

Review of Policies within the Ministry of Science Energy Technology (MSET) which address Greenhouse Gas (GHG) Emissions

Overview of the GHG Situation in Jamaica

There is a global move towards decreasing the amount of greenhouse gases (GHG) released into the atmosphere through human activities due to the fact that these are the primary contributors to the issues of global warming and climate change. In the **Second National Communication (SNC) of Jamaica to the United Nations**, the country's inventory of anthropogenic emissions and removals of GHG were reported. The direct GHGs included in the inventory were carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆), while indirect GHGs included non-methane volatile organic compounds (NMVOC), carbon monoxide (CO), nitrogen oxide (NO_x) and sulphur dioxide (SO₂). Emissions were estimated for sources and sinks in four sectors:

1. Energy
2. Industrial Processes and Product Use
3. Agriculture, Forestry and other Land Use
4. Water
5. Transport

The energy sector accounted for 86% of total net CO₂ emissions, while the waste sector accounted for 54% of CH₄ emissions in 2000. CO₂ and CH₄ are considered to be the most potent GHGs and reduction in emissions of these and other GHGs will be the responsibility of the Ministry of Science Energy and Technology (MSET) based on the policies that have been already implemented or are currently being reviewed. This document will provide a review of the policies within MSET which address how GHGs will be reduced in Jamaica.

1.0 Legislative Framework

Policies within MSET which address the issue of GHG emissions are driven by existing legislations:

- The Jamaican Constitution (1962) Chapter III 13(2I) which states that all Jamaicans have the *'right to enjoy a healthy and productive environment free from the threat of injury or damage from environmental abuse and degradation of the ecological heritage.'*
- The Clean Air Act (1964), Section 6(1) which stipulates that all owners of industrial operations should use the best practicable means for:
 - a) *preventing the escape of any noxious or offensive gas; and*
 - b) *preventing the discharge of any such gas into the air; and*
 - c) *rendering such gas, where discharged, harmless or inoffensive*

2.0 Existing Policies within MSET

The overarching plan which addresses the impacts of increased GHG emissions is the **National Development Plan (NDP): Vision 2030**. According to **Outcome #1** (A Healthy and Stable Population), the state of the environment is important to maintaining one's health. The NDP states that standards must be implemented to contain the levels of atmospheric, water and ground pollution. Provisions are also made in **Outcome #9** (Strong Economic Infrastructure) where the negative impact on the environment by fuel emissions should be reduced. However, it is **Outcome #10** (Energy Security and Efficiency) that gave rise to the **National Energy Policy** from which sub-policies were derived to align with Vision 2030's goal of creating a modern, efficient, diversified and environmentally sustainable energy sector in Jamaica.

2.1 National Energy Policy (NEP) 2009 – 2030

The NEP was developed in response to global trends and issues related to energy. In highlighting the link between energy and the environment, the policy states that:

‘The burning of fossil fuels is the single largest contributor to emissions of greenhouse gases (GHG) such as carbon dioxide and nitrous oxide that contribute to global warming and climate change. The development and implementation of a national energy policy is therefore an important component for the achievement of sustainable national development and must balance issues relating to demand, supply, energy security, conservation and development of renewable energy technologies.’

It was also highlighted that mitigation efforts such as energy efficiency and conservation programmes, as well as the use of alternative energy sources will, *inter alia*, contribute to the reduction in global GHG emissions. Additionally, the *‘development, deployment and wide-scale use of new, clean technologies in industry for example, emitting fewer greenhouse gases and other air pollutants is also essential in pollution reduction and the protection of human health.’* There are three goals of the Policy which address the GHG emissions and air pollution – Goals 3, 4 and 7.

Goal 3 of the NEP focuses on Renewable Energy Sources as the priority area. The percentage of renewable energy mixes (of the total energy used) is projected to increase, with given targets of 11% by 2012, 12.5% by 2015 and 20% by 2030 according to the NEP. The latter target was revised to 30% by 2030, by the current Minister of Science, Energy and Technology – Dr Andrew Wheatley. Through increased use of renewable energy, the dependence on fossil fuels will be reduced and air pollution lowered. The key strategies and actions involved in accomplishing this goal will be discussed further in the review of the Renewable Energy Policy (2009 – 2030).

Goal 4 of the NEP focuses on Energy Security as the priority area. The energy supply for Jamaica will be more secure and sufficient to meet long-term demand and through diversification of energy sources, the reliance on fossil fuels will be decreased. Two of the key issues that will be addressed under this goal, are air pollution and the reduction in emissions from the generation and transmission of energy. The introduction of a National Vehicle Emissions Standards and Regulations was highlighted as a strategy to be employed in the reduction of vehicular emissions under this policy.

