



National Renewable Energy Policy 2009 – 2030 ...Creating a Sustainable Future



Ministry of Energy and Mining

August 26, 2010

National Renewable Energy Policy



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List of Acronyms

CDM	Clean Development Mechanism
CO ₂	Carbon dioxide
CPDI	Cambridge Project Development Incorporation
EFW	Energy-from-Waste
EIA	Environmental Impact Assessment
GHG	Greenhouse Gas
IPP	Independent Power Producer
MSW	Municipal solid waste
MW	MegaWatt
NEPA	National Environment and Planning Agency
NGO	Non-governmental Organization
OPM	Office of the Prime Minister
OUR	Office of Utilities Regulation
PCJ	Petroleum Corporation of Jamaica
PWG	Policy Working Group
REP	Rural Electrification Programme
RET	Renewable Energy Technologies
SRC	Scientific Research Council
SWOT	Strengths, Weaknesses, Opportunities, Threats
WTE	Waste-to-Energy
UNFCCC	UN Framework Convention on Climate Change

Acknowledgements

The Ministry of Energy and Mining wishes to thank the members of the Renewable Energy Policy Working Group for providing technical support and guidance to the development of this policy.

The National Energy Policy 2009 – 2030 provided the overarching framework for the development of this Renewable Energy Policy. Of note, we also wish to thank the members of the Energy and Minerals Development Thematic Working Group of the Vision 2030 Jamaica – National Development Plan Monitoring and Evaluation Process as well as the various Ministries and Agencies that assisted the process by providing pertinent data and engaging in the consultative process that is so important in national policy development.

We also wish to thank our International Development Partners who are currently providing extensive support in the development of Jamaica’s energy sector and in particular our efforts at achieving energy security, diversification of the country’s energy mix and reducing the cost of energy to Jamaicans.

Message from the Minister of Energy and Mining



Following on the promulgation of Jamaica's first long-term National Energy Policy 2009 – 2030 in December 2009, I am happy to present to the nation, Jamaica's first National Renewable Energy Policy. This Policy sets out the roadmap by which we will steer Jamaica to a new and sustainable energy future.

It is well known that the challenges for energy policy are complex and urgent. Today in Jamaica, we are faced with high energy demand, volatile fossil fuel prices and uncertainty about security of supply. Environmental threats and the challenge of climate change require us to join other nations for urgent global action. The development of this Renewable Energy Policy and the promotion of establishing renewable energy sources (RES) will effectively contribute to economic development and environmental sustainability bringing economic opportunities to our island state and strategically positioning some of our larger companies in this soon to be rapidly expanding sector.

Within the context of the National Energy Policy, a commitment has been made to have by 2030, twenty percent of the country's energy mix coming from renewable sources. Recognizing that our economic and social development will entail an increase in energy demand, an energy importing country like ours needs to continually review our energy options and diversify our energy sources. This Renewable Energy Policy therefore has to be priority as today as much as 87% of the foreign exchange earned in this country goes back into buying imported oil. So while on the one hand we will diversify our energy mix we also will simultaneously displace Jamaica's need to spend foreign exchange on the importation of fossil fuels.

Through the Policy Framework we will seek to accomplish a number of things such as the implementation of a stable regulatory framework to effectively facilitate the deployment of renewable energy technologies such as those related to wind, solar, biomass among others. The use of biomass and waste to generate energy for example will benefit the agricultural sector on one hand as well as contribute to better management of the country's waste on the other hand.

In this policy we also will take into account that fact that renewable energy sources also face sustainability challenges. For example, the recent growth in the use of biofuels has contributed to rising food prices and greater food insecurity globally. Land conversion can also threaten our unique biodiversity. To this end, through the policy framework we will ensure among other things that appropriate production methods and technologies are adopted to ensure sustainable use of the resources of this "land of wood and water".

In essence this Renewable Energy Policy will create the conditions for the development and commercial implementation of renewable technologies. Government will use a phased, managed and partnership approach to renewable energy projects that are well conceived and show the potential to provide acceptable social, environmental and financial returns for all investors and stakeholders involved - contributing to a more sustainable future for all Jamaicans. Renewable energy is good business for Jamaica, it will be profitable, and will help to boost our economy in the short, medium, and long term, helping Jamaica to become “the place of choice, to live work, raise families and do business”.

James Robertson, M.P.



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Executive Summary

This document presents Jamaica’s National Renewable Energy Policy which is designed to achieve:

A well-developed, vibrant and diversified renewable energy sector that contributes to Jamaica’s energy security and a sustainable future

This policy supports the implementation of the National Energy Policy 2009-2030 which seeks to provide **“affordable and accessible energy supplies with long-term energy security.”** The creation of this policy was a specific response to the National Energy Policy which calls for the development of the energy sector especially in areas related to renewables, diversification fuels, biofuels and waste-to-energy.

Overview and Context

Jamaica is highly dependent on imported petroleum to meet its energy needs. The country imports approximately 91% of its energy, with the remainder derived from renewable sources. The spiraling cost of world oil prices, coupled with an increasing demand for fuel locally and the paucity of financial resources to cover an ever increasing oil bill, necessitate that Jamaica urgently explores various options in the energy sector.

Jamaica, through its national energy policy, Vision 2030 Jamaica – National Development Plan and its national renewable energy policy has set targets for renewable energy and the percentage diversification of energy supply. By 2030, the policy articulates that 20% of the country’s energy mix would be from renewable sources.

This Renewable Energy Policy will focus on meeting these national energy policy goals with regard to competitiveness, environment, and security of supply, R&D and the development of a sustainable energy market. The primary focus will be on the deployment of wind, the emerging potential and deployment of biomass and biofuels, the development of energy-from-waste initiatives, exploratory work on ocean energy and the deployment of other technologies such as solar and hydro technologies. Deployment will be delivered through a range of strategies creating the enabling environment for the development of, and investment in, the renewable energy sector and other support mechanisms such as requiring power regulators to integrate wind, small hydro, cogeneration etc. into their systems.

The Ministry of Energy and Mining and its Departments and Agencies will take leading roles in the implementation of this policy. Collaboration with other sectors such as environmental management, agriculture, and finance also will be necessary.

Policy Framework

The policy framework is underpinned by a **Strategic Framework** which sets out the goals, strategies and actions necessary to facilitate the implementation of the policy; and the **Institutional Framework** describes the roles and responsibilities of the various stakeholders in the renewable energy sector.

The Strategic Framework underpinning this policy presents five (5) goals which will contribute

- Goal 1:** The economic, infrastructural and planning conditions conducive to the sustainable development of all of Jamaica’s renewable energy resources
- Goal 2:** An enabling environment that facilitates the introduction of key policy instruments (financial and fiscal) for the promotion of renewable energy (by redirecting national resources and investments to RETs)
- Goal 3:** A dynamic legislative and regulatory environment, responsive to growth and development in the renewable energy sector
- Goal 4:** Enhanced technical capacity and Public awareness of renewable energy through effective support of training programmes, information dissemination strategies and ongoing government communication
- Goal 5:** Sustained R & D and innovation in existing and emerging RETs

to achieving the vision for the sector. These five goals are:

For each goal, the framework presents short- to medium-term as well as long-term strategic directions for the government, private sector and industry and names the key implementing agencies. The framework has been designed to be flexible and adaptable to meet new challenges and opportunities as they arise.



Section 1

Background, Overview and Context

Background

Renewable energy is derived from resources that are generally not depleted by human use, such as the sun, wind, and water movement or from resources that can be rapidly replenished such as biomass. These primary sources of energy can be converted into heat, electricity, mechanical energy, and transportation fuels in several ways. There are some mature technologies for conversion of renewable energy such as hydropower, biomass, and waste combustion. Other conversion technologies, such as wind turbines and photovoltaics, are already well developed, but they have not achieved the technological efficiency and market penetration that they are expected to ultimately reach.

Renewable energy and its associated technologies are therefore essential contributors to sustainable energy as they generally contribute to world energy security, reducing dependence on fossil fuel resources, and also provide opportunities for mitigating greenhouse gases.

High and fluctuating oil prices have continued to stimulate strong debate locally of the role that renewable energy may play in producing electricity, displacing fossil fuel use, and impacting the need for power transmission equipment and replacing aged equipment.

Today, renewable energies cover 25% of global power capacity from all sources and delivered 18% of global electricity supply in 2009 (RE 21, 2010).

The Government of Jamaica like many other countries around the world and particularly those in emerging economies is increasingly recognizing the potential role of renewable energy within a portfolio of low-carbon and cost-competitive energy technologies capable of responding to the emerging major challenges of energy security, climate change, and access to energy. Globally today in 2010 there is much active renewable policy development with more than 100

The term “renewable” is generally applied to those energy resources and technologies whose common characteristic is that they are non-depletable or naturally replenishable.

Renewable resources include solar energy, wind, falling water, the heat of the earth (geothermal), plant materials (biomass), waves, ocean currents, temperature differences in the oceans and the energy of the tides. Renewable energy technologies produce power, heat or mechanical energy by converting those resources either to electricity or to motive power.

countries enacting some type of policy target and/or promotion policy related to renewable energy, up from 55 countries in early 2005.

Jamaica’s National Energy Policy 2009 – 2030 calls for Jamaica to realize its energy resource potential through the development of renewable energy sources and enhance its international competitiveness, energy security whilst reducing its carbon footprint. This is further emphasized in Goal 3 of that policy. The National Policy also sets targets for the percentages of renewable energy in the energy supply mix to 2030. By 2030, the policy articulates that 20% of the country’s energy mix would be from renewable sources. One of the main purposes of setting these national targets for renewable energy is to provide certainty for investors and to encourage continuous research in technologies which have the potential to generate energy from all types of renewable sources.



The purpose therefore for the development of a National Renewable Energy Policy is to set out Jamaica’s goals and objectives for renewable energy to 2030. This Policy furthermore commits Government to a number of enabling strategies to ensure that renewable energy becomes a significant part of its energy portfolio over the next twenty years.

In contrast to conventional energy sources, there has been a continued and significant reduction in the cost for renewables over the last 20 years. As an example, the cost of wind energy per kWh has fallen by 50% over the last 15 years while at the same time the size of the turbines has increased by a factor of 10. Solar photovoltaic systems today are more than 60% cheaper than they were in 1990.

This National Renewable Energy Policy is directly related to the achievement of Goals 3 and 4 of Jamaica’s National Energy Policy 2009 – 2030 and will focus on introducing measures that will allow us to achieve the targets set for renewable energy as defined in the National Energy Policy 2009 – 2030.

Goal 3 of the policy states that **“Jamaica realizes its energy resource potential through the development of renewable energy sources and enhances its international competitiveness and energy security whilst reducing its carbon footprint”**. This goal focuses on the development of indigenous renewable energy resources with the goal of increasing the percentage of renewables in the energy mix to 20% by 2030. Waste is considered a renewable source of energy since it is indigenous and sustainable. By adding waste to the list of solar, hydro, wind and biofuels, the target of renewables in the nation’s energy mix will be facilitated.

Goal 4 of the policy states that **“Jamaica’s energy supply is secure and sufficient to support long-term economic and social development and environmental sustainability”**. Under this goal, Jamaica will reduce the percentage of petroleum in the country’s energy supply mix from the current 95% in order to protect the country from disruptions in oil supply and price volatility. The Renewables energy policy will effectively contribute to fuel diversification to achieve this goal.

This Renewable Energy Policy will focus on meeting these national energy policy goals with regard to competitiveness, environment, and security of supply, R&D and the development of a sustainable energy market. The primary focus will be on the deployment of wind, the emerging potential and deployment of biomass and biofuels, exploratory work on ocean energy and the deployment of other technologies such as solar and hydro technologies. Deployment will be delivered through a range of strategies creating the enabling environment for the development and investment in the renewable sector and other support mechanisms such as requiring power regulators to integrate wind, small hydro, cogeneration etc. into their systems, and the linking of all such incentives to energy generated as opposed to capacity created; as well as requiring power regulators to mandate feed-in laws for renewable energy, where appropriate.

