ANTIGUA AND BARBUDA

DRAFT

SUSTAINABLE ENERGY ACTION PLAN

MARCH 2013

Prepared by the Department of Sustainable Development of the General Secretariat of the Organization of American States with the expert advice of IT Power Group – European Division under the European Union funded initiative "Caribbean Sustainable Energy Program (CSEP)".

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EXECUTIVE SUMMARY

Antigua & Barbuda is a Caribbean island state that relies almost exclusively on imported fossil fuels for electricity generation, transportation and cooking. This imposes a very big financial burden for the economy of the country.

In terms of electricity generation Antigua & Barbuda relies almost exclusively on fossil fuels (diesel and HFO). The electrical installed capacity is approximately 121MW and the production capacity is 105.5MW. In 2009, net generation in Antigua and Barbuda was of 326GWh, derived from fossil fuel generating plants. Besides fossil fuel generation plants, since the end of 2009, there is a small photovoltaic grid-connected pilot project of 3kW installed in Antigua. This small renewable energy facility in the full year of 2010 supplied to the grid 4.8MWh of electricity.

Antigua & Barbuda is endowed with renewable energy resources, mostly wind and solar, and these renewable resources have not been exploited yet. Studies indicate 400MW and 27MW potential for wind and solar respectively. Nevertheless, additional studies need to be carried out to evaluate the useful extent of this technology as well as other resources such as biogas and waste to energy (WTE).

In terms of consumption, from 2001 to 2010 total energy consumption increased 45%. Between 2001 and 2006 energy consumption increased at an annual average rate of 3.2% and from 2007 until 2010 at an annual average rate of 5.6% From 2007 to 2010 electricity demand in Antigua & Barbuda, and consequently consumption increased approximately 16%, from 200GWh in 2007 to 232GWh in 2010. The main electricity consumption sectors in 2010 were the Commercial (45%), Domestic (38%) and Government/Public sector (11%). From 2010 to 2011, the total consumption in the country in these three sectors increased 2%, from 94% in 2010 to 96% in 2011.

In recent years, Antigua & Barbuda has made important strides in its energy policy by drafting and approving their National Energy Policy (NEP) on August 20th 2011. This is the main policy in terms of renewable energy and energy efficiency development. The National Energy Policy document sets out the Government of Antigua & Barbuda's approach in achieving its vision that:

By 2030 Antigua & Barbuda will meet the needs of the present generation while safeguarding the environment and enabling future generations to meet their own energy needs. All citizens and residents will have access to affordable efficient, socially responsible and reliable forms of energy.

According to the NEP of Antigua & Barbuda approved in 2011 (herein referred as NEP 2011), the following five (5) sector priorities for the energy sector have been defined:

- **Energy Cost Reduction** - Targeted efficiency and conservation measures designed to reduce the overall energy intensity of the economy by 10% below a 2010 baseline within 10 years.
- **Diversification of Energy Sources** - Reformed market framework and mandated targets to achieve 15% renewable energy in the electricity supply by 2030.
- **Electricity Reliability Improvement** - Regulatory reform designed to protect consumer interest and improve the quality of electricity supply.
- **Environmental Protection** – Laws and regulations which ensure that environmental considerations are an integral part of the energy permit process and in the planning and execution of energy related projects.
- **Stimulate new Economic Opportunities** – Incentives and market mechanisms to create an enabling environment for private investment in renewable energy and energy efficiency measures, including support for education and training.

Particular attention has been provided to the power and transportation sectors, as those are the major consumption sectors in terms of energy.

The SEAP, as defined in the Antigua & Barbuda's National Energy Policy (NEP) is intended to serve as a roadmap for the energy future in Antigua and Barbuda from 2010 until 2030. It contains short (1-5 years), medium (5-10 years), and long (10-20 years) term actions designed to enhance the implementation of the policies and goals of Antigua & Barbuda's NEP. The specific activities contained in the SEAP will foster energy conservation and energy efficiency, diversification of energy sources, sustainable energy consumption and generation as well as the utilization of renewable energy sources available in Antigua and Barbuda (the five main pillars of the NEP).

Within the SEAP and to achieve the referred objectives, three specific strategies and one general cross-cutting strategy have been defined:

1. **Strategy 0: General Cross Cutting Strategy:** intends to address some of the institutional and regulatory barriers identified for A&B. It addresses the Institutional barriers that have hindered active Energy Efficiency/Renewable Energy development in A&B and those frameworks that should be instituted before active implementation of the SEAP. Moreover, it also addresses the lack of specific attention to the energy sector (energy is a matter that is dealt under the Cabinet of the Prime Minister by the Government and lacks a dedicated specific institution).

2. **Strategy I: Energy Conservation and Energy Efficiency -** intends to address the following barriers:
   - A&B high energy intensity index;
   - Low levels of energy efficiency in the electricity sector;
   - Low levels of energy efficiency in the energy consuming sectors, in particular the commercial, public, residential, agro-industrial and transport sectors;
   - Low levels of energy efficiency from building designs, electrical installations and low levels of energy efficiency of end use devices.

3. **Strategy II: Renewable Energy Development** – intends to address the following barriers:
   - High dependency on imported petroleum (fossil fuels);
   - Lack of know indigenous fossil fuel sources;
   - High energy import bill;
   - High electricity costs;
   - Lack of detailed data for determining renewable energy projects;
   - Lack of renewable energy projects;
   - Inexistent independent regulatory agencies;

4. **Strategy III: Education and Awareness -** intends to address the following barriers:
   - Low awareness and technical capacity on energy efficiency and renewable energy;
   - Low level of education on energy efficiency and renewable energy;
   - Low level of resources dedicated to the energy sector;
   - Low involvement of the financial sector on energy efficiency and renewable energy projects;
   - Lack of certified renewable energy installers;
   - Lack of certified energy efficiency auditors.

To address these issues, and achieve the strategic intent of the SEAP, the most efficient, reliable and accessible forms of energy to be developed and promoted, especially renewable energy technologies, energy efficiency practices and energy saving measures were identified and analysed. Research into the development of an appropriate legal, institutional and economic framework and management structure for enabling sustainable and economically sound energy activities and services within A&B and in cooperation with Caribbean initiatives was also undertaken. This

methodology seeks to encourage regional and international technical and funding collaboration to stimulate an enabling environment for the implementation and integration of appropriate RE/EE measures in A&B.

The four strategies delineated under the SEAP identify different, strategic intents, lines of actions and specific measures to be implemented. The following table summarise the strategic intents and lines of action proposed under each of the four strategies.