Goal 7 of the NEP focuses on Eco-Efficiency in Industry as the priority area. The goal was developed in response to, *inter alia*, a lack of energy management programmes in the private sector, low levels of energy efficiency and conservation and the need to move towards a green economy. A key strategy identified by the NEP to achieve this goal, is for emission standards to be established, implemented and enforced.

2.2 Draft National Renewable Energy Policy (2009 – 2030)

The Draft National Renewable Energy Policy (REP) is a sub-policy under the NEP which aims to lead Jamaica into a new and sustainable energy future through its focus on the use of renewable energy sources as opposed to fossil fuels. The REP, although a sub-policy, also provides the framework for two other sub-policies under the NEP: the Energy-from-Waste Policy and the Biofuels Policy. One of the three environmental drivers of the REP, is that of '**Reducing Emissions**'. In outlining the benefits of establishing a renewable energy sector in Jamaica, less emissions and reduced GHG emissions associated with electricity generation were outlined as two of the key benefits.

Under **Goal 2** of the REP, renewable energy is promoted through the introduction of key policy instruments. In noting fiscal limitations, Goal 2 outlines that international funding for projects that reduce GHG emissions are more accessible due to the fact that Jamaica has already ratified the United Nations

Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol; both of which address the need for countries to reduce GHG emissions. Under **Goal 3**, the legislative system which will support the renewable energy sector is dynamic and effective which will lead to the energy targets being met.

Section 3 of the REP outlines the Implementation, Monitoring and Evaluation Framework. The successful implementation of the policy requires certain key players, chief being the Ministry of Science Energy and Technology, where linkages will be made between the energy sector and other industries (e.g. transport, agriculture, environment etc.). The Policy outlines the role of the National Environment and Planning Agency (NEPA) in ensuring that environmental considerations are included in renewable energy projects and will determine the impact of such projects on the emission of greenhouse gases. The strategies listed in the REP to address the reduction of emissions are given in Table 1.

Table 1 showing projects geared towards reducing emissions under the Renewable Energy Policy

Flagship Project	Responsible Agencies	Contribution to other Goals	Strategies	Expected Outcomes
Biomass and Biofuels (Ethanol and Diesel)	MSET, PCJ, MICAF, SRC Support: UWI and UTECH	Goal 3	Introduce ethanol blends to replace methyl tertiary-butyl ether (MTBE) as fuel additive and increase energy security. Introduce biodiesel blends to increase environmental protection and reduce carbon emissions.	Development and implementation of bio-fuel policy and programs Establishment of a strong legal and regulatory framework for liquid bio-fuels industry
			Identify and develop indigenous non-renewable sources of energy and necessary enabling environment to encourage private sector participation	Island-wide E10 distribution infrastructure Development of testing labs
	PCJ, NSWMA, OPM	Goal 3	Identify and develop indigenous renewable	Avoided carbon emissions

Waste to Energy Project	Support: JPSCo, OUR, NEPA, UTECH, UWI		sources of energy and necessary enabling environment to encourage private sector participation	Generation of energy from waste Waste minimization
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Although not listed in Table 1, an expected outcome of the Biomass and Biofuels project would be a reduction in GHG emissions over time.

2.2.1 Net Billing, Electric Power Wheeling and Auxiliary Connections

The REP also noted the importance of promoting renewable energy through incentive programmes such as net metering and wheeling. Since the policy was drafted, Jamaica has since implemented Net Billing (2012) and Electric Power Wheeling (2017). These incentive plans were developed out of a need to promote cleaner energy sources which would decrease the country’s reliance on fossil fuels, which emit greenhouse gases when burned for energy. The responsibility of processing applications for both plans fall under the Energy sector of MSET.

With net billing, a consumer which generates energy from renewable sources is able to sell excess electricity back to the utility company (Jamaica Public Service Company, JPSCo) at a cost which is less than the retail value at which the utility charges the customer for consumption. Both electricity taken from the electricity grid and that which is supplied back to the grid are therefore priced differently. Customers under net billing lend support to the grid by contributing energy which would have been otherwise obtained through the burning of fossil fuels. The net billing pilot programme concluded in 2015, the same year which it was legislated and afterwards processing of new applications began in 2016.

Electric Power Wheeling will allow customers who generate energy at one location to use credit obtained from JPSCo at another location. With this new incentive, customers who own multiple properties can use the energy credit obtained to offset their electricity bill at another location. This also acts as an incentive to encourage persons to use renewable sources.