The development of this sector will require strong and sustainable partnerships among the public and private sectors as well as with academia. Energy from renewable sources is therefore expected to play a major role in Jamaica’s future energy provision. In essence, this National Renewable Energy Policy will outline how Jamaica will meet its legally (constitutionally)-binding target to ensure 20% of energy comes from renewable energy sources by 2030.

Introduction

This document presents Jamaica’s National Renewable Energy Policy. This policy is one of six (6) sub-sector policies under the National Energy Policy 2009 – 2030 that are intended to support the achievement of the goals of the National Energy Policy 2009-2030 which seeks to provide “affordable and accessible energy supplies with long-term energy security.” The National Energy Policy calls for the development of the energy sector, with specific emphasis on renewables, new and alternative fuels, biofuels and waste-to-energy.

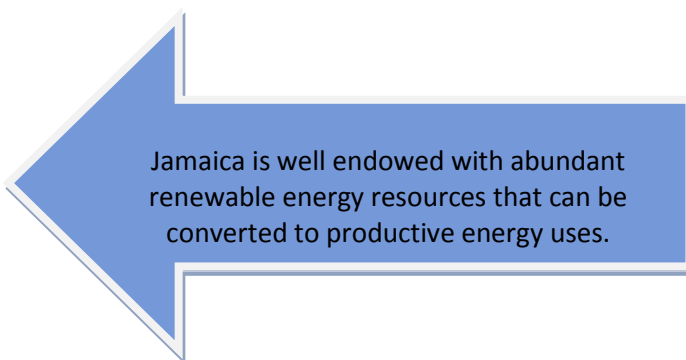
The National Renewable Energy Policy will enable **“A well developed, vibrant and diversified renewable energy sector that contributes to Jamaica’s energy security and a sustainable future”**

It is well known globally that growth of renewables is strongest when policymakers establish favourable policy frameworks. This National Renewable Energy Policy establishes a general structure for the development of Jamaica’s renewable energy sector to reach its full potential by 2030. This policy also will promote sustainable development in Jamaica by protecting the environment and contributing economic development and the international effort to curb climate change impacts. The Renewable Energy Policy establishes a strategic framework that includes goals, outcomes and strategies that will effectively promote the development and use of renewable energy.

Whilst this National Renewable Energy Policy is a sub-policy under the National Energy Policy, it also plays a critical role in creating the framework for 2 of the other sub-sector policies of the National Energy Policy: the Energy-from-Waste Policy and the Biofuels Policy. It also will support the achievement of many of the goals articulated in the Policy for the Trading of Carbon Credits.

Sub- Policies under Jamaica’s National Energy Policy 2009 – 2030

- Renewable Energy Policy
- Energy-from-Waste Policy
- Biofuels Policy
- Carbon Emissions and Trading Policy
- Energy Conservation and Efficiency Policy
- Electricity Policy



Jamaica is well endowed with abundant renewable energy resources that can be converted to productive energy uses.

Additionally, to garner full interest and support for renewable energy, the policy will provide the framework for the integration of renewable energy into other related policy fields such as environment, spatial planning, economic affairs, and employment, thereby broadening the basis for long-term sustainability of support for renewable energy.

The Policy also will recognize the importance of the Clean Development Mechanism (CDM) within the development of the renewable energy sector, and that the CDM can help develop renewable energy projects, but this endeavour alone will not suffice to enable the country to reach the overall renewable energy targets as set out in the National Energy Policy 2009 - 2030. Therefore, this policy will ensure stimulation of new investment in renewable energy sources, through the application of various policy instruments directed specifically to renewables.



This Renewable Energy Policy is expected to create an overarching framework and the necessary conditions to enable Jamaica to harness all its renewable energy resources – with waste being one such component. Jamaica believes that energy-from-Waste can make a significant contribution to achieving renewable energy targets, ensuring security of energy supply as well as treating waste that cannot otherwise enter a waste minimization and recycling programme.

Structure of the National Renewable Energy Policy

The Renewable Energy Policy is structured as follows:

Section 1 – Background, Overview and Context provides the introduction to and rationale for the policy, identifies the linkages between this policy and the National Energy Policy 2009 –

2030, as well as other sub-sector policies under the national energy policy. This section also presents the current framework for renewable in Jamaica and global issues and trends in renewable energy.

Section 2 – Defining the Policy Framework presents the vision for the renewable energy sector in Jamaica and the policy/strategic framework (goals and strategies) for this policy. Section 2 also includes the institutional framework for renewable energy Jamaica.

Section 3 – Implementation, Monitoring and Evaluation Framework describes the implementation, monitoring and evaluation framework for this policy.

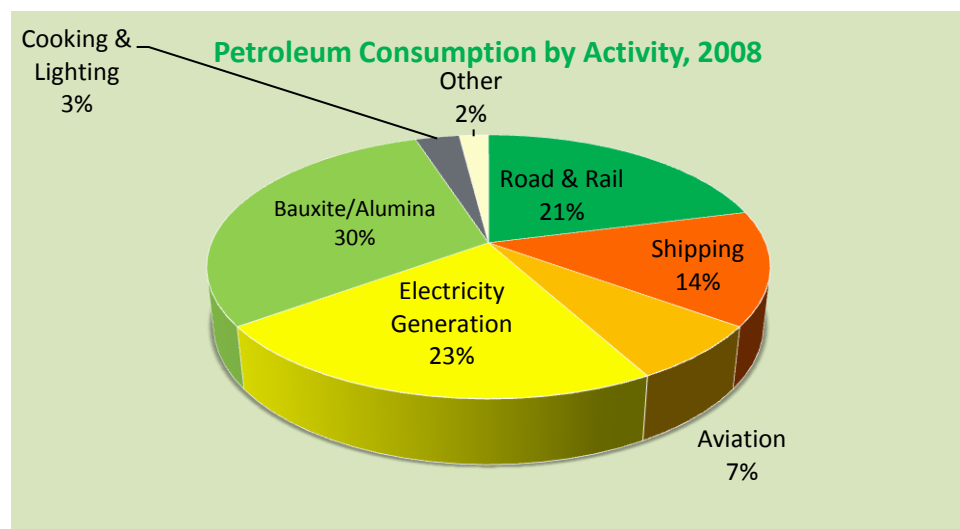
The Energy Sector in Jamaica

The development of Jamaica’s energy sector shows much promise in reducing dependence on imported petroleum, lowering the cost of energy to consumers and creating a framework for better use of energy through energy conservation and efficiency by all Jamaicans, because of the promulgation of the country’s first long-term National Energy Policy 2009-2030. The national policy was promulgated in 2009 to address the situation facing the energy sector of being “characterized by an almost complete dependence on imported petroleum; high rates of energy use; ... and an inadequate policy and regulatory framework.” The extreme dependence on imported petroleum has significant economic impacts, with 87% of the nation’s foreign exchange earned being used to buying imported oil.

Energy Use in Jamaica

Jamaica currently consumes about 60,000 barrels of oil per day to meet its diverse needs. Over the past decade, the level of annual oil imports moved from 23.6 million barrels in 1999 to about 22.1 million barrels in 2009¹, representing an overall average annual decline of one percent (1%) per annum. Jamaica’s energy mix remains dependent on the use of imported fossil/petroleum fuels which account for 91% of the energy mix, while renewable resources account for 9%. Most of the renewable sources come from wind, hydro, fuelwood, bagasse, solar and ethanol (used in the transportation sector).

Transport is the largest consumer of petroleum in Jamaica’s economy, accounting for 37 percent of total petroleum consumption in 2008 and the demand for automotive fuels (gasoline and diesel



oil) is growing at a rate of 4.3% per annum. The bauxite and alumina industry accounts for 34 per cent, while electricity generation accounts for 23 per cent.

¹ Ministry of Energy and Mining, Oil Import Statistics, 2009

The table below shows the petroleum import levels over the past five years, and the utilization by sector.

National Petroleum Consumption by Activity

INPUTS	History				Base
	2005	2006	2007	2008	2009
Total Fuel Imports (M BOE)	27.33	29.16	29.09	27.80	22.10
For Electricity	6.55	6.39	6.65	6.27	6.66
For Bauxite Industry	9.80	9.55	8.81	9.39	3.39
For Road and Rail Transportation	6.25	6.37	6.08	5.84	5.90
Other (shipping, aviation and other manufacturing)	4.73	6.85	7.55	6.30	6.15
Growth	--	6.7%	-0.2%	-4.4%	-20.5%
Cost of Fuel Imports (M US\$)	\$1,397	\$1,837	\$2,007	\$2,706	\$1,350
Composite overall cost per barrel of crude	\$55.51	\$59.77	\$61.64	\$97.34	\$61.09

Source: Ministry of Energy and Mining Oil Import Statistics 2009

The following table provides a synopsis of the energy sector, identifying some key strengths and weaknesses.

Strengths:

- Jamaica has a well developed power supply and distribution system with more than 90% of the population having access to electricity
- Jamaica is endowed with a very high potential for the use of renewables in the form of solar, wind and biomass production
- There are diverse opportunities for co-generation

Weaknesses:

- High dependence on imported petroleum
- Lack of known indigenous fossil fuel sources
- High energy import bill
- High cost of electricity
- Old/aging electricity generation plant - Over 40% of the power generation system is old and in need of replacement/retirement
- Aged technology of the local petroleum refinery
- Lack of detailed and up-to-date data for determining renewable energy projects
- Slow development of renewable energy resources
- Low levels of public action on energy conservation
- Weak enforcement powers of regulatory agencies

The National Energy Policy is expected to build on the strengths and reduce many of these weaknesses.

Management of the Energy Sector

The Ministry of Energy and Mining has overarching responsibility for the development of the energy sector in Jamaica. The Ministry's Energy Division facilitates the development of strategies, programmes and projects to ensure the successful implementation of the National Energy Policy with a focus on the identification of new, renewable and alternative energy sources and the promotion of energy conservation and efficiency.

The Petroleum Corporation of Jamaica (PCJ) is the main implementing agency of the Ministry and focuses on implementing the energy security and fuel diversification strategies and the cost-effective availability of petroleum products.

The Jamaica Public Service Company Limited (JPSCo) is the National Electric Grid Operator and, along with several Independent Power Producers (IPPs), satisfies the electricity generation needs of the country.

The Rural Electrification Programme (REP) has responsibility for providing electricity to non-urban areas. Under the REP, 7,000 km of low voltage distribution lines were constructed and approximately 70,000 rural homes electrified. In excess of 90% of households island-wide now have access to electricity.

Currently, the Government of Jamaica owns 20% of the Jamaica Public Service Company (JPSCo) Limited. The Government has taken the decision to privatize and liberalize the electricity sector, and as a first step, all new generating capacity is being undertaken by the private sector through independent power producers (IPPs) which generate electricity for their own use (self producers) and/or for sale to the national grid. While JPSCo retains a monopoly on the transmission and distribution of electricity, independent power providers now account for over 25% of electricity generation capacity. In 2008, total generating capacity in Jamaica was approximately 818 megawatts (MW), which included 217 MW capacity provided by IPPs.

