDS DOCK
June 29, 2019