Auxiliary connections describe persons being connected to the national grid for other purposes aside from net billing or power wheeling, where electricity is generated for personal use and not for exporting to the grid. Such a connection may be necessary for a self-generating customer who needs power from the grid to stabilize their system by protecting it from frequency fluctuations or a customer may be able to independently supply some of their load requirements but need to supplement that with power from the grid at intervals. With auxiliary connections, a customer can comfortably invest in renewable energy sources because the option is available to get additional support from the national grid. Their non-reliance on the grid for electricity would lead to a reduction in fossil fuels, which would have otherwise been used to support such customers. Similarly, the net billing and power wheeling incentives will promote the use of renewables and thus, the Vision 2030 goal of having 30% renewable energy by 2030 is closer to being achieved, which would mean a reduction in GHG emissions.

2.2.2 Legislative Framework for Promoting Renewable Energy

Net Billing has been legislated in the newly amended Electricity Act of 2015. Specifically, under Section 9(4) of the Electricity Act (Non-Refundable Processing Fee) (Other Arrangements) Order, 2016:

'Proposed licensees seeking the grant of a licence under Section 9(1)(b), for net billing, shall pay a non-refundable processing fee in the amount of Fifteen Thousand Jamaican Dollars (JM \$15,000.00).'

Provisions for auxiliary connections and power wheeling are given under Section 9(4) of The Electricity Act (Non-Refundable Processing Fee) (Other Arrangements) Order, 2016:

'Proposed licensees seeking the grant of a licence under Section 9(1)(b), for connecting to the grid for some other purpose, shall pay a non-refundable processing fee in the amount of the Fifteen Thousand Jamaican Dollars (JM \$15,000.00).'

'Under the grant of a licence under Section 9(1)(b) of the principal Act, for connecting to the grid for some other purpose, the licence fee payable by the licensee shall be Fifty Thousand Jamaican Dollars (JM \$50,000.00).'

2.2.3 Renewable Energy Achievements to Date

At present, the energy generated from renewable sources stands at 10.5% of net electricity generation. In 2016, an additional 80 MW of generating capacity was connected to the national grid: 24 MW from the Wigton III wind farm, 36.8 MW from Blue Mountain Renewables (BMR) and 20 MW from Content Solar. In 2016, the government of Jamaica also selected Eight Rivers Energy Company (EREC) to construct and operate a 33.1 MW solar PV plant. Added to the pre-existing projects (Wigton was producing 38.7 MW before 2016), the total amount of energy from renewable sources connected to the national grid will stand at 152.6 MW after EREC begins its operations.

At the start of the BMR operations, it was postulated that the wind farm would reduce greenhouses gases by about 60,000 tonnes CO₂ per year which would be equivalent to removing 13,000 cars from the road. Therefore, with 152.6 MW of renewable energy being contributed to the national grid, GHGs will be reduced by approximately 457,800 tonnes of CO₂ per year. All phases of the Wigton Windfarm alone have led to the reduction in CO₂ emissions by 800,000 tonnes between 2004 and mid-2016, and therefore with additional entities, a significant reduction in emissions is expected. Aside from large companies such as the aforementioned, the megawatts of energy being self-generated by residential customers will also contribute to reduced GHG emissions.

2.3 Draft National Energy Conservation and Efficiency Policy

The Draft National Energy Conservation and Efficiency Policy (ECEP) is a sub-policy under the NEP which recognizes that energy conservation and efficiency (ECE) must be given priority attention. One of the key

benefits highlighted in the ECEP is the reduction of GHG emissions and the policy is closely linked to the REP with the same targets as shown in Table 1 also being outlined in the ECEP for reducing emissions.

2.3.1 Energy Conservation Projects

Under the REP and ECEP, energy conservation is an important consideration as it will cause an overall reduction in the use of fossil fuels for electricity and this has an indirect impact on GHG emissions. There are two projects which the Government of Jamaica have undertaken to meet the energy conservation goals of the REP: **Energy Efficiency and Conservation Programme (EECP)** and **Energy Security Efficiency and Enhancement Project (ESEEP)**. The EECP was designed to reduce energy consumption in the public sector by retrofitting Government establishments with energy efficient equipment (cool roof, solar control film and air-conditioning). As of July 2016, through energy efficiency mechanisms being implemented in 41 public sector facilities, a total of 1,954 barrels of oils which is equivalent to 2,514 tonnes of CO₂ have been reduced. The ESEEP's objective is to increase energy efficiency and security through the implementation of the legislative plans and actions associated with the National Energy Policy (e.g. feasibility studies, software and testing equipment).