Jamaica’s National Energy Policy 2009 – 2030

Jamaica’s National Energy Policy 2009 – 2030 is designed to ensure that by 2030 Jamaica achieves:

“A modern, efficient, diversified and environmentally sustainable energy sector providing affordable and accessible energy supplies with long-term energy security and supported by informed public behaviour on energy issues and an appropriate policy, regulatory and institutional framework”

This Strategic Framework– the goals and strategies underpinning this National Energy addresses both supply and demand energy issues the country faces and places priority attention on seven key areas:

1. Security of Energy Supply through diversification of fuels as well as development of renewables
2. Modernizing the country’s energy infrastructure
3. Development of renewable energy sources such as solar and hydro
4. Energy conservation and efficiency
5. Development of a comprehensive governance/regulatory framework
6. Enabling government ministries, departments and agencies to be model/leader for the rest of society in terms of energy management
7. Eco-efficiency in industries

The National Energy Policy will support the implementation of Vision 2030 Jamaica – National Development Plan, particularly National Outcome #10 – Energy Security and Efficiency and is therefore consistent with, and part of the overarching vision for achieving developed country status by 2030. The National Energy Policy and its relationship to Vision 2030 Jamaica as well as Government’s policy-making framework are presented in the matrix below:

“Jamaica, the place of choice to live, work, raise families and do business”

“A modern, efficient, diversified and environmentally sustainable energy sector providing affordable and accessible energy supplies with long-term energy security and supported by informed public behaviour on energy issues and an appropriate policy, regulatory and institutional framework”

(Vision of Jamaica's Energy Sector)

<p>Goal 1: Jamaicans use energy wisely and aggressively pursue opportunities for conservation and efficiency</p>	<p>Goal 2: Jamaica has a modernized and expanded energy infrastructure that enhances energy generation capacity and ensures that energy supplies are safely, reliably, and affordably transported to homes, communities and the productive sectors on a sustainable basis</p>	<p>Goal 3: Jamaica realizes its energy resource potential through the development of renewable energy sources and enhances its international competitiveness, energy security whilst reducing its carbon footprint</p>	<p>Goal 4: Jamaica’s energy supply is secure and sufficient to support long-term economic and social development and environmental sustainability</p>	<p>Goal 5: Jamaica has a well-defined and established governance, institutional, legal and regulatory framework for the energy sector, that facilitates stakeholder involvement and engagement</p>	<p>Goal 6: Government ministries and agencies are a model/leader in energy conservation and environmental stewardship in Jamaica</p>	<p>Goal 7: Jamaica’s industry structures embrace eco-efficiency for advancing international competitiveness and moves towards building a green economy</p>
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Energy Strategies and Key Actions to 2030

Implementation Framework (Energy Specific Plans, Vision 2030 Jamaica Action Plans/3yr Corporate Plans of Ministries, Agencies and Departments)

Monitoring and Evaluation Framework (Energy Indicators)

Policy Review (3-yearly, and consistent with GOJ Policy Review Framework)

Jamaica’s National Energy Policy (2009 – 2030) supports the development and expansion of renewable energy resources by establishing a set of targets for renewable energy and the percentage diversification of energy supply. These targets are presented in the table below.

Indicator	2009	2012	2015	2030
Percentage of renewables in energy mix	9%	11%	12.5%	20%
Percentage diversification of energy supply	9%	11%	33%	70%

These targets, therefore call for Jamaica to investigate various options for advancing the development of the energy sector. Development of the renewables energy sector to include expansion of use of RE technologies, energy from waste, and the increased use of biofuels become important considerations for the achievement of these targets and goals as set out in the National Energy Policy.

Renewable Energy in Jamaica

Jamaica has abundant renewable energy sources, thereby giving the country the potential and opportunities for the development of RE. In fact, Jamaica is relatively advanced in the development of renewable energy, surpassing a number of Caribbean countries. These resources include wind, biomass, mini-hydro, photovoltaic and solar energy. In addition, the potential for the conversion of waste to energy, ocean thermal technologies and bio-fuels is being explored.

Notwithstanding this, a report entitled “The Renewable Energies Potential in Jamaica” (2005) identified several barriers to the expansion of renewable energy use in Jamaica, as follows:

- Time-consuming administrative procedures related to RE project development
- Lack of economically sound contractual arrangements
- Imprecise legal formulations

Some Current Renewable Energy Activities in Jamaica

- Wind - Wigton Wind Farm in the Parish of Manchester, operated by the Petroleum Corporation of Jamaica (PCJ). This was commissioned in May 2004; consists of 23 wind turbines and generates an average of 7 MW.
- Bagasse - Cogeneration-electricity production at sugar factories.
- Biomass - fuel wood on the PCJ Font Hill Farm
- 8 Operable Hydro Power Plants (23 MW) - operated by Jamaica Public Service Company (JPS).
- 10% use of ethanol as fuel in the transport sector gasoline to replace the additive MBTE

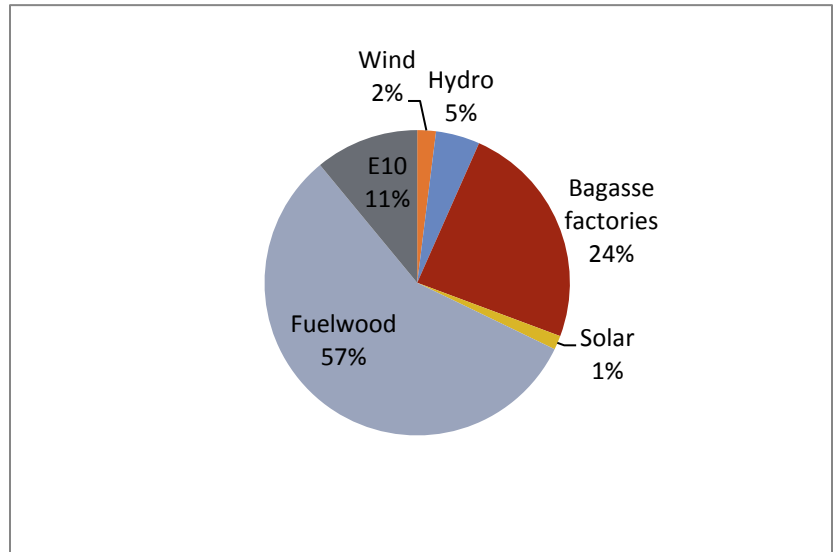
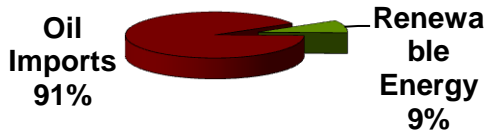
- Inadequate financial and fiscal incentives (e.g. duty and GCT exemptions or property tax rebates)
- Lack of dedicated grants or soft-loans for RE exploration
- Inadequate up-to-date on-site pre-feasibility assessments
- JPS' system losses (technical and non-technical) currently exceed the total energy produced by renewable energy providers, effectively raising the price of electricity to paying consumers. This issue will effectively raise the price consumers pay to JPS for each kilowatt-hour of renewable energy sold.
- Lack of penalties for not meeting renewable energy targets in the National Energy Policy
- Lack of building code enforcement for items such as solar water heaters
- Lack of uniform net-metering and interconnection standards for small-scale power generation units (e.g. solar photovoltaic systems)

Another barrier includes the Jamaica Public Service Company Ltd. (JPS) Licence which gives this company exclusive rights to transmit, distribute and supply electricity throughout Jamaica, for a twenty (20) year period, based on the All Island Electricity License (2001). This National Renewables Policy is designed to break down these barriers and create an enabling framework for the development of the sector and for the deployment of RE technologies.

This potential for renewable energy development along with various strategic analyses and the direction of the National Energy Policy currently provide the context for the implementation of a range of projects which is expected to enable the country to reduce petroleum imports by about 10% by 2011. There also are three pieces legislation that is currently enabling the development of the sector. These are:

- Petroleum (Quality Control) Act,
- Caribbean Basin Initiative and
- Economic Partnership Agreement (EPA)

Already there has been an increase in the percentage of renewables in the energy mix moving from 6% in 2008 to 9% in the 2009 due primarily to the development and implementation of various programmes such as the full roll out of E10 for use in motor vehicles in the transport sector. The pie-chart below (to the left) shows how the 9% of renewable energy is broken down.



In 2006, the country took an innovative and bold step in establishing a Centre of Excellence for Renewable Energy (CERE), a division within the Petroleum Corporation of Jamaica (PCJ), which was established to ensure that Jamaica will regularly implement new ideas and methods in renewable energy, in recognition of the country’s excellent and abundant supply of natural resources, including indigenous energy sources.

The Mission of CERE is to enhance the contribution of renewables to our energy mix by:

- Bringing focus to the development and diversification of renewable energy sources and technologies;
- Researching, educating, demonstrating new technologies and methods and collaborating with various energy stakeholders, local and foreign investors and environmental stewards; and
- Meeting the energy policy goal of 15% renewables in the energy supply mix of by 2020 and 20% by 2030.

A Synopsis of the Profile of Renewable Energy Sector in Jamaica

- Jamaica currently has one operational commercial Windfarm – The Wigton Windfarm in Manchester which has a capacity of 20.7 MW.
- There are 8 small hydro powered plants with a combined capacity of 23 MW. All 8 plants are owned by the Jamaica Public Service Company Limited

- The Solar PV capacity installed is unknown but it has been estimated that there are about 20,000 solar water heating units mainly on private homes
- With respect to bioethanol, there are three ethanol dehydration plants with a combined capacity of 220 million gallons per year. There also was a full roll-out of E10 in November of 2009. E10 is made using imported anhydrous ethanol made from sugarcane feedstock.
- Jamaica currently has 350 Biodigesters treating animal waste equivalent to the production of approximately 10,000 m³ of Biogas and 200 Biodigester Septic Tanks treating domestic sewage equivalent to the production of approximately 2000 m³ Biogas
- The Government, with the assistance of the Brazilian Government has embarked on a drive to develop an ethanol industry from sugar cane. The state-owned refinery, Petrojam, has partnered with Brazil's Coimex Group to rehabilitate a 40-million gallon ethanol plant that has already generated revenues of US\$120 million from exports to the United States since 2005. Total bagasse output in 2003 was approx 600,000 tonnes per annum, equivalent to approx 940,000 barrels of oil with a value of US\$37.5 million. 1 Tonne of sugar cane equivalent to about 1.2 barrels of oil.



Planned Renewable Projects in the Short to Medium Term – 2009 to 2012

There are various renewable energy projects that are currently in the pipeline and are expected to come on stream in the medium term. Some of these include:

- **Energy from Waste** - Jamaica has eight (8) Solid Waste Disposal sites. Approximately 1.3M tonnes of Municipal Solid Waste (MSW) is generated island-wide annually. This waste can be converted into usable energy through the use of waste-to-energy (WTE) conversion technologies. The PCJ is currently in negotiations with an investor to develop two WTE plants :
 - One plant to be sited near Riverton: to produce ~ 45 MW of electricity
 - One plant to be sited near Retirement : to produce ~ 20MW
- **Biodiesel** - Jamaica has the potential to produce and use biodiesel made from feedstocks such as WVO or indigenous crops such as castor and jatropha. The PCJ has commenced a small pilot project on biodiesel which will help to inform policy.



Global Trends in Renewable Energy

Energy security denotes the uninterrupted supply of diverse forms of energy in adequate quantities and at affordable prices. Since access to energy is the lifeblood of economic growth and social well-being, most countries are striving to achieve energy security. With rapid economic development expected to take place in developing countries such as China, India and Brazil, along with unprecedented world population growth to approximately 9 billion² by 2050, the appetite for energy is expected to grow. However, volatility in oil prices, dwindling oil reserves, geopolitical tensions and concerns about global climate change impel countries to make the transition to low carbon economies and access sustainable forms of energy. Many countries, especially the developed ones, have therefore turned their attention to renewable energy (RE) as a sustainable source of energy.

Renewable energy—including biomass, geothermal, hydropower, solar, wind, tidal, and wave— offers tremendous benefits for meeting global energy needs. Building on a foundation of hydropower, biomass combustion, and geothermal power pioneered during the industrial revolution in the late 1800s, new forms of renewable energy began to be developed and commercialized, including solar, wind, and several forms of advanced bioenergy.

Today, these renewable energy technologies are the fastest growing energy technologies (particularly wind and solar) and are cost competitive in a variety of grid, off-grid, and remote applications worldwide.

The development of RE coupled with energy efficiency and conservation may allow countries to meet their energy needs with limited use of fossil fuels. RE now accounts for almost a quarter of global energy consumption but fossil fuels remain the dominant sources of energy. Energy scenarios have predicted that investments in existing and new renewable energy technologies (RETs) will continue to grow as countries try to accomplish their sustainable development goals.

Today, in a number of countries, renewables represent a rapidly growing share of total energy supply—including heat and transport. The share of households worldwide employing solar hot water heating continues to increase and is now estimated at 70 million households. Additionally, investment in new renewable power capacity in both 2008 and 2009 represented over half of total global investment in new power generation.