Table 1: Summary of the strategic intent and lines of actions proposed in the different strategies in the SEAP

Strategy	Strategic intents	Policy/Line of Action
Strategy 0: Cross-Cutting Strategy	**01: Reformulation of the Energy Related Institutional and Organisational Framework**	01.1 Create the Energy Unit
		01.2 Create the Energy Advisory Panel
		01.3 Create Independent Regulatory Agency
	02: Finalise and adopt NEP and SEAP	02.1 Finalise and adopt NEP and SEAP
	0.3: Diversification of Energy Sources	03.1: Enhance the contribution of the energy sector to climate change mitigation and adaptation
		03.2: Define a fuel diversification strategy for the short, medium and long term and develop priorities for diversification
Strategy I: Energy Conservation and Energy Efficiency	**I.1: Create appropriate structures, instruments and tools to enable the development and implementation of energy efficiency programmes and measures**	I1.1: Elaborate energy end-uses statistics and monitoring tools
		I1.2: Define and implement incentives for the efficient use of energy
		I1.3: Define the role of APUA and other market actors in the promotion of energy efficiency
		I1.4: Revise electricity tariffs to stimulate energy efficiency
	I.2: Coordinate national energy efficiency programmes with international and regional initiatives	I2.1: Coordinate national energy efficiency programmes with international and regional initiatives
	I.3: Develop and implement horizontal energy efficiency measures	I3.1: Energy auditing and management programme
		I3.2: Building codes
		I3.3: Energy efficiency standards and labelling
		I3.4: Replacement of energy consuming equipment
		I3.5: Energy efficient lighting
	I.4: Develop and implement targeted sector specific energy efficiency programmes and measures	I4.1: Energy efficiency programme in the electricity sector
		I4.2: Energy efficiency programme in the public sector
		I4.3: Energy efficiency programme in the residential sector

Strategy	Strategic intents	Policy/Line of Action
		I4.4: Energy efficiency programme in the tourist sector
		I4.5: Energy efficiency programme in the agro-industrial sector
		I4.6: Energy efficiency programme in the transport sector
Strategy II: Renewable Energy Development	**II1: Create an enabling environment for the development of renewable energy through private sector participation**	II1.1: Provide Incentive package to directly stimulate renewable energy deployment
		II1.2: Open the market for private generation of RES electricity
		II1.3: Provide incentive package for utilisation of cleaner technologies in the transport sector
	II.2: Integration of renewable energy in the grid	II2.1: Analysis of the impacts of integration of renewable energy in the grid
	II.3: Develop appropriate renewable energy sources	II3.1: Strengthen economic and scientific data through resource assessments on the country's energy resource potential (namely wind, solar and waste to energy (WTE))
		II3.2: Develop renewable energy diversification priorities (based on cost, efficiency, environmental considerations)
		II3.3: Promote the use of small renewable generation through the production of a fast track approval process and by streamlining the procedures and standards
	II4: Diversification of Energy Sources	II4.1: Promote incorporation of biodiesel
		II4.2: Diversify energy sources by type and geographical location
		II4.3: Engage in multilateral/regional a/ bilateral partnerships and cooperative agreements that contribute to Antigua & Barbuda energy goals and objectives
	II5: Application of emerging technologies	II5.1: Undertake review of new emerging technologies
	II6: Establish policy, enforce laws, regulations and institutions that create equitable and transparent opportunities for all stakeholders in the energy sector	II6.1: Develop transparent and comprehensive policy framework for the electricity sector and or amend existing legislation
		II6.2: Promote a market based approach and increase competition in the sector
		II6.3: Amend existing legislation and regulations or promulgate new ones where necessary to ensure responsible market behaviour
		II6.4: Develop and implement a comprehensive regulatory framework for the energy sector
		II6.5: Continuously review the existing internal regulatory framework for performance, strengths, weaknesses and lessons learnt while recognising the

Strategy	Strategic intents	Policy/Line of Action
		implications of external dimensions and formulate and implement programmes of regulatory reform
		II6.6: Review and modify national framework and industry structure for the energy sector towards the achievement of the NEP goals
Strategy III: Education and Awareness	**III1: Develop and Implement programmes to influence non-market behaviour toward and to promote efficient use of energy**	III1.1: Draft and Implement a public consumer awareness and education program and end-use statistics on energy efficiency awareness
		III1.2: Encourage research development and timely and efficient implementation of renewable energy projects
	III2: Capacity Building and Training	III.2.1: Build Capacity of the Energy Unit in the field of RE and EE
		III.2.2: Train professional staff in relevant public and private sector
		III2.3: Systematic inclusion of RE and EE topics in school curriculum
		III2.4: RE installers certification programmes
		III2.5: Energy auditing and management programme
		III2.6: EE in the transport sector
		III2.7: Articulation with other programmes and initiatives in the region
	III3: Undertake public information sessions for the general public and target groups about support measures	III3.1 Raising public awareness and acceptance
		III3.2 Identify and promote funding assistance programs for the public

For each line of action proposed the SEAP defines specific measures for its implementation. For details on the measures proposed please consult the Sections 6.2, 7.2, 8.2 and 9.2 of the SEAP.

As part of the development of the SEAP, these four strategies (including institutional reform) were subjected to analysis as it relates to:

- Timeline for implementation (ranging from 5-20 years);
- Priority - Based on the evaluation criteria of: Relevance to the NEP and its goals, Influence to existing and future policies, Impact/Reach, Environmental impact (GHG reduction), Cost Benefit, Feasibility and Synergies with other programmes;
- Responsible Agencies to implement and coordinate the actions and measures outlined;.
- Outcomes and Indicators as it relates to the 2010 baselines.