A new programme will be implemented in 2017 – **Energy Management and Efficiency Programme (EMEP)**, which will consolidate and expand on the achievements of the EECP and ESEEP. The EMEP will be jointly financed by the Inter-American Development Bank (IDB) and the Japan International Cooperation Agency (JICA), and its objective is to reduce carbon dioxide emissions, as well as other environmental benefits. On announcing the project, Dr Wheatley noted that *“In increasing the gains made from ESEEP and EECP, the EMEP will....reduce travel times and lessen fuel consumption through improved traffic control management, which will translate to lower carbon dioxide.”*

2.3.2 Liquid Nitrogen Gas (LNG)

The use of liquid nitrogen gas (LNG) was outlined as an alternative fuel source by the REP due to the fact that as the least corrosive fuel, LNG is a clean and efficient energy source that is more beneficial to the environment than fossil fuels. Although in the strictest sense this is not a renewable source of energy, its use over petroleum will result in a reduction of GHG emissions and increase energy efficiency. Under an agreement, the USA-based New Fortress Energy will provide JPSCo with LNG for its 120 MW power plant at Bogue in Montego Bay, St. James. At the opening of the LNG plant in November 2016, Prime Minister Andrew Holness highlighted the possibility of using LNG in the public transport system as this would significantly lower operation cost and will reduce Jamaica's carbon footprint through GHG emissions being lessened.

2.4 Draft National Energy-from-Waste Policy 2016 – 2030

The Draft National Energy-from-Waste (EFW) Policy was developed in response to the NEP with the main objective being to provide affordable and clean energy from waste in an effort to ensure Jamaica's sustainable future. The policy notes that *'Energy from waste will displace expensive petroleum, result in lower greenhouse gas emissions and contribute to Jamaica's fuel diversification.'*

The EFW policy outlines the importance of managing gases released from landfills. The main gases produced are methane (CH₄) and carbon dioxide (CO₂), both of which are considered to be the most potent, heat-trapping greenhouse gases. The amount of gas produced by the landfill is directly proportional to the total quantity of organic material contained in the landfill. Therefore, with the EFW policy, methane recovered from waste can be used as an energy supply, as opposed to being released into the atmosphere to further exacerbate the greenhouse effect. A key component of **Goal 2** of the EFW

policy is the exploration and development of systems to capture landfill gas in an effort to improve air quality.

2.5 Draft Biofuels Policy

The Draft Biofuels Policy is another sub-policy of the NEP which was developed to assist with meeting the energy targets for renewable energy. The Policy notes that biofuels, which are derived from renewable biomass resources, are able to satisfy energy needs in a way which is cost-effective and able to reduce the dependence on fossil fuels. Biofuels are one of the few low-carbon options available for the transport sector which provide lower emissions of harmful pollutants. Thus, an important environmental benefit from the use of biofuels is the reduction of GHG emissions.

As shown in Table 1, a key strategic action of the Biofuels Policy is the use of bioethanol (fermentation of sugar components from plants such as sugar cane) for fuel in vehicles. Although it can be used in its pure form, in Jamaica it is used as a gasoline additive to produce E10 – a mixture of 10% ethanol and 90% gasoline. The policy also highlights that through replanting cane fields with the intention of creating biofuels, the newly created vegetated areas will act as carbon sinks where CO₂ is removed from the atmosphere, thus reducing the greenhouse gas effect. The NEPA will have the responsibility of ensuring that the facilities engaging in biofuels production are operating in a manner that causes no harm to human health and the environment is protected from harmful emissions.

2.6 Draft Trading of Carbon Credits Policy

The Draft Trading of Carbon Credits (TCC) Policy is a sub-policy of the REP that is important in Jamaica's climate change strategy that facilitates reductions in the country's GHG emissions. The mitigation projects which qualify for carbon credits fall into three categories – renewable energy that replaces/reduces fossil fuel consumption, energy efficiency and afforestation/reforestation. The policy is developed to facilitate

Jamaica's fulfilment of its commitment to the UNFCCC and to create the necessary framework for generating carbon credits. Under this policy, the majority of the GHG mitigation projects are initiatives that develop renewable energy sources and energy efficiency programmes. Potential carbon emissions reduction projects in Jamaica were listed in the TCC as:

- Renewable energy (wind, solar, hydro, biofuels)
- Alternative fuel sources (liquefied natural gas, compressed natural gas)
- Energy-from-Waste
- Energy Efficiency
- Land Use, Land Use Change and Forestry

Through the renewable energy, energy efficiency and energy-from-waste projects, the TCC Policy forms linkages with the REP, ECEP and the EFW Policy.