Among the renewable energy options that are currently in wide use in some regions and are now ready for large scale introduction in many areas include:

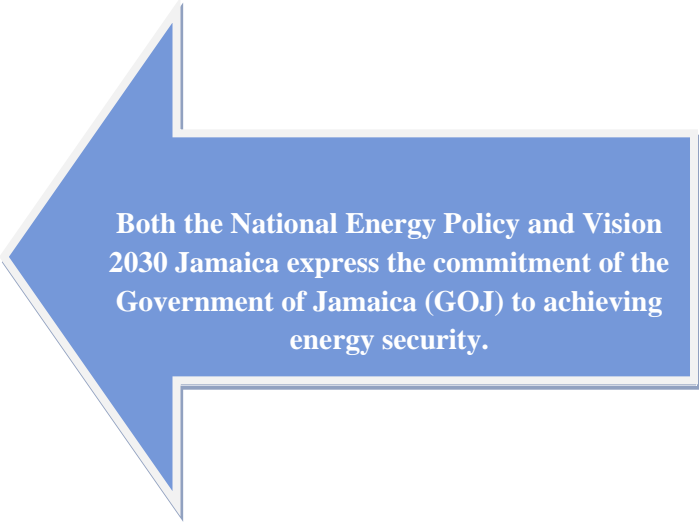
²Population Division of the United Nations.

- Biogas for decentralized cooking and electricity
- Small Hydro Power for local electricity
- Small Wind Power for water pumping and local electricity
- Solar Photovoltaics for local electricity
- Solar Collectors for water and space heating
- Ethanol and Biodiesel for agriculture and transportation
- Large Hydro Power for grid electricity
- Large Wind Power for grid electricity
- Geothermal Energy for heat and grid electricity
- Biofuels



Rationale for the Development of a Renewable Energy Policy - Provision for Renewable Energy in the National Energy Policy

Jamaica's National Energy Policy 2009 – 2030 explicitly underscores the importance of development of the renewable energy sector. In fact increasing the use of renewable energy in the country's energy supply mix will be one of the principal ways of achieving energy security for this nation. It is well known and documented that the principal driver of today's impressive renewable energy growth is policy. Growth of renewables is strongest where and when the policymakers have established favourable conditions.



Both the National Energy Policy and Vision 2030 Jamaica express the commitment of the Government of Jamaica (GOJ) to achieving energy security.

Both the National Energy Policy and Vision 2030 Jamaica express the commitment of the Government of Jamaica (GOJ) to achieving energy security. These are policy responses to the fact that Jamaica, having no fossil fuel resources, relies on imported oil to meet approximately 91% of its energy needs with renewables (hydro, wind, solar and biomass) making up the other 9%. This high dependence on imported oil renders the country vulnerable to the volatility of the oil market which has had adverse effects on the country's ability to achieve energy security and has also constrained economic growth. In particular, Jamaica has suffered during the spikes in energy costs over the past decade curtailing efforts to wean from imported oil. Also, the fluctuations in global oil prices have made electricity relatively expensive, being produced at average US34 cents/KWh, about three times the world average. Although, comparatively, energy carriers such as fuels for cooking and transportation are cheaper in Jamaica than some countries, it is still quite expensive for the average Jamaican leading to energy poverty in certain rural sections of the island where there are pockets of poverty. The volatility in oil prices has also negatively impacted variables such as inflation, Gross Domestic Product (GDP), employment, the trade balance and the fiscal deficit.

For Jamaica, as for many non-oil producing nations, the development and diffusion of renewable energy resources and technologies will help realise important economic, environmental and social objectives. Renewable resources such as wind, solar, hydro and biomass are indigenous to the country, and if developed adequately, can provide cleaner, and

in the long term, more affordable alternatives to oil. This will not only lower the oil bill and lessen environmental impacts but also improve energy security through diversification of the energy base. It is on this basis that the National Energy Policy 2009-2030 sets a target of 20% renewables in the energy mix by 2030 in line with the goal of *“Jamaica realizes its energy resource potential through the development of renewable energy sources and enhances its international competitiveness, energy security whilst reducing its carbon footprint.”* This complements National Outcome 10 within Vision 2030 Jamaica of the country attaining “Energy Security and Efficiency,” which has been identified as a priority in the country’s national development plan.

Energy from renewable sources is therefore a critical element for achieving sustainable development and is expected to significantly contribute to *“Jamaica, the place of choice to live, work, raise families and do business”*. (Jamaica’s national vision statement)

Key Considerations in the Development of the Renewable Energy Sector in Jamaica

It is well documented that renewable energy technologies generally have lower operation and maintenance costs but often have higher investment costs. This means that many renewable energy technologies are not cost-competitive compared with the country’s fossil-based energy technologies. Through this policy, consideration will be given to the creation of an enabling environment through for example by the introduction of fiscal and financial support mechanisms within an appropriate legal and regulatory framework, to allow renewable energy technologies to compete with fossil-based technologies.

Drivers for Development of the Renewable Energy Sector in Jamaica

There are many different reasons why the Government of Jamaica wants to support renewable energy. The drivers for active support for the implementation of renewable energy initiatives have remained pretty constant over time. Initially, it was the fluctuating price of oil which led to a policy priority for alternative energy sources for energy security. Today it also is increasing environmental awareness and concern about sustainability of conventional energy use as well as climate change. Also, renewables provide benefits that are not reflected in energy policies and market conditions, including increased employment, reduced import dependence, and reduced burdens on foreign exchange.

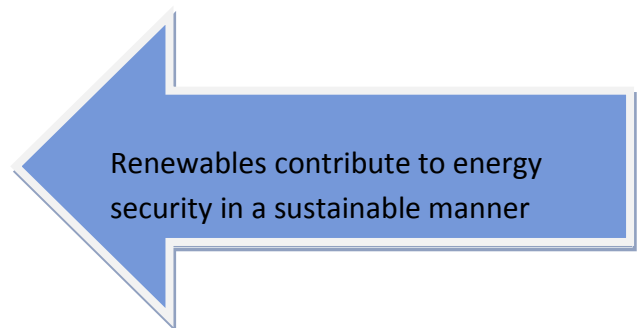
Economic Drivers	Social Drivers	Environmental Drivers
<ul style="list-style-type: none"> • Security of energy supply • Economic optimization • Reduced costs of energy • Development of new industry • Provides opportunities for innovation 	<ul style="list-style-type: none"> • Employment opportunities (and with energy feedstock production particularly in rural areas) • Social-economic cohesion - improving economic prospects in rural areas • Improved access to energy services by providing reliable and affordable energy supply • Public support 	<ul style="list-style-type: none"> • Environmental Conservation • Reducing the impacts of climate change • Reducing Emissions

Benefits of Establishing a Renewable Energy Sector in Jamaica

Renewable energy is indigenous, non-depleting, modular and environment-friendly and can meet a broad spectrum of energy demand. RE can provide energy access and meet unmet demand and can provide captive energy thus conserving fossil fuels and electricity. It also can augment grid power.

Some key benefits are expected to include:

- Renewable energy will help to reduce transmission losses in the electricity system
- Potential for RE to provide employment creation and economic diversification thereby reducing poverty
- Greater energy security by displacing traditional energy sources with more sustainable sources of energy
- Improvements in balance of trade due to the displacement of imported oil
- Less emissions and cleaner sources of energy due to new access to more sustainable sources of energy
- Contribute to more affordable energy to consumers
- Reduced greenhouse gas emissions associated with electricity generation
- Supplement fossil fuels in transportation



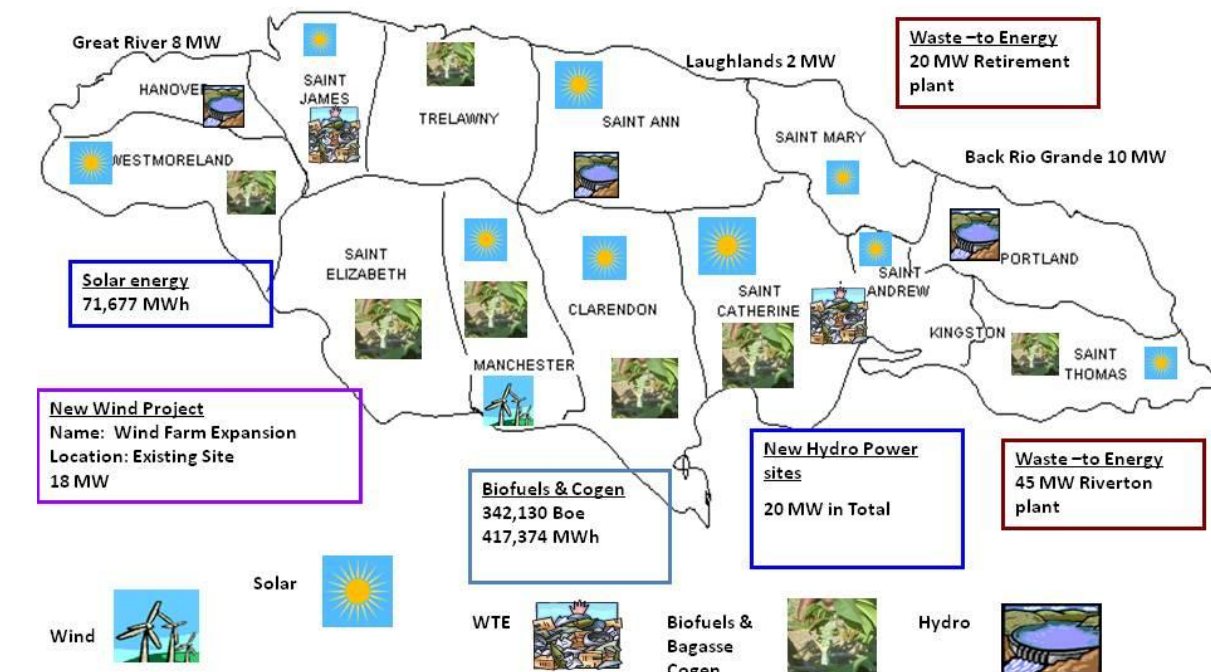
Exploring the Scope for the Development of Jamaica’s Renewable Energy Sector

Jamaica has excellent renewable energy sources. For the development of sector, research will be undertaken to determine which of the renewable energy focus areas mentioned below will be pursued. In this regard, the government will seek to create the economic, infrastructural and planning conditions conducive to the sustainable development of all of Jamaica’s renewable energy resources.

- Hydro
- Wind
- Solar /PV/Solar Water Heaters
- Bagasse – sugar co-generation
- Co –generation
- waste energy from waste food and agricultural wet waste
- landfill gas
- sewage gas
- geothermal
- ocean/wave/tidal
- fuel cells

The energy map below highlights the various renewable energy projects and programmes that are expected to be in place by 2015/16 when the percentage of renewable in the energy mix will be over 12%.

Renewable Energy Map 2015/16



SWOT Analysis

For the development of renewable energy sector, the identification of strengths and weaknesses represents the internal assessment of the sector while the consideration of opportunities and threats represents the analysis of the impact of the external environment on the sector. The SWOT analysis, along with the issues and challenges and the profile of the energy sector presented above, form the basis for identifying goals and strategies that will be employed in the development of the sector.