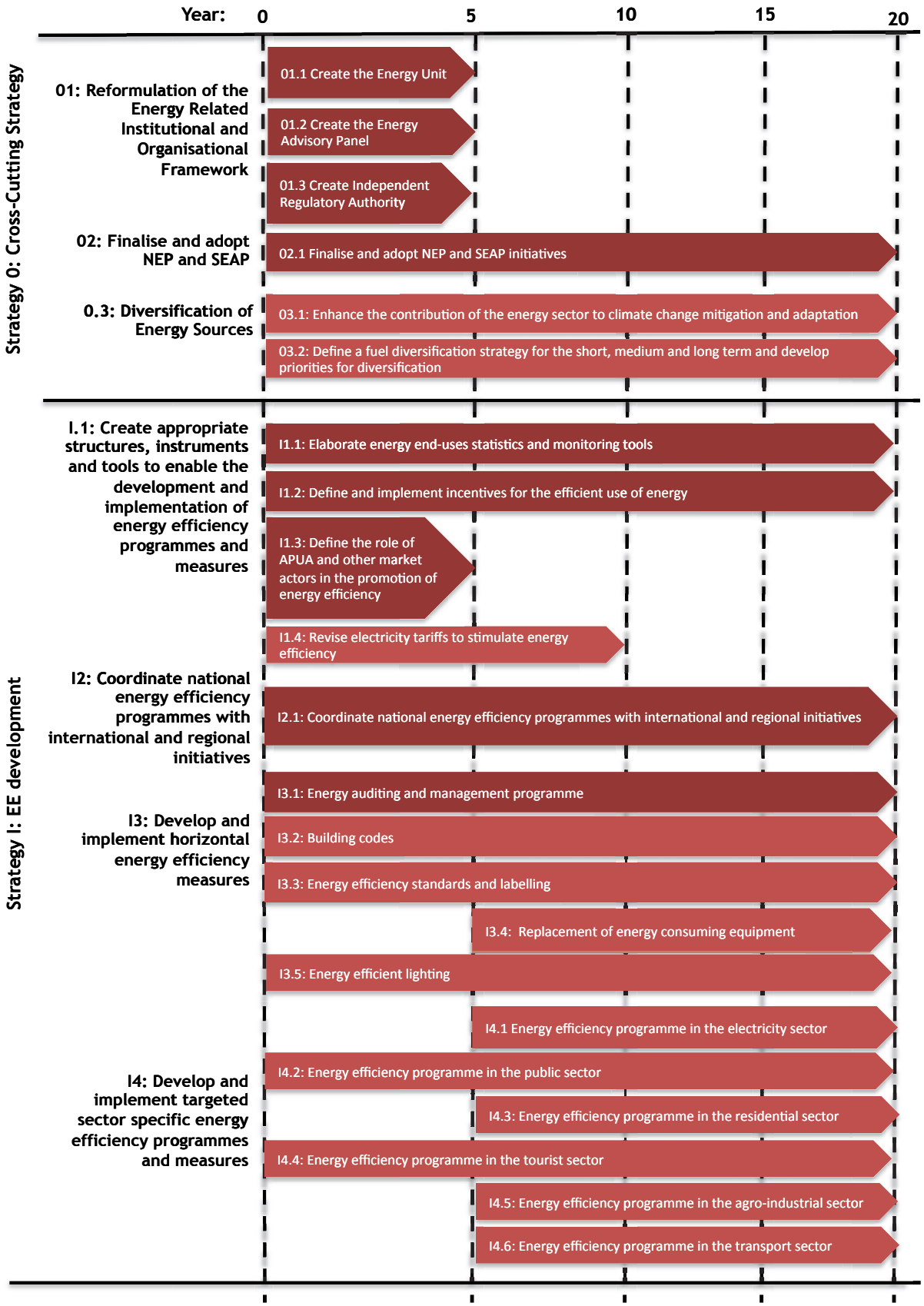
These criteria have been identified based on requirements expressed in the NEP as the criteria to be used to identify the priorities and timeline for the implementation of each line of action. These have been used to build up the Roadmap for SEAP implementation.

The Roadmap for SEAP implementation presented in the figure below highlights the proposed path towards reversing the negative and significant impact that almost exclusive dependency on fossil fuel has on the economy and environment of A&B.

The implementation of the proposed roadmap (which does not include RE and EE equipment, installation and maintenance) will need investments of approximately EC$26 million Eastern Caribbean Dollars, over a period of 20 years. Section 11 provides a breakdown of the estimated budget per proposed strategy.

For the implementation of the SEAP, A&B can seek financing from varying sources who traditionally fund projects within the Caribbean Region and SIDS. A description of these sources of financing and its role in the Caribbean regions is provided under the Annex III of the SEAP.

With the proposed strategies, lines of actions and measures, A&B will successfully integrate an economic development model which is less carbon intensive and less dependent on fossil fuels.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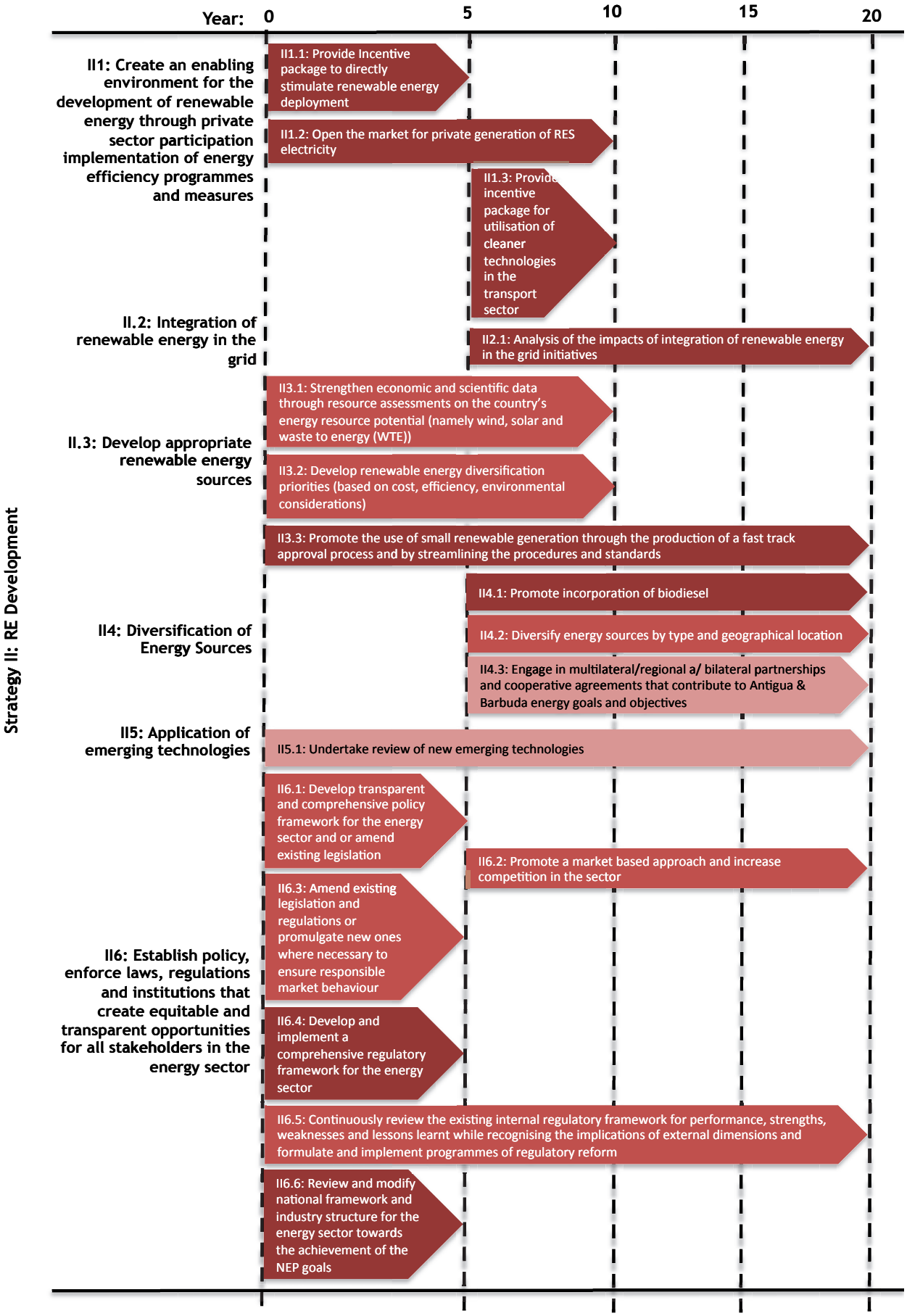
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Strategy II: RE Development
II1: Create an enabling environment for the development of renewable energy through private sector participation implementation of energy efficiency programmes and measures
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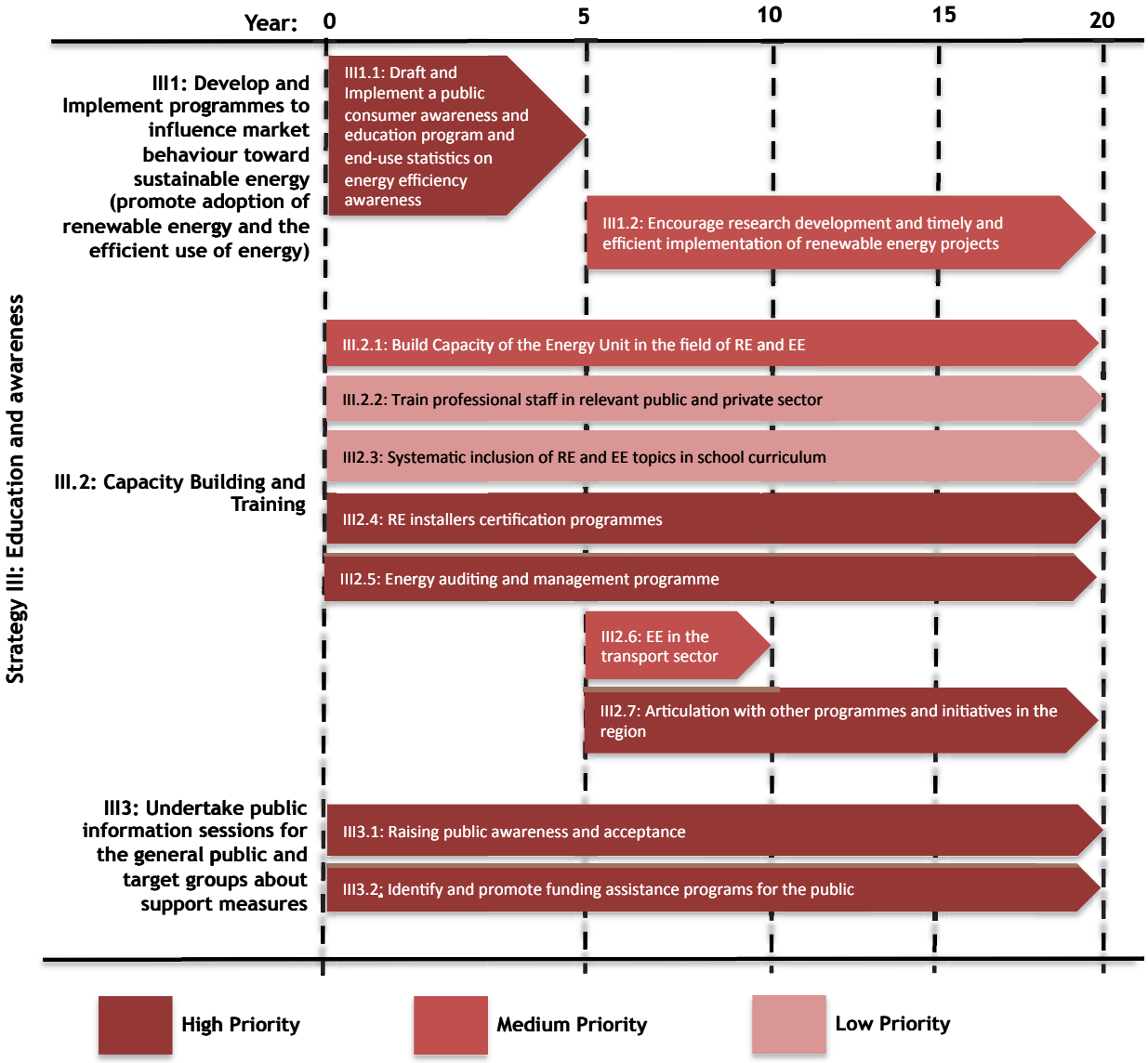
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Strategy III: Education and awareness
III1: Develop and Implement programmes to influence market behaviour toward sustainable energy (promote adoption of renewable energy and the efficient use of energy)
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III3: Undertake public information sessions for the general public and target groups about support measures
III3.1: Raising public awareness and acceptance
III3.2: Identify and promote funding assistance programs for the public
High Priority
Medium Priority
Low Priority