Strength	Weaknesses
<p>Indigenous sources of energy (water, solar, biomass etc.)</p> <p>Existence of long term national energy policy that establishes the framework for the development of the renewable energy sector</p> <p>Existence of a long-term national development plan – Vision 2030 Jamaica which prioritizes energy as a national outcome</p> <p>Existence of high energy crop (sugar cane) and high levels of experience in sugar cane production</p> <p>Existence of an institutional framework for renewable energy in government (for example Centre of Excellence for Renewable Energy) to promote research and facilitate the development of the RE sector</p>	<p>Low levels of technical and R&D capacity in RE</p> <p>Low levels of awareness of RE among the general population</p> <p>Limited regulatory framework for promoting the use of renewables (e.g. lack of proper tax incentives/disincentives; net metering; feeding tariffs, wheeling etc.)</p> <p>PCJ’s exclusivity for renewable energy development</p> <p>Low levels of investment in R & D</p> <p>Low levels of enforcement</p> <p>Inadequate coherence of national policies</p> <p>Low levels of capacity for drafting legislation in a timely manner</p>
Opportunities	Threats
<p>Current private sector interest towards investment in RE</p> <p>Increasing investments by key private sector entities in the use of renewable energy technologies driving the sustainability of their businesses (examples in manufacturing, tourism etc.)</p> <p>Access to information and expertise in RE</p> <p>Global thrust towards development of RE as sustainable forms of energy</p> <p>Support for RE developments from IDPs</p> <p>Current high price of electricity to manufacturing, tourism and household sector among others</p> <p>Public sector reform that is creating the framework for an enabling business environment for private sector growth and investment</p> <p>Requirement for new generation capacity (for replacement of old equipment and to meet demand growth)</p> <p>Benefits from trading carbon credits through participation in the clean development mechanism by implementing RE projects</p>	<p>Fluctuating (relative price of oil) oil prices (if oil prices fall low there could be loss of interest in RE)</p> <p>Advanced technologies for accessing conventional sources of energy</p> <p>Prohibitive costs of existing renewable energy technologies</p> <p>Natural hazards</p> <p>Crime</p>



Section 2

Defining the Policy Framework

Vision of Jamaica's Renewable Energy Sector

A well-developed, vibrant and diversified renewable energy sector that contributes to Jamaica's energy security and a sustainable future

The Vision sets out the general policy objective which is to increase the share of modern renewable energy consumed in Jamaica and to provide more affordable access to energy for all Jamaicans, thus contributing to a sustainable society and environmental conservation. Part of this long-term thrust is therefore the establishment of a renewable energy sector producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels.

The policy provides the framework within which the renewable energy industry can operate, grow, and contribute positively to the Jamaican economy and to the global environment. This also means that Jamaica will optimally utilize indigenous renewable energy resources as well as other RET's as part of its economic growth strategy.

The vision of this policy is directly related to the achievement of Goal 3 of the National Energy Policy 2009 – 2030 which states:

Jamaica realizes its energy resource potential through the development of renewable energy sources and enhances its international competitiveness, energy security whilst reducing its carbon footprint

This Policy also will support the achievement of other goals as set out in the National Energy Policy. These are:

- **Goal 2:** Jamaica has a modernized and expanded energy infrastructure that enhances energy generation capacity and ensures that energy supplies are safely, reliably, and affordably transported to homes, communities and the productive sectors on a sustainable basis
- **Goal 4:** Jamaica's energy supply is secure and sufficient to support long-term economic and social development and environmental sustainability
- **Goal 5:** Jamaica has well-defined and established governance, institutional, legal and regulatory framework for the energy sector that facilitates stakeholder involvement and engagement
- **Goal 7:** Jamaica's industry structures embrace eco-efficiency for advancing international competitiveness and moves towards building a green economy

The Renewable Energy Policy is the overarching framework policy for the National Energy-from-Waste Policy and the Biofuels Policy and has linkages with the other energy-sub-sector policies on electricity, trading of carbon credits and energy conservation & efficiency.

The Strategic Framework Underlying Jamaica's Renewable Energy Policy 2009 - 2030

The Strategic Framework of this Policy sets out areas for action under five goals. It is built around the notion a renewable energy sector established within a portfolio of low-carbon and cost-competitive energy technologies is capable of responding to the emerging major challenges of climate change, energy security, and access to energy. The five goals and the supporting strategies outlined under each goal will be instrumental in facilitating the development of an enabling framework in order for Government to meet its commitment to promoting renewable energy and meeting its 2030 target of 20% of renewable in the energy mix.

This strategic framework will effectively create the conditions for the development and commercial implementation of renewable technologies. The Strategic Framework will provide a mechanism for the Government to use a phased, managed and partnership approach to renewable energy projects that are well conceived and show the potential to provide acceptable social, environmental and financial returns for all investors and stakeholders.

The six goals underpinning the National Renewable Energy Policy addresses the following areas:

1. Economic, infrastructural and planning conditions conducive to RE development
2. Financial and fiscal policy instruments
3. Legislative and regulatory environment
4. Awareness raising, capacity building and education
5. Technology development and the promotion and introduction of RETs

Goals of National Renewable Energy Policy

- Goal 1:** The economic, infrastructural and planning conditions conducive to the sustainable development of all of Jamaica's renewable energy resources
- Goal 2:** An enabling environment that facilitates the introduction of key policy instruments (financial and fiscal) for the promotion of renewable energy (by redirecting national resources and investments to RETs)
- Goal 3:** A dynamic legislative and regulatory environment, responsive to growth and development in the renewable energy sector

- Goal 4:** Enhanced technical capacity and Public awareness of renewable energy through effective support of training programmes, information dissemination strategies and ongoing government communication
- Goal 5:** Sustained R & D and innovation in existing and emerging RETs



Goal 1: *The economic, infrastructural and planning conditions conducive to the sustainable development of all of Jamaica's renewable energy resources*

Under this goal, efforts will be made to create a favourable climate for the renewable energy sector, this means that strategies will be developed that will facilitate the development, adoption, adaptation and implementation of renewables into the energy mix as they become commercialized in order to improve the competitiveness of businesses and households. Emphasis will be placed on to overcoming high initial costs and additional market distortions (such as lack of information, higher risk perception) with the explicit intention to mainstream renewables in the market place.

Additionally, relevant strategies will be designed and implemented to help advance the use of renewable energy help by creating an environment that is conducive for long-term investments while at the same time, providing planning certainty for stakeholders and consumers. In effect, clear rules, roles and responsibilities will be defined at an early stage in the development of this sector. Consideration also will be given to ensure that the renewable sector is based on efficient and environmentally-friendly technologies and practices, protecting the environment, human health and reducing GHGs

Key Strategies for Goal 1:

- Establish a number of "early win" investments/projects spread across relatively low cost technologies, such as biomass-based cogeneration, as well as technologies with larger-scale application such as solar water heating, wind and small-scale hydro, along with a focus on building and fine tuning the required institutional framework.
- Facilitate the creation of an investment climate for the development of the renewable energy sector, towards attracting foreign and local investors.
- Remove information asymmetries that may exist about the potential of renewables in Jamaica by developing an inventory and economic impact assessments of all potential renewable energy sources
- Promote research, development and implementation of qualified renewable energy projects through the provision of resources and appropriate incentives
- Develop diversification priorities based on cost, efficiency, environmental considerations, appropriate technologies and competitiveness

- Compile renewable-energy resources assessments for wind, biomass, geothermal, hydro, and solar energy and conduct assessments where needed.
- Organize renewable energy assessments into a single Renewable Energy Resource Database for use in promoting Jamaica as a possible destination for renewable-energy investments, research and development, and export of energy.
- Develop the institutional framework to ensure the continuous review of new and emerging technologies that facilitate the improved delivery and efficiency of technology as well as policy alignment to ensure their seamless introduction into both the production and consumption processes
- Provide mechanisms to facilitate an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options
- Integrate renewable energy in building designs and physical planning processes e.g. through the use of an appropriately designed National Building Code
- Incorporate modern production and use of renewable energy into policies relating to land-use planning, agriculture, forestry, and waste treatment.
- Enable relevant institutions to effectively set priorities, plan, and establish policy and regulatory agendas to encourage the development of a renewable energy market.
- Integrate the planning process for renewable energy infrastructure with that of the national spatial plan and the regional development strategy to ensure the implementation of adequate capacity in the geographic locations where they are most required.
- Include opportunities to infuse renewable energy issues and aspects of the Renewable Energy Policy into JAMPRO's investment promotion strategies and activities
- Promote renewable energy investments by engaging the micro and small business sector (MSMEs) to link micro-credit to micro-enterprises
- Create efficient, flexible and long-term financing scheme(s) for the development of RETs
- Create an enabling environment to attract and retain foreign direct investments in the development of RE

- Create mechanisms to introduce modern renewable energy in rural areas—for example, link this policy with other policies that promote rural development, recognizing that renewable energy can play an important role in rural income-generation activities
- Ensure that efficient and environmentally-friendly technologies and practices are entrenched in the renewable energy sector
- Streamline RE programmes and projects to complement each other, lower duplication and optimize use of limited financial and technical resources
- Promote the use of RETs to lower the risk of disruption of energy supplies to critical utilities and essential services in the event of disasters and other emergency situations.

Key Implementing Agencies and Partners

- Ministry of Energy and Mining
- Petroleum Corporation of Jamaica
- Office of Utilities Regulation
- Ministry of Agriculture
- JAMPRO (Jamaica Trade and Invest)
- Jamaica Bureau of Standards
- Planning Institute of Jamaica
- Jamaica Public Service Company Limited
- Rural Electrification Programme
- Office of the Prime Minister
- National Environment and Planning Agency
- National Land Agency



Goal 2: *An enabling environment that facilitates the introduction of key policy instruments (financial and fiscal) for the promotion of renewable energy (by redirecting national resources and investments to RETs)*

Under Goal 2, various policy instruments would be explored for the introduction and promotion of renewable energy in Jamaica. It is clear that renewable energy development may require financial incentives. While the Government is committed to providing some level of incentives, there is recognition that the country's fiscal resources are limited, and there are other competing high priorities in the social and economic sectors. The fact that Jamaica has already ratified the United Nations Framework Convention on Climate Change and the Kyoto Protocol (2002), creates the framework for tapping into international funds via the Global Environment Facility and the Clean Development Mechanism for projects that reduce greenhouse gas emissions. The goal also sets out measures to develop closer partnerships with the financial sector to facilitate investments in the renewable energy sector.

Renewable energy policy incentives generally seek to reduce costs of construction or production of renewable energy; increase costs for fossil fuels, based on environmental costs; and open markets for these technologies. Determining which policies should be used for increasing renewable energy would involve the review and analysis of direct and indirect policy instruments. The direct approaches/instruments will be aimed at the renewable energy sector, whereas indirect instruments are aimed mainly at barrier removal 'outside' this sector and at improving or facilitating the framework for renewable energy.

The direct policy instruments, which aim to directly influence the renewable energy sector and market, can be divided into financial and non-financial measures. The financial measures speak to financial incentives to market parties to increase their role in the renewable energy sector. Non-financial measures on the other hand, aim to reach this market impact through agreements with important stakeholders or through obligations.

Area for RE Development Focus	Financial Measures <i>(Subsidies, loans, grants, fiscal measures)</i>	Non-Financial Measures
RD&D (Research, Development and Demonstration) and innovation	Fixed government RD&D subsidies Grants for demonstration, development, test facilities, etc. Zero (or low) interest loans	Technical cooperation
Investments	Fixed government investment subsidy Bidding system on the investment Subsidy/grant	Negotiated agreements between producers and government

Area for RE Development Focus	Financial Measures (Subsidies, loans, grants, fiscal measures)	Non-Financial Measures
	Subsidy on switching to renewable energy production or on the replacement of old renewable energy installations Zero (or low) interest loans Tax advantage for renewable energy investments Tax advantage on (interest on) loans for renewable energy investments	
Production	Feed-in tariffs at a fixed level set by the authorities Bidding system on the feed-in tariffs necessary to operate on a profitable base Tax advantage on the income generated by renewable energy	Quota obligation on production
Consumption	Tax advantage on the consumption of renewable energy	Quota obligation on consumption

Financial incentives, when managed properly can be very effective. Already, Jampro (Jamaica Trade and Invest) has indicated several specific incentives that will apply to local renewable energy projects on a case by case basis:

- Full duty and GCT exemption for importation of machinery and equipment used on the project (excluding motor vehicles),
- Tax credits for a number of years (to be negotiated) and
- Accelerated Depreciation benefits allowing full write-off of capital costs associated with the acquisition of new machinery and equipment items for renewable energy projects.

The table below indicates a few of the various types of incentive programmes being implemented worldwide:

Incentives for Renewable Energy Developments

Country	Investment Tax Credits	Grants & Low Interest Loans	Rebates	Green Pricing	Subsidies	Capital Cost Allowances	VAT & Import Duty Exemptions
Australia		●	●	●		●	
Brazil			●		●		
Barbados	●	●	●			●	●
Ireland	●		●			●	
Canada	●	●	●			●	
China	●		●			●	●
Italy	●	●		●	●	●	●
Jamaica	●	●				●	●
Japan		●	●		●		
USA	●	●	●	●	●	●	
UK							●

Key Strategies for Goal 2:

- Analyze and explore the main financial and non-financial instruments for the direct stimulation of renewable energy deployment into type and position in the development chain. Choice of instrument will ultimately be based on factors such as: effectiveness; cost effectiveness; market efficiency (static and dynamic); transaction cost and administrative capacity; equity (fair distribution of benefits); and market conformity.
- Introduce appropriate fiscal incentives for renewable energy
- Introduce innovative approaches for the establishment of sustainable structures and financing mechanisms for delivering renewable energy systems.
- Capitalize on use of the Global Environment Facility (GEF) and other facilities such as the Clean Development Mechanism (CDM) which encourages investments in renewable

technologies by covering the incremental costs of such projects. Certified Emission Reductions (CERs), which have derived from the CDM, are another option for attracting international capital flows.

- Establish a level playing field through economic or regulatory means, such as subsidy reductions or the provision of balancing subsidies to renewable energy for example – where the marketplace reduces biases against renewables as a result of long-standing subsidies to conventional energies

Key Implementing Agencies and Partners

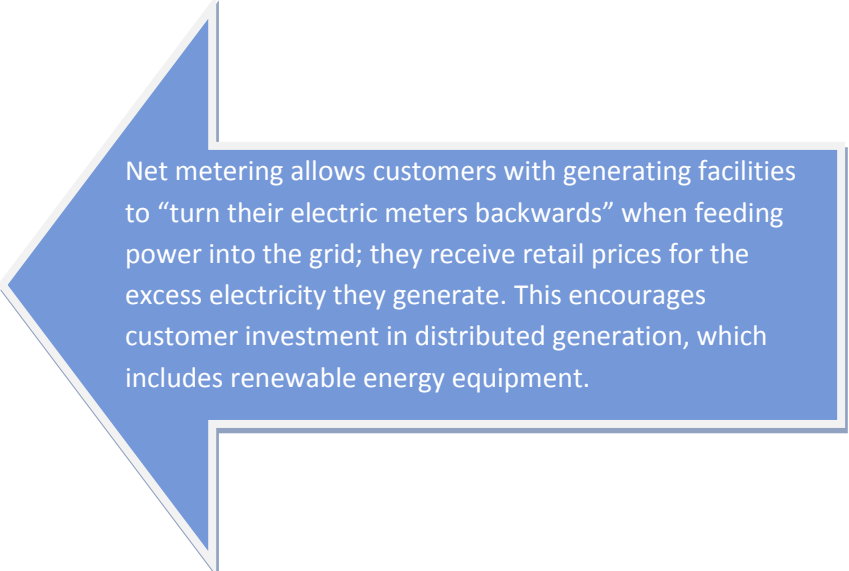
- Ministry of Energy and Mining
- Petroleum Corporation of Jamaica
- Office of Utilities Regulation
- Jamaica Public Service Company Limited
- Office of the Prime Minister
- Ministry of Finance and the Public Service
- Ministry of Justice/Chief Parliamentary Council

Goal 3: *A dynamic legislative and regulatory environment, responsive to growth and development in the renewable energy sector*

Under this goal, focus will be placed on developing, implementing, maintaining and continuously improving an effective legislative system to promote the implementation of renewable energy. This means that the strategies contained herein will be designed to improve the various planning processes to be swifter and more strategic so that the legal requirements for the effective and sustainable deployment of renewable energy are in place. This goal focuses on improvements and investments in the electricity grid towards the development of a modernized transmission network, including improved grid access for more strategic investments. The strategies contained herein also will ensure that due account is taken of the benefit that embedded producers of electricity from renewable energy sources and local producers of gas from renewable sources bring to the electricity grid.

Key Strategies for Goal 3:

- Strengthen the legal provisions to remove barriers to the integration of renewable energy sources in the national energy system and remove institutional and legal patchwork, where there exists different and often contradictory laws, regulations, policies and administrative procedures. Create the framework for increasing the percentage of electricity generated from renewable sources as well as for installing extra renewable electricity capacity.
- Review the current pricing and regulatory mechanisms and legislation in order to provide the overarching framework to facilitate the introduction of renewables
- Develop an appropriate legal and regulatory framework for pricing and tariff structures to support the integration of renewable energy into the energy economy and to attract necessary investments.
- Establish net metering strategies that value renewable energy production at the point of end-use and allow public utility networks to provide “energy storage” for small users



Net metering allows customers with generating facilities to “turn their electric meters backwards” when feeding power into the grid; they receive retail prices for the excess electricity they generate. This encourages customer investment in distributed generation, which includes renewable energy equipment.

- Establish Comprehensive Renewable Energy Regulations to include policies that permit companies to generate their own electricity while still maintaining continuous link to the power grid. This policy may also include a mechanism that permits auto-generators to sell excess capacity back to the utility.
- Create a Renewable Portfolio Standard (RPS) which would include a specified percentage of electricity supply that comes from renewable energy which may increase over time
- Create protocols that facilitate grid connections and extensions for electricity generated from renewable energy sources
- Restructure the electricity system to inject competition and market forces into the generation and retail aspects of the system
- Implement a system which ensures that costs of connecting new producers of electricity and gas from renewable energy sources to the electricity grid will be objective, transparent and non-discriminatory
- Implement a system which requires transmission system operators and distribution system operators to provide any new producer of energy from renewable sources wishing to be connected to the system with the comprehensive and necessary information required, including: a comprehensive and detailed estimate of the costs associated with the connection; a reasonable and precise timetable for receiving and processing the request for grid connection; a reasonable indicative timetable for any proposed grid connection.
- Develop transmission and distribution grid infrastructure, intelligent networks, storage facilities and the electricity system, in order to allow the secure operation of the electricity system as it accommodates the further development of electricity production from renewable energy sources.
- Provide for either priority access or guaranteed access to the grid-system of electricity produced from renewable energy sources
- Streamline permission procedures to be complied with in order to construct renewable energy systems
- Establish standards that require all new construction in the public and private sectors to incorporate the use of solar water heating

Key Implementing Agencies and Partners

- Ministry of Energy and Mining
- Petroleum Corporation of Jamaica
- Office of Utilities Regulation
- Jamaica Public Service Company Limited
- Office of the Prime Minister
- Ministry of Finance and the Public Service
- Ministry of Justice/Chief Parliamentary Council

Goal 4: *Enhanced technical capacity and Public awareness of renewable energy through effective support of training programmes, information dissemination strategies and ongoing government communication*

Under this goal, mechanisms will be developed to raise public awareness of the benefits and opportunities of renewable energy. This will be done to: promote knowledge of renewable energy for the purpose of increasing its use; to promote and stimulate the renewable energy market through the dissemination of information regarding the economic, environmental, social and trade benefits of renewable energy technologies and their applications; persuade Government institutions to implement training and education programmes with regard to renewable energy; and improve communication and interaction between national and local Government institutions on renewable energy policies. A major component of this goal would be the development and strengthening of human capacity building programmes both at formal and non-formal levels.

Key Strategies for Goal 4:

- Promote the development of human capacity for renewable energy development by revising educational agendas at all levels and redirecting professional training to incorporate renewables. In both the production and consumption of energy, a shift towards a sustainable system requires targeted action directed at professionals and consumers.
- Strengthen capacity to enable the existence of a well-trained workforce to install, operate and maintain technology, business, and regulatory systems (and where possible to also manufacture); and to design of a coherent and functioning institutional framework
- Increase public awareness of the potentials, costs, and benefits of renewables – this can be supported through public awareness campaigns, formal education programs, and other measures.
- Establish a comprehensive renewable energy training initiative with the purpose of increasing the capacity to develop and utilize these systems among the utility staff and potential project developers.
- Government, primarily through CERE will partner with tertiary institutions, and collaborate with those government and private sector agencies who are able to strike the proper balance between environmental protection, economic growth and the demonstration of renewable energy sources.

- Provide consumer choices for, and increase confidence in credible renewable energy products
- Increase consumer awareness of renewable energy and greenhouse issues
- Promote the exchange of best practices on renewable energy sources
- Provide consumers and potential investors with information on available technologies
- Undertake focused campaigns to facilitate take off of renewable energy, promoting the implementation of projects in various renewable energy sectors (photovoltaic systems, wind farms, biomass installations, integrating renewable energy in communities etc.)

Key Implementing Agencies and Partners

- Ministry of Energy and Mining
- Petroleum Corporation of Jamaica
- Ministry of Education
- Consumer Affairs Commission
- Jamaica Information Service
- University of the West Indies
- University of Technology
- Northern Caribbean University
- Ministry of Water and Housing
- Bureau of Standards
- Scientific Research Council

Goal 5: *Sustained R & D and innovation in existing and emerging RETs*

Under this Goal, strategies will be employed that promote, enhance and develop technologies for the implementation of sustainable renewable energy. Emphasis also will be placed on promoting appropriate research and development and local manufacturing to strengthen renewable energy technology and optimize its implementation.

Key Strategies for Goal 5:

- Provide guidelines/standards and code of practices for the appropriate use of renewable energy technologies
- Create an enabling framework to facilitate the development, diffusion, deployment and transfer of existing, emerging and longer term cost-effective, cleaner, more efficient technologies and practices among the public and private sectors
- Facilitate and promote research, development and demonstration of new energy technologies by strengthening institutional capacity, improving R&D infrastructure, attracting and retaining quality expertise and creating long-term funding mechanisms
- Conduct feasibility studies for wider use of solar technologies such as solar manufacturing facility and the use of solar PV for homes and in use in rural electrification
- Incorporate rural electrification policy and planning into the renewable energy policy and programmes so that it forms part of regulated businesses which serve rural customers
- Establish energy technology support centres ensuring that linkages are made with existing research institutions
- Support the demonstration and commercialization of decentralized renewable energy technologies to take advantage of local energy sources, increased security of energy supply, shorter transport distances, reduced energy transmission losses, strong community development, job creation, and income generation .
- Undertake research and development (R&D) through cooperation with public and private research institutions and private businesses for strengthening and advancing the renewable energy technologies, business models, and policies are necessary for determining the optimal applications for renewables in market environments

- Create a platform and climate for cooperation through private and public initiatives for moving research & development beyond demonstration projects. Such a venture could lead to programmes which bridge the gap between successful demonstration of innovative technologies and effective market entrance to achieve mass deployment and to boost investment in new and best-performing technologies.
- Engage in a process to continuously develop “best practices” and benchmarking while furthering R&D to replicate and scale-up such experiences

Key Implementing Agencies and Partners

- Ministry of Energy and Mining
- Petroleum Corporation of Jamaica
- University of the West Indies
- University of Technology
- Northern Caribbean University
- Bureau of Standards
- Scientific Research Council
- Ministry of Industry, Investment and Commerce
- JAMPRO (Jamaica Trade and Invest)
- Jamaica Institute of Engineers
- Jamaica Institute of Architects





Section 3

Implementation, Monitoring and Evaluation Framework

Policy Implementation

A continuous programme of monitoring and evaluation, involving relevant stakeholders from public and private sectors, will be implemented and this will be aligned to the Monitoring and Evaluation Framework that is part of Vision 2030 Jamaica as well as the Whole of Government Business Planning Process. The Ministry responsible will use several indicators to assess the effectiveness of the National Renewable Energy Policy in achieving the goals, which will form the basis for reviewing the policy and recommending any changes to the policy framework.