ABBREVIATIONS

A&B	Antigua & Barbuda
ABIA	Antigua & Barbuda Investment Authority
APUA	Antigua Public Utilities Authority
CARICOM	Caribbean Community
CFL	Compact Fluorescent Lamp
DCA	Development Control Authority
EC	Eastern Caribbean Dollars
ECERA	Eastern Caribbean Energy Regulatory Authority
EE	Energy Efficiency
EU	Europe
Gov.	Government
IPPs	Independent Power Producers
LED	Light-Emitting Diodes
MW	Megawatt
MWh	Megawatt-hour
NEP	National Energy Policy
NGO	Non-Governmental Organisations
PPA	Power Purchase Agreement
PV	Photovoltaics
RE	Renewable Energy
RES	Renewable Energy Sources
SEAP	Sustainable Energy Action Plan
UNFCCC	United Nations Framework Convention on Climate Change
UNEP	United Nations Environmental Programme
US	United States of America
WTE	Waste-to-Energy

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1 INTRODUCTION

This report presents the proposed Draft for the Sustainable Energy Action Plan (SEAP) for Antigua & Barbuda (A&B).

The SEAP delineates achievable target quotas for the NEP's five goals (energy cost reduction, diversification of energy sources, electricity reliability improvement, environmental protection and stimulate new economic opportunities) as well as four strategies (general cross-cutting strategy, energy conservation and energy efficiency, renewable energy development and education and awareness) for achieving these goals.

For each of the four strategies outlined, goals and objectives, specific actions to be implemented, responsible agency per each action, appropriate indicators to measure its outputs, level of priority (short, medium or long term), cost and potential sources of funds have been identified. The SEAP is intended to align concrete goals and the strategies to achieve the five guiding pillars of the NEP in order to enable the creation of a stable sustainable and efficient energy sector that fosters the national economic and social development in Antigua & Barbuda.

2 OVERALL STRATEGY

2.1 Objective(s) and Targets

The SEAP, as defined in the Antigua & Barbuda's National Energy Policy (NEP) is intended to serve as a roadmap for the energy future in Antigua and Barbuda from 2010 until 2030. The SEAP contains short (1-5 years), medium (5-10 years), and long (10-20 years) term actions designed to enhance the implementation of the policies and goals of Antigua & Barbuda's NEP. The specific activities contained in the SEAP will foster energy conservation, energy efficiency, and diversification of energy sources, sustainable energy consumption and generation as well as the utilization of renewable energy sources available in Antigua and Barbuda.

The SEAP contemplates a traversal general strategy and three specific strategies:

- Strategy 0: General Cross-Cutting Strategy
- Strategy I: Energy Conservation & Energy Efficiency
- Strategy II: Renewable Energy Development
- Strategy III: Education and Awareness

With the implementation of these strategies A&B expects to reduce in 2020 10% of its overall energy intensity compared to 2010 values and to reduce its dependency on fossil fuels by 10%, as well.

2.2 Current Framework

Current Framework

In recent years, Antigua & Barbuda has made important strides in its energy policy by drafting and approving their National Energy Policy (NEP) in November 2011. This is the main policy in terms of renewable energy and energy efficiency development. The National Energy Policy document sets out the Government of Antigua & Barbuda's approach in achieving its vision that:

By 2030 Antigua & Barbuda will meet the needs of the present generation while safeguarding the environment and enabling future generations to meet their own energy needs. All citizens and residents will have access to affordable efficient, socially responsible and reliable forms of energy.

According to the National Energy Policy of Antigua & Barbuda approved in 2011 (herein referred as NEP 2011), the following five (5) sector priorities for the energy sector have been defined:

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Particular attention has been provided to the power and transportation sectors, as those are the major consumption sectors in terms of energy.

Power Sector

According to the NEP 2011, transformation of the electricity supply will involve moving from a total dependence on fossil fuel to a mix of which includes solar, wind and waste to energy. To this end, the government will facilitate resource assessments and pre-feasibility studies to understand the technical challenges, economic feasibility and environmental considerations in relation to deploying these technologies in an Antigua & Barbuda context. Additionally energy conservation and efficiency improvements in supply and demand will be key strategies in achieving the overall objective lowing costs to consumers.

A range of policy instruments will be used to stimulate and support investments in new technologies and energy saving measures, including, inter alia, legislative, regulatory and financial incentives. Although APUA will continue to play a key role in the sector, where practicable market mechanisms will be used to achieve higher effectiveness, lower generation costs, lower costs to consumers and increased generation using indigenous energy resources, room is also left open for independent power producers to enter into the generation market as renewable micro-generators (capacity lower than 50kW) or large generators (to substitute generation from existent fossil fuel power plants and to help APUA in achieving its targets)

APUA is the state body institution responsible for the power generation, transmission, and distribution of electricity in Antigua and Barbuda.

In Antigua & Barbuda, the main energy consumption sectors are the Commercial, Domestic and Government/Public sector. In 2011, these three sectors accounted for 94% of electricity consumed on the country. Figure 2 illustrates consumption in Antigua & Barbuda in 2010 based on information obtained from the Energy Desk.

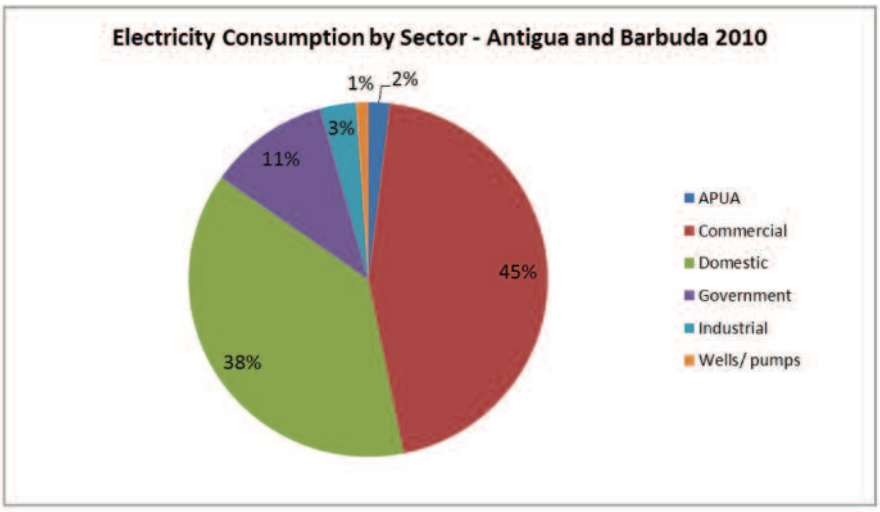


Figure 2: Electricity Consumption by Sector 2010

As Antigua & Barbuda continues to develop, energy demand and as a result, consumption, continues to grow as between 2007 and 2010 electricity consumption increased by approximately 16%. As

such, decision makers have realised the increasing importance of drafting and implementing a Sustainable Energy Actin Plan to effectively reduce and manage current energy trends.

Transportation

The structure of the Antigua & Barbuda economy its heavy reliant on air travel for tourism purposes and has a high level of private vehicle penetration, that contributes to its relatively high energy intensity. Moreover, past Governments policy of shielding consumers from the full cost of fuel at the pumps, has only served to maintain inefficiencies in ground transportation. Recognizing the important role transportation plays in fulfilling the social and economic needs for access, this SEAP contemplated measures and actions within its purposed strategies to diversify the options available to consumers, while ensuring that they are efficient, safe, affordable and environmentally-friendly. Standards relating to fuel efficiency and emissions are to be established, as well as economic measures designed to support more sustainable transportation choices. Government will take a lead role by ensuring the application of efficient vehicles and cleaner fuels within its fleet.

The transportation sector in Antigua and Barbuda has not been spared by global fluctuations in the price of fuel as in 2011 the price of gasoline to the consumer increased by 24% between January and December, which is reflected by a dollar value of EC$2.89 or US$1.07.

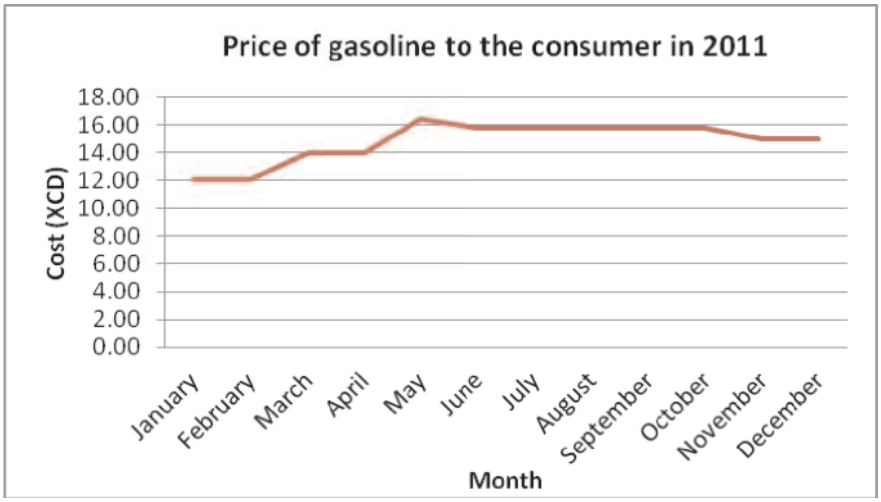


Figure 3: Price of gasoline to the consumer 2011

Between 2005 and 2009, vehicles used for ground transportation increased from 23,930 to 30,525, reflecting an increase of approximately 28% over 5 years, with a large proportion of this increase being attributed to the importation of SUVs and large vehicles which are competitively priced, due to duty waivers and customs incentives, to cars and smaller vehicles.