The policy will be evaluated mid-term, after three years, to see if the targets, objectives and deliverables are being achieved. It will be updated in the light of progress to assess whether any amendments in policy are required. Sustainable development criteria – economy, environment and social priorities - will be used to guide strategy in a balanced way for the longer-term. At the same time, Government will monitor worldwide technical developments in renewable energy with a view to identifying technologies that may be particularly appropriate to Jamaica's situation in the long-term, making the best use of partnerships where possible, both locally and internationally.

Institutional Framework

The key players in the implementation of the Renewable Energy Policy and their roles and responsibilities are described below. An expanded list of stakeholders is thereafter presented in a chart below.

The **Ministry of Energy and Mining (MEM)** will lead and facilitate the implementation of the Renewable Energy Policy, in collaboration with other Government Departments and Agencies, the private sector, academia and NGOs. The Petroleum Corporation of Jamaica, which is an agency of the Ministry, and its Centre of Excellence for Renewable Energy (CERE) will be involved in facilitating the implementation of renewable energy projects. MEM also will be responsible for building the requisite human resource capacities across the various implementing partners to strengthen information access and know-how in renewables.

The successful implementation of this policy will require that linkages be made between the energy sector as well as other aspects of the economy and society including, but not limited to, agriculture, transport, environment, finance and education.

The **Office of Utilities Regulation (OUR)** will play a key role in ensuring the development of key pieces of legislation to facilitate the effective deployment of renewable energy in Jamaica and will have oversight responsibility for the regulatory framework guiding renewable energy

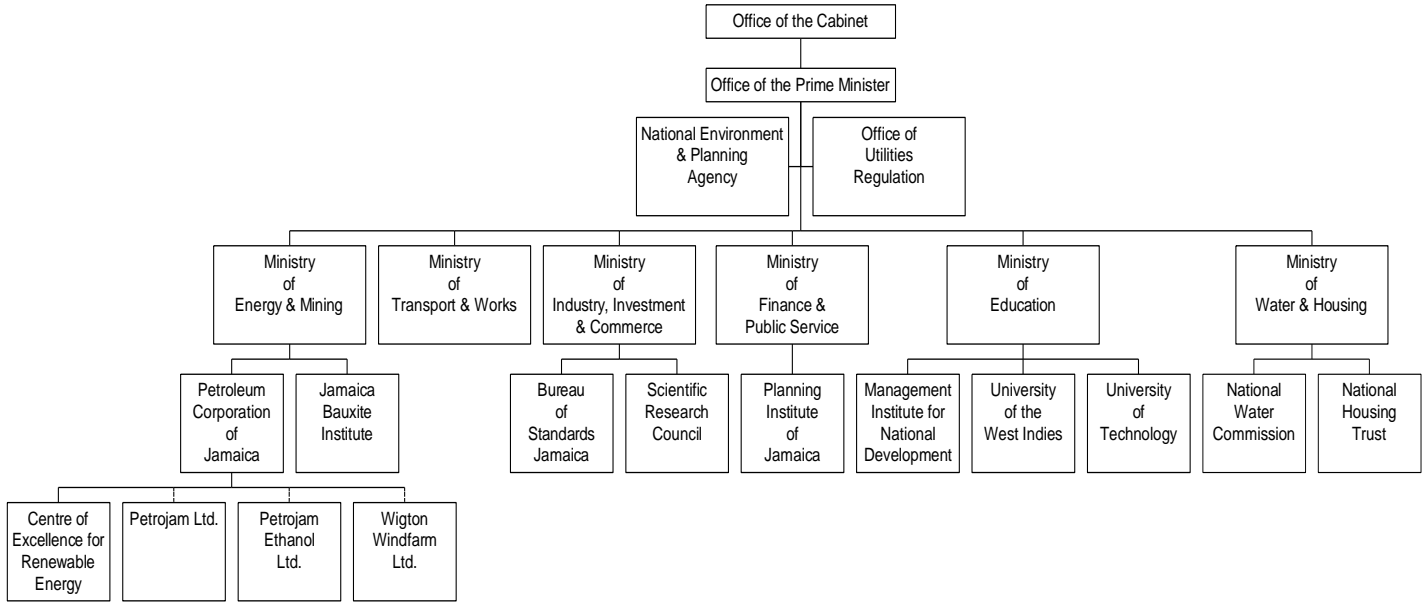
initiatives. That office will protect the interest of both the consumer and investor in the provision and utilization of public utility services.

The **Scientific Research Council** will

The **Office of the Prime Minister** (Environmental Management Division) has portfolio responsibility for environmental management, land use planning and development, spatial planning and solid waste management, and will have responsibility for facilitating the implementation of renewable energy projects related to waste-to-energy. They also along with the National Environment and Planning Agency (NEPA) will provide expert advice and guidance on the environmental impacts of all renewable energy projects and programmes. They also will have an important role to play in ensuring that the development of the renewable energy sector is done in an environmentally sustainable manner and will determine the impact of renewable energy projects on the emission of greenhouse gas emissions. Also, NEPA will be responsible for reviewing applications for permits for the implementation of various renewable energy projects.

The **National Environment and Planning Agency** (NEPA) will have the responsibility of ensuring that renewable projects being developed take into account environmental considerations (that is demonstrate that they are being developed in a manner that would meet or exceed our environmental standards and regulations), and they also will ensure that these projects/facilities operate in such a way that human health and the environment are protected from harmful emissions. In carrying out its role, the Agency will continuously assess renewable energy projects and their associated plant operations and their environmental performance for example by routinely checking emissions etc. NEPA will be responsible for taking appropriate enforcement actions or prosecuting an operator if and when there is a breach.

Local universities will play a key role in keeping abreast of research in renewable energy and RE technologies and continuously work with government and private sector to keep them abreast of these emerging technologies.



Implementation Framework/Action Plan for Renewable Energy 2010 - 2012

For each of the five goals outlined in the Renewable Energy Policy 2009 to 2030, key or flagship projects/initiatives will be developed and implemented towards contributing to the achievement of the goals. The priority projects for the first three years 2009 to 2012 are already included in the Energy Policy Action Plan 2009 to 2012. These were selected based on significant of impact in terms of advancing the achievement of a goal or the level of investment (for example high investment that are also expected to have high impact).

This means that strategies identified in the Strategic Framework of this Renewable Energy Policy will be operationalized by the associated implementing agencies and partners through the incorporation of specific actions in the Strategic and Operational Plans of these entities. These plans will provide detailed information on specific actions to be undertaken, the implementing agencies and partners, timelines and costs.

Most if not all of these priorities and flagship projects presented here are already reflected in at least one of the following:

- The priority strategies and actions identified in the National Energy Policy
- The key strategies and actions for the energy sector for 2010-2012 as enunciated in Vision 2030 Jamaica, National Development Plan and the Medium Term Socio-Economic Policy Framework (MTF) 2009-2012
- Priorities as expressed in the corporate plans of Ministry of Energy and Mining and its departments and agencies

The Table below presents the action plan for the period 2009 – 2012 for the Renewable Energy Policy by summarizing the descriptions a number of flagship projects. The projects identified are aligned to the National Energy Policy and are listed along with the strategies identified in the National Energy Policy that are addressed by the project, and the expected outcome(s), responsible agencies, timeline and cost. Also, for each flagship project the other goals in the energy policy that will be supported are specified.

Flagship Project	Responsible Agencies	Contribution to Other Goals	Strategies Addressed	Timeline	Cost	Expected Outcomes	Performance Measurement
Goal 1: Jamaicans use energy wisely and aggressively pursue opportunities for conservation and efficiency							
Sub-Projects							
Establishment of a revolving facility for EE and RE financing in the private sector	DBJ, MEM Support: PCJ, PC Banks	Goals 3, 7	Provide incentives/disincentives for the use of innovative technologies to improve energy efficiencies		US\$2.5 million	Establishment of EE/RE Revolving Fund Encouragement of private sector uptake	Evidence of aggressive promotion of facility Number of active participants listed as a percentage of target group
Goal 2: Jamaica has a modernized and expanded energy infrastructure that enhances energy generation capacity and ensures that energy supplies are safely, reliably, and affordably transported to homes, communities and the productive sectors on a sustainable basis							
Improvement of Electricity Distribution and Transmission Efficiency	JPSCo Support: OUR, MEM, UTech, UWI		Ensure continuity and consistency of energy supply and distribution Strengthen the capacity of the government’s electrical inspectorate and the petroleum safety inspectorate to adequately monitor and control incidences of illegal operations	2009 - 2012	US\$65.1 Million	Reduced theft of electricity Reduced technical losses Reduction in non-technical losses Upgraded billing system	Reduction in technical losses from 10% at present to 8.5% of net generation by 2014 Reduction in non-technical loss by 2.6% over the next five (5) years Customer bills accurate
Power Sector	OUR, JPSCo,		Ensure continuity and				

Flagship Project	Responsible Agencies	Contribution to Other Goals	Strategies Addressed	Timeline	Cost	Expected Outcomes	Performance Measurement
Development and Capacity Replacement	IPPs, MEM		<p>consistency of energy supply and distribution</p> <p>Through a competitive basis, retire the old generation plants and replace them with modern plants to improve the conversion efficiency</p> <p>Establish a system to identify and replace old and inefficient units/plants with more fuel efficient and cost efficient technologies and plants</p>				
<p>Goal 3: Jamaica realizes its energy resource potential through the development of renewable energy sources and enhances its international competitiveness, energy security whilst reducing its carbon footprint</p> <p>Over the next three years Jamaica will implement renewable energy projects that are expected to bring the country to meet the energy target by allowing the country to meet its 2015 targets of 12.5% renewables in the energy mix by 2015. These projects will be mainly focused on wind, solar and hydropower.</p> <p>This flagship project includes three sub-projects as follows:</p> <ul style="list-style-type: none"> • Sub-Project 1 – Expansion of Hydro Power Capacity • Sub-project 2 - Increase in Wind Energy Generation Capacity • Sub-project 3 - Promotion of Solar (Photovoltaic and Thermal) Technologies 							
Sub-projects							
Expansion of Hydro Power Capacity	PCJ, CERE, OUR, JPS, NWC	Goal 4	Prioritize renewable energy sources by economic feasibility	2009 - 2014	US\$28.5 million	Increased hydroelectric capacity	Development of hydroelectric power resources

Flagship Project	Responsible Agencies	Contribution to Other Goals	Strategies Addressed	Timeline	Cost	Expected Outcomes	Performance Measurement
	Support: WRA, NLA, UTech, UWI		<p>criteria, environmental considerations including carbon abatement</p> <p>Promote the development of efficient and low cost renewable plants with a size of 15 MW or less through applications to the OUR.</p> <p>Comply with international conventions on climate change and global warming</p>				Defined CO2 reduction
Increase in Wind Energy Generation Capacity	PCJ, CERE, JPSCo Support: UTech, UWI	Goal 4	<p>Prioritize renewable energy sources by economic feasibility criteria, environmental considerations including carbon abatement</p> <p>Promote the development of efficient and low cost renewable plants with a size of 15 MW or more on a competitive basis</p>	2009 - 2014	US \$ 58 million	<p>Increased wind energy generation capacity³</p> <p>Studies into wind energy generation potential conducted</p>	<p>Wigton Wind Farm expanded</p> <p>Munro Wind Farm constructed</p>

³ Target: 87 MW of installed wind energy will be developed by 2014

Flagship Project	Responsible Agencies	Contribution to Other Goals	Strategies Addressed	Timeline	Cost	Expected Outcomes	Performance Measurement
			<p>through a level playing field</p> <p>Comply with international conventions on climate change and global warming</p> <p>Strengthen R&D base</p>				
Promotion of Solar (Photovoltaic, Solar Cooling and Thermal) Technologies	PCJ, CERE Support: UTech, UWI	Goal 4	<p>Prioritize renewable energy sources by economic feasibility criteria, environmental considerations including carbon abatement</p> <p>Promote the development of efficient and low cost renewable plants with a size of 5 MW or less through applications to the OUR.</p> <p>Comply with international conventions on climate change and global warming</p> <p>Develop the local</p>	2009 - 2014	US\$1.5 million	<p>Increase in solar’s portion of Jamaica’s energy mix</p> <p>Increase in solar power and water heating equipment used in housing schemes</p> <p>Increased local capacity in implementation of solar systems</p>	<p>Development of solar power resources</p> <p>Defined reduction in CO2</p> <p>Predetermined amount of electrical energy in (GWh) produced by the use of solar technologies</p> <p>15 students a year trained in the design, installation and maintenance of PV, solar thermal</p>