As a result, the NEP focuses on how vehicles are utilized, improving the quality and attractiveness of public transportation and utilizing a combination of fiscal incentives to promote the use of the most efficient technologies. The mechanisms to be put in place to ensure the most efficient use of fuel, as it relates to consumption in the transportation sector, include:

- Utilization of vehicles with higher fuel efficiency and lower emissions, proven by periodic tests and emission standards
- Compulsory recycling of used oil
- Traffic routing systems and traffic patterns

- More efficient and reliable public transport systems
- Support the importation of hybrid, flex-fuel or electric vehicles through waivers and financial incentives
- Moderate the use of large, popular vehicles such as SUVs through financial penalties and levies
- Utilization of regional bio-fuels
- Increased use of cleaner fossil fuels as liquid natural gas (LNG)

In addition to the changes in its own consumption patterns, the Ministry of Transport, once institutional capacity has been developed, in conjunction with other government institutions – recognizing that transportation is simply a means to access people and services - will develop and/or promote:

- New legislation for emissions;
- Regular checks of tire pressure levels to minimize tire rolling;
- Reduce the demand for travel while protecting social and economic needs for access;
- Improve access by identifying and removing the obstacles to more sustainable choices such as car pooling, walking and cycling; and
- Mandatory recycling of used fuel

2.3 Organisation and Financial Aspects

Responsible Agency (ies) and Stakeholders for the implementation of the SEAP

A reformulation of the institutional framework in place in Antigua & Barbuda is proposed in both NEP and in this plan. In this reformulation it is proposed to create:

- An Independent Regulatory Agency
- Sustainable Energy Unit (herein referred as Energy Unit); and
- Energy Advisory Panel (which would include key members of the public and private sector).

From these three agencies, the Energy Unit will be mainly responsible for the implementation and update of the NEP and for the implementation and monitoring of the SEAP, ensuring that the overall objectives of the energy sector reform are achieved in the shortest possible time. The following are the specific responsibilities of the Energy Unit as defined under the NEP:

I. Mandating and coordinating studies on energy resources, generation, transformation and marketing in close cooperation with the responsible operating agencies;

II. Fostering the development of appropriate legislation for the sectors electricity, transportation, petroleum and gas through a participatory and consultative process with focus on cheaper and more sustainable services;

III. Fostering the development and adoption of appropriate energy efficiency standards and programs;

IV. Promoting and monitoring power sector demand-side management programs and other programs designed to encourage the purchase and adoption of energy-efficient appliances by final energy users;

V. Encouraging private sector participation in energy efficiency measures and technologies relevant to Antigua and Barbuda;

VI. Organizing energy awareness campaigns and capacity building events and disseminating appropriate information to private and public sector;

VII. Cooperating with national and regional NGOs or institutions active in the energy and environmental sector to increase the dialogue and organize dissemination of relevant information or capacity building programs.

The Independent Regulatory Agency will be an independent arbiter in all matters relating to the sale of electricity, with the following responsibilities:

I. Establishing rules, guidelines and standards which will allow for consistency, predictability and transparency in the regulation of electricity supply in Antigua & Barbuda;

II. Setting up electricity tariffs and conducting tariff reviews;

III. Cooperating with the Eastern Caribbean Energy Regulatory Authority (ECERA) in all matters related with setting up the electricity tariffs and in the incorporation of rules guidelines and standards necessary for the regulation of the electricity sector;

IV. Monitoring performances, developing and helping to implement technical standards for improving performances and tariff incentives if necessary;

V. Developing and monitoring data on the electricity sector;

VI. Developing a model market structure, licensing terms, and helping to implement fair and transparent rules regarding new investors in electricity generation, especially from renewable energy sources.

VII. Developing a framework for sustainable investment in the electricity system by: (i) reviewing and approving the investment plans of the utility, including allowing the utility to recover the prudently incurred costs of their investments in electricity rates; (ii) approving the procurement processes associated with carrying out these plans in order to ensure that the investments deliver the best value for the consumers, with a special emphasis on the procurement of renewable energy resources.

VIII. Facilitating the process of formulating and implementing (1) possible renewable energy (RE) targets, (2) utility obligations and procurement rules to purchase electricity from RE sources, (3) mechanisms to recover corresponding costs from consumers, and (4) standard contractual terms for private suppliers of electricity.

IX. Upon the request of the Government(s), providing expert advice and input to national policymaking. This could include involvement in consultations to help formulate energy policy goals for the country, responding to the needs for energy security, reliability of electricity supply and energy diversification and providing expert advice on the impacts of policies on consumer electricity prices.

X. Responsible for supporting Government's policy on the supply of electricity for national sustainable development.

XI. Responsible for engaging and working with other agencies to promote, protect and enhance a sustainable environment.

The Energy Advisory Panel will be responsible for serving as a platform for industry players including inter alia, policy makers, regulator, generators, consultants and NGO's to meet, discuss and make recommendations on current issues in the energy sector and advise the Government on improvements to the NEP and SEAP.

Estimated Budget for SEAP Implementation

The estimated total budget for the SEAP finalisation and implementation (which does not include RE and EE equipment, installation and maintenance) is approximately **EC$26 million Eastern Caribbean Dollars over a 20-year time.** Section 11 provides a breakdown of the estimated budget per proposed strategy.

3 SWOT ANALYSIS

Energy is an essential component of development of the nations. A standard tool for strategic analysis commonly used that seeks to identify the main strengths, weakness, opportunities and threats for a given entity, that can range from a nation to a sector to an individual enterprise, is the SWOT analysis. In the analysis of the energy sector of Antigua and Barbuda, the strengths and weaknesses represent the internal assessment of the sector while the opportunities and threats represent the external environment of the sector.

This analysis, along with the Country Profile developed under this project, form the basis for the identification of the goal, objectives and the three strategies considered under this SEAP. The goals, objectives and strategies proposed in this document are mean to apply the strengths, address the weaknesses of the sector while capitalizing on the opportunities and mitigating the threats to the sustainable development of the sector.

Figure 4: SWOT Analysis of the Energy Sector

Internal Analysis

Strengths

- Existing sources of renewable energy
- Commitment by the Government to adopt the NEP
- Existing Energy Policy (APUA's Act)
- Draft National Energy Policy (NEP)
- Stakeholder support to move towards a more carbon efficient energy sector
- Commitment of the utility in incorporating renewable energy in the electricity mix
- Strong stakeholder involvement in the development of the NEP
- Biofuel power demonstration plant installed and running

Weakness

- Total dependency on imported fossil fuels (petroleum products)
- Lack of an independent regulatory agency and a Ministry of Energy/Energy Unit
- Lack of indigenous fossil fuel sources
- High energy bill
- High electricity cost and high electricity tariff
- Old/aging electricity generation plants
- Low efficiency of the electricity system
- High electricity losses
- High energy intensity
- Lack of energy sector action plans and strategies
- Inefficient energy use in production and consumption throughout the economy
- Low level of adaptation to new energy generation technologies
- Inefficient and inadequate public transport system
- Inefficient road network in rural areas
- Inefficient movement of traffic and urban centres
- Inefficient use of energy in public buildings, the tourism and domestic sectors
- Low awareness and technical capacity on energy efficiency and renewable energy
- Lack of energy efficiency standards & labelling
- Lack of energy service providers
- Lack of policies and mandated to enable the introduction of biofuels and ethanol
- Lack of emission standards

External Analysis

Opportunities

- Existence of affordable technologies to exploit natural energy sources
- Favourable relations with energy-rich countries in the CARICOM, Caribbean Region and other regions
- International interest in energy investments in Antigua & Barbuda
- Ability to yield carbon finance through the Kyoto Protocol
- Potential for renewable energy development
- Potential for energy conservation & efficiency
- Renewable fuel technologies for motor vehicles

Treats

- Volatility of petroleum supply prices
- Potential impact of natural hazards on the sector
- Geo-political influences on international energy supply and demand
- Contribution of GHGs to climate change
- Potential impact of emission and contaminations
- Risk of natural hazards

4 BASELINE AND BASELINE EMISSIONS

4.1 Baseline and Baseline Scenario

Electricity Sector Baseline: Generation and Consumption

Antigua & Barbuda is a country that relies almost exclusively on imported fossil fuels for electricity generation, transportation and cooking. This imposes a very bid financial burden for the country as all fuel consumed in the different sectors is imported into the island.

In terms of electricity generation, Antigua & Barbuda relies almost exclusively on fossil fuels (diesel and HFO). The electrical installed capacity is approximately 121MW and the production capacity is 105.5MW, according to information from the Energy Desk. In 2009, net generation in Antigua and Barbuda was of 326GWh, derived from fossil fuel generating plants.

Besides fossil fuel generation plants, since the end of 2009, there is a small photovoltaic grid-connected pilot project of 3kW installed in Antigua. This small renewable energy facility in the full year of 2010 supplied to the grid 4.8MWh of electricity.

Antigua & Barbuda is endowed with renewable energy resources, mostly wind and solar, and these renewable resources have not been exploited yet. Studies indicate 400MW and 27MW potential for wind and solar respectively. Nevertheless, studies need to be carried out to evaluate the useful extent of this technology as well as other resources such as biogas and waste to energy (WTE).

In terms of consumption (see Figure 5), from 2001 to 2010 total energy consumption increased by 45%. Between 2001 and 2006 energy consumption increased at an annual average rate of 3.2% and from 2007 until 2010 at an annual average rate of 5.6%. Between 2007 and 2010, electricity demand in Antigua & Barbuda, and consequently consumption increased by approximately 16%, from 200GWh in 2007 to 232GWh in 2010.

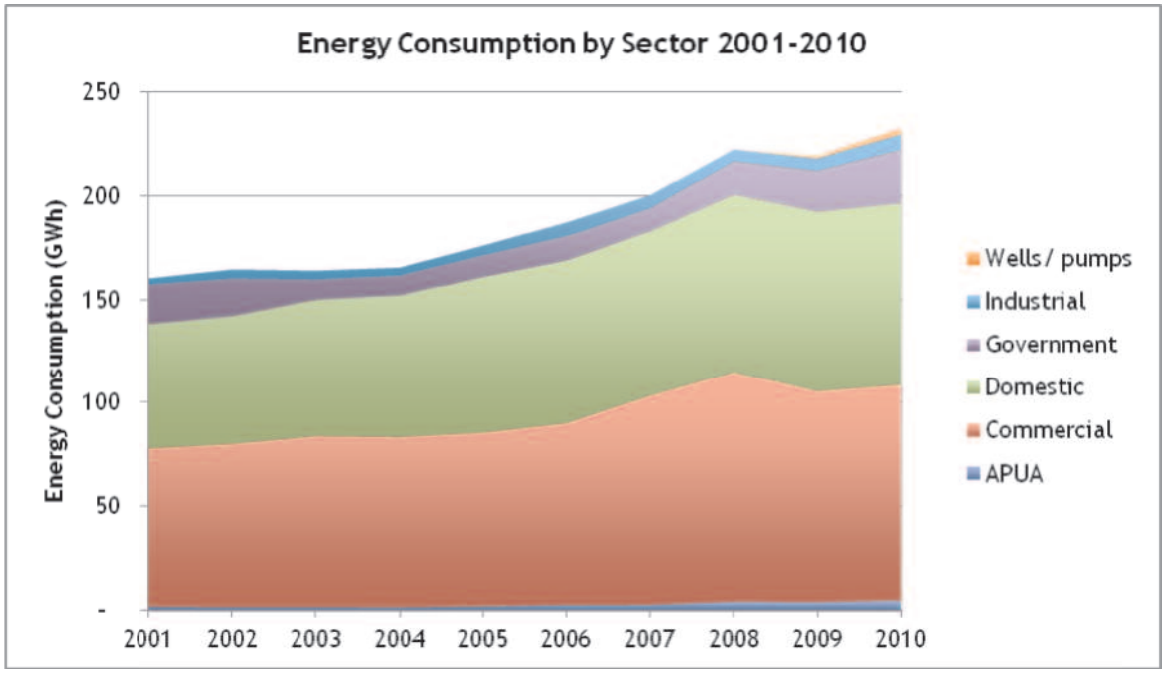


Figure 5: Electricity Consumption by Sector 2001-2010

As it can be seen in Figure 5 the main electricity consumption sectors in 2010 were the Commercial (45%), Domestic (38%) and Government/Public sector (11%). From 2010 to 2011, the total consumption in the country in these three sectors increased 2%, from 94% in 2010 to 96% in 2011.

Electricity Sector BAU Scenario: Consumption & Production

Projections for Antigua & Barbuda's electricity demand and production for the next 20 years were carried out by Nexant (Nexant, 2010). According to the referred report, the electricity demand in the country is expected to increase by 3.3% per year during the next 20 years[1]. This will lead to the double of the current demand which is now around 50% of what is expected to be in 2030. In terms of production the same report, projects that net electricity generation in the country is expected to increase annually 3.9%. Figure 6 illustrates the projected net generation forecasted versus the projected demand using the data of the Nexant report (covers the period between 2009 and 2028) extended to 2030 by ITP. According to these projections net energy generation is expected to increase by 117% from 2010 to 2030, compared with 2010 values.

This constitutes the Business as Usual (BAU) scenario for the electricity sector until 2030 and takes into account the historic demand and the programmes and policies in place in Antigua & Barbuda.