Flagship Project	Responsible Agencies	Contribution to Other Goals	Strategies Addressed	Timeline	Cost	Expected Outcomes	Performance Measurement
			capacity to implement and maintain the solar technology systems				and solar cooling systems
Renewable Energy Study	PCJ, UWI Support: IDB, WWFL, UTech	Goal 4	Develop an inventory of all potential sources of wind, solar and renewable technologies and ranked according to their economics with full economic impact analysis Implement incentives to encourage tertiary institutions to develop research programmes for the application and implementation of renewable energy technologies	2009 - 2012	US\$1 million	Recommendations regarding solar and wind energy projects in Jamaica Establishment of 20 wind measurement sites	Market research and recommendations for roll-out Research data available for the 20 potential projects sites
Solar Energy Study in Schools	MEM, MOE Support: UTech, UWI	Goals 1, 4	Encourage research, development and implementation of qualified renewable energy projects		97,350 Euro	Solar energy used in 34 schools Recommendations for national replication	
Goal 4: Jamaica's energy supply is secure and sufficient to support long-term economic and social development and environmental sustainability							
This flagship project aims to develop the infrastructure and capacity to use alternative fuels such as Liquefied Natural Gas (LNG), petcoke and biofuels as part of the national efforts to reduce its dependence on oil. The strategies within the National Energy Policy addressed by this project							

Flagship Project	Responsible Agencies	Contribution to Other Goals	Strategies Addressed	Timeline	Cost	Expected Outcomes	Performance Measurement
<p>are:</p> <ul style="list-style-type: none"> Determine the fuel diversification programme for the short, medium and longer term Develop diversification priorities based on cost, efficiency, environmental considerations and appropriate technologies Diversify energy sources by type and geographic location Engage in multilateral, regional and bilateral partnerships and cooperative arrangements that best advance Jamaica’s energy interests <p>This flagship project consists of five sub-projects as follows:</p> <ul style="list-style-type: none"> Sub-project 1 - Biomass and Biofuels (Ethanol and Biodiesel) Sub-project 2 - Petcoke Cogeneration Sub-project 3 - Waste-to-energy project Sub-project 4 - LNG Project Sub-project 5 - Oil and Gas Exploration Programme 							
Biomass and Biofuels (Ethanol and Biodiesel)	MEM, PCJ, CERE, MOA, SRC Support: UTech, UWI, BSJ	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. Identify and develop indigenous non-renewable sources of energy and necessary enabling environment to encourage private sector participation	2009 - 2014	US\$516,000	Development and implementation of bio-fuel policy and programs Establishment of a strong legal and regulatory framework for liquid bio-fuels industry Island-wide E10 distribution infrastructure Development of testing labs	Biofuels policy in place Volume of local blendstock increased Measurable increase in productivity in the agricultural sector Presentation of R&D findings
Waste-to-energy project	PCJ, CPDI, NSWMA, OPM	Goal 3	Identify and develop indigenous renewable sources of energy and	2009 - 2013	US\$ 350-400 million	Generation of energy from waste	Construction of two waste-to-energy plants

Flagship Project	Responsible Agencies	Contribution to Other Goals	Strategies Addressed	Timeline	Cost	Expected Outcomes	Performance Measurement
	Support: JPSCo, OUR, MFPS, NEPA, UTech, UWI		necessary enabling environment to encourage private sector participation			Avoided carbon emissions Waste minimization	
Goal 5: Jamaica has a well-defined and established governance, institutional, legal and regulatory framework for the energy sector, that facilitates stakeholder involvement and engagement							
Development of Energy Sector policies	MEM, MOA, NSWMA Support: OPM, PCJ, UTech, UWI		Develop necessary regulatory framework for the introduction of diversification fuels Develop the institutional framework to coordinate policy with energy initiatives and provide integrated monitoring and enforcement of regulations Review and modify existing institutional framework and industry structure for energy sector toward achievement of policy objectives	2009 - 2011	J\$2.5 million	A coherent policy framework to support the implementation of the National Energy Policy	promulgated for renewable energy, waste-to-energy, carbon emissions, energy conservation & efficiency, biofuels
Expansion of the regulatory mandate of	OUR Support:		Review on an ongoing basis the existing legal framework for			Extension of the mandate of the OUR for the	

Flagship Project	Responsible Agencies	Contribution to Other Goals	Strategies Addressed	Timeline	Cost	Expected Outcomes	Performance Measurement
OUR	Cabinet Office, Solicitor General’s Office, MEM		performance, strengths, weakness, and lessons learnt, to formulate and implement programmes of legal reforms			regulation of new sub-sectors	
Net Metering and Wheeling System	MEM, OUR, JPSCo Support: PCJ, CERE	Goals 3,4	Conduct studies to include net metering and wheeling in the tariff rates and introduce appropriate mechanisms for net metering and wheeling procedures and standards to encourage the development of renewable energy and cogeneration opportunities	2009 - 2012		Establishment of net metering and wheeling framework	Number of customers on system
Goal 6: Government ministries and agencies are a model/leader in energy conservation and environmental stewardship in Jamaica							
Flagship Project 18 - Increasing energy conservation and efficiency in the public sector							
This							
Use of Green Technology in Local Government	OPM - DLG, LGAs Support: UTech, UWI	Goals 1, 3				Use of solar powered-street lights in areas not on the main grid	
Goal 7: Jamaica’s industry structures embrace eco-efficiency for advancing international competitiveness and moves towards building a green economy							
Facilitating private investment in	PCJ, JTI		Provide incentives for the development and use of innovative			Checklist for project development	Technical support given on request

Flagship Project	Responsible Agencies	Contribution to Other Goals	Strategies Addressed	Timeline	Cost	Expected Outcomes	Performance Measurement
industry			technologies to improve energy efficiencies			Template for Prefeasibility	Potential projects identified and incubated

Monitoring and Evaluation Framework

The Ministry of Energy and Mining will be accountable for monitoring and evaluating the implementation of this Policy based on the Guidelines of the Cabinet Office. The proposed indicators outlined in this policy represent the foundation of a results-based monitoring and evaluation system to ensure that the five goals of this policy are achieved which will, in turn, contribute to the achievement of the related goals as set out in the National Energy Policy 2009-2030 and Vision 2030 Jamaica - National Development Plan.

A continuous programme for monitoring and evaluation, conducted by relevant stakeholders from public and private sectors, will be implemented. The Ministry of Energy and Mining will conduct broad stakeholder consultations periodically to review and assess the effectiveness of the Policy using the indicators identified below as a guide. The results of the assessment including recommendations will be published in an annual report for submission to the Cabinet.

Proposed Indicators

The proposed indicators for the National Energy-from-Waste Policy over the period 2010-2030 are presented in the table below. These indicators are the building blocks of the Monitoring and Evaluation programme. Targets will be set in collaboration with the key implementation partners.

Indicators and Targets – Renewable Energy Policy 2009 – 2030

Proposed Indicator	Baseline	Targets		
	2010	2012	2015	2030
Percentage of energy from renewable energy sources in the energy supply mix				
GWh of electricity generated from renewable energy facilities				
Percentage of workforce employed in the renewable energy sector				
Investments in renewable energy as a % of total investments				
Number of new renewable energy projects				
Contribution of the renewable energy sector to GDP				
Area of land used by renewable energy projects as a percentage of total land use				
Volume of waste imported for EFW sector				

Appendices

Appendix I

Glossary

Annex I, or Annex B

The signatory nations to the Kyoto Protocol that are subject to caps on their emissions of greenhouse gases and committed to reduction targets – countries with developed economies. Annex I refers to the 36 countries identified for reduction in the UNFCCC while the Annex B is an adjusted list of 39 countries identified under the more recent Kyoto Protocol. Annex B countries have their reduction targets formally stated.

Annex II

A subset of Annex 1/B, Annex II countries are signatory nations to the UNFCCC which are also members of the OECD - the most industrialized economies. They have extra obligations to help developing nations combat climate change via technology transfer and financial help.

Biofuels

Biofuels are renewable fuels made from plants that can be used to supplement or replace the fossil fuels petroleum and diesel used for transport. The two main biofuels are ethanol and biodiesel. Ethanol is produced from the fermentation of sugar or starch in crops such as corn and sugar cane. Biodiesel is made from vegetable oils in crops such as soybean, or from animal fats. Depending on the processes used to make biofuels, greenhouse emissions from cars and fuel-powered machinery can be substantially reduced by their use.

Carbon footprint

The global warming impact of human activities in terms of the amount of greenhouse gases they produce. The emissions associated with the use of power, transport, food and other consumption for an individual, family or organisation are added up to give one comparable measure in units of carbon dioxide equivalent.

Carbon neutral

An individual, household or organisation that is responsible for no net emissions of greenhouse gases from all its activities is considered "carbon neutral". Emissions must be cut to a minimum and any necessary emissions then offset by emission reducing activities elsewhere. Buying accredited clean electricity helps cut household or office greenhouse emissions, while investing in sustainable energy projects or afforestation schemes are examples of offsets.

Clean Development Mechanism (CDM)

A Kyoto Protocol initiative under which projects set up in developing countries to reduce greenhouse gas emissions generate tradable credits called CERs, the first step towards a global carbon market. These credits can be used by industrialized nations to offset carbon emissions at home and meet their Kyoto reduction targets. The projects include renewable energy generation, reforestation and clean fuels switching.

Greenhouse Gas (GHG)

Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), chlorofluorocarbons

(CFCs), hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), ozone (O₃), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

Kyoto Protocol

The agreement reached in Kyoto in 1997 committing developed countries and countries making the transition to a market economy (Annex I countries) to achieve quantified targets for decreasing their emissions of greenhouse gases.

Landfill gas

All gases generated from waste deposited in a landfill or dumpsite.

Net metering

A system that allows customers with generating facilities to feed locally-generated electricity into the national grid in which they receive retail prices for the excess electricity they generate

UNFCCC

United Nations Framework Convention on Climate Change. Also referred to informally as the UN climate change convention. It is the international agreement for action on climate change and was drawn up in 1992. A framework was agreed for action aimed at stabilizing atmospheric concentrations of greenhouse gases. The UNFCCC entered into force on March 1994 and currently has 192 signatory parties. The UNFCCC in turn agreed the Kyoto Protocol in 1997 to implement emission reductions in industrialized countries up to 2012 and is currently seeking the negotiation of a new treaty to extend commitments beyond 2012.

Appendix II

Members of the Renewable Energy Policy Working Group

Ms Shernette Sampson	Ministry of Transport & Works
Ms Monifa Blake	Ministry of Transport & Works
Mr. Vivian Blake	National Environment & Planning Agency
Ms Kerine Senior	National Environment & Planning Agency
Mr. Horace Reid	National Irrigation Commission
Ms Nicole O'Reggio	Office of the Prime Minister (Environmental Management Dept)
Mr. Hopeton Heron	Office of Utilities Regulation
Mr. Peter Johnson	Office of Utilities Regulation
Mr. Peter Johnson	Office of Utilities Regulation
Mr. Earl Green	Petroleum Corporation of Jamaica
Mrs. Denise Tulloch	Petroleum Corporation of Jamaica – Centre of Excellence for Renewable Energy
Mr. Mark Dennis	Petroleum Corporation of Jamaica – Centre of Excellence for Renewable Energy
Mr. Richard Kelly	Planning Institute of Jamaica
Mrs. Seveline Clarke-King	Planning Institute of Jamaica
Dr. Earle Wilson	University of Technology, Jamaica
Mrs. Charmaine Delisser	University of Technology, Jamaica
Dr. Claude McNamarrah	University of the West Indies