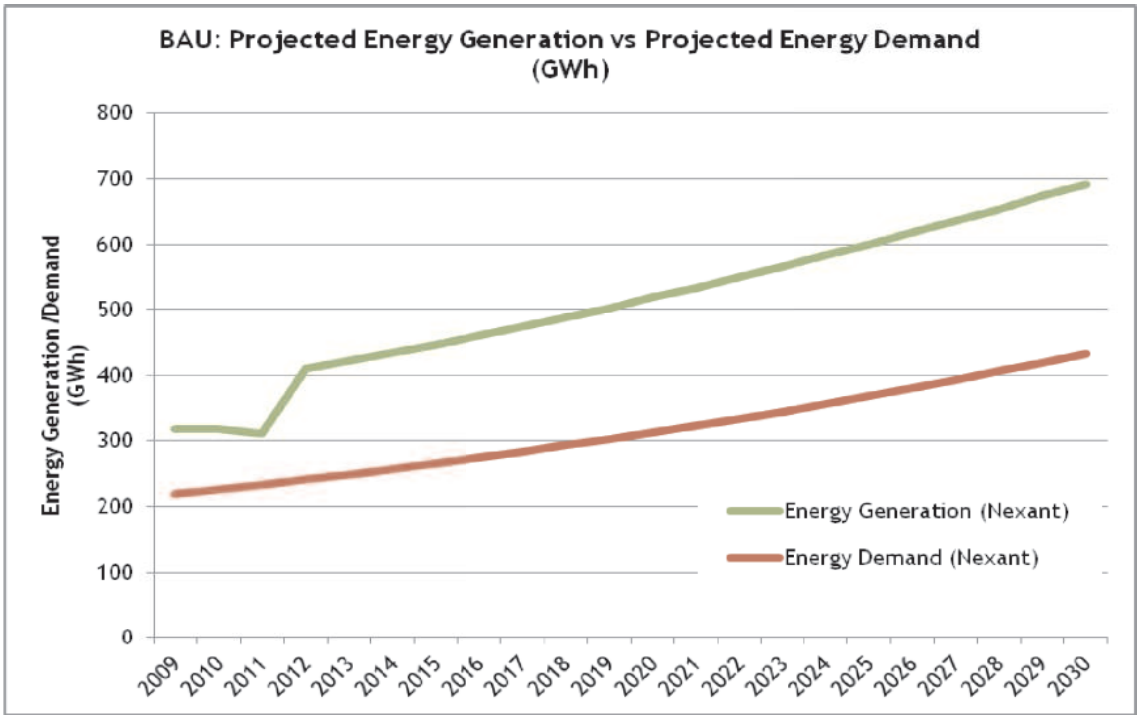


Figure 6: BAU – Projected Energy Generation vs Projected Energy Demand (GWh)

Thus to produce the projected energy, additional capacity (apart from the already commissioned power plant in 2011) will need to be installed (see Figure 7). As it can be seen in Figure 7, a total additional capacity of 20MW will need to be added to the country's installed capacity to face peak load demand and so that the forecasted energy generated can be actually generated. The

[1] ITP also made its own forecast for electricity demand (based on the energy consumption data from 2007 to 2010), which yielded similar results as the ones estimated by NEXANT – average growth rate estimated by ITP from 2010 to 2030 was of 2.9%.

additional capacity will need to be installed before 2024. If the same path followed until now for installing additional capacity remains fossil fuel generators will be added to the system.

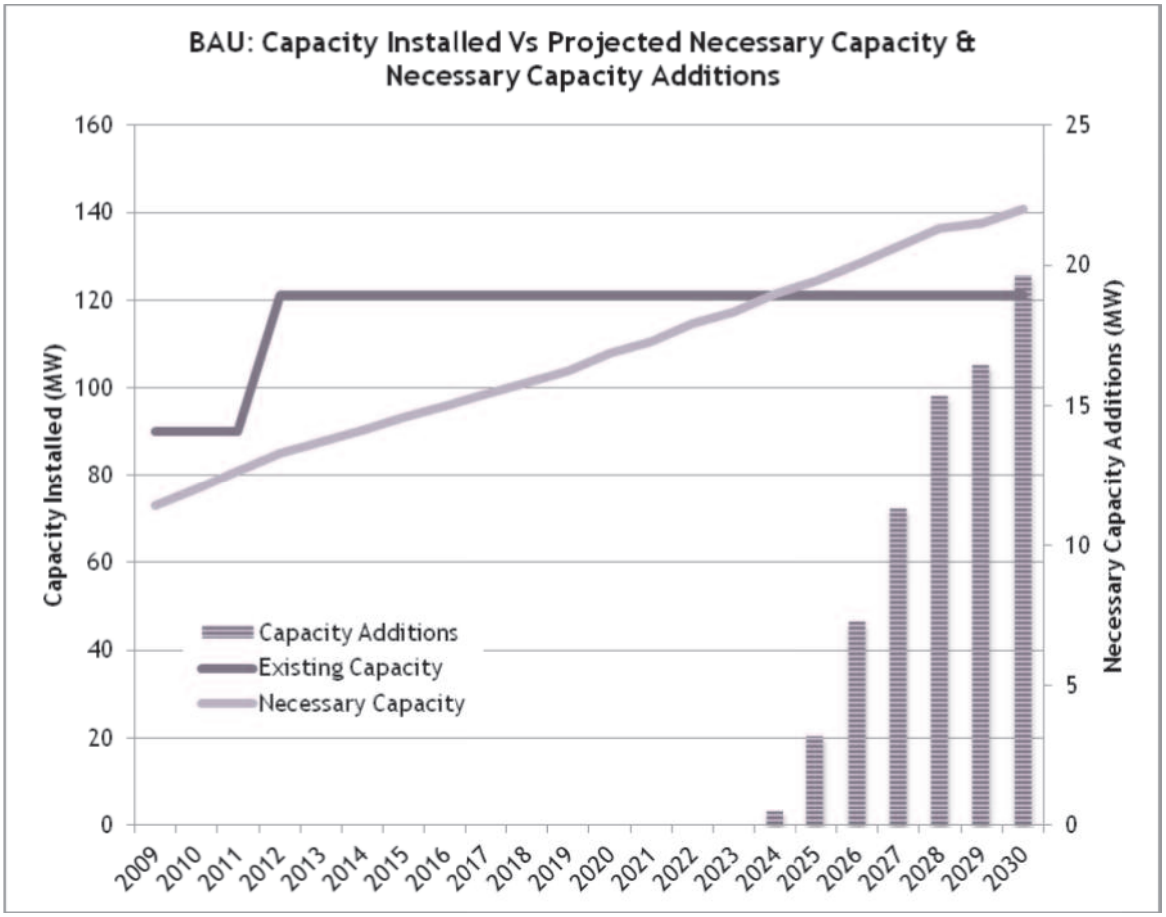


Figure 7: BAU - Capacity Installed vs Projected Necessary capacity (left axis) and Necessary Capacity Additions (right axis)

4.2 Baseline Emission Inventory and Baseline Emission Scenario

According to the Antigua & Barbuda 2nd Communication to the UNFCCC developed in 2009, in 2000, Antigua & Barbuda registered emissions of 371ktCO2. The main sectors responsible for these emissions were the energy industry and the transport sectors. The table below shows the summary of the CO2 emission in 2000.

Table 2: Carbon emissions registered in Antigua & Barbuda in 2000 (2009, UNFCCC)

Sector	CO2 emission (ktCO2)	%
Energy Industries	177	47.7%
Manufacturing Industries & Construction	0	-
Transport (Road)	182	49.1%
Commercial/Industrial	5.52	1.49%

Sector	CO2 emission (ktCO2)	%
Residential Sector	7.36	1.98%
Agriculture, Forestry, Fishing (mobile)	0	-
Total	**371**	**100%**

The following figure illustrated the carbon emissions from 1991 to 2009 according to the United Nations Statistics Division. As it can be seen carbon emissions in Antigua & Barbuda have been increasing. The biggest increase was registered from 2000 onward; a 3.3% annual increase was registered between 2000 and 2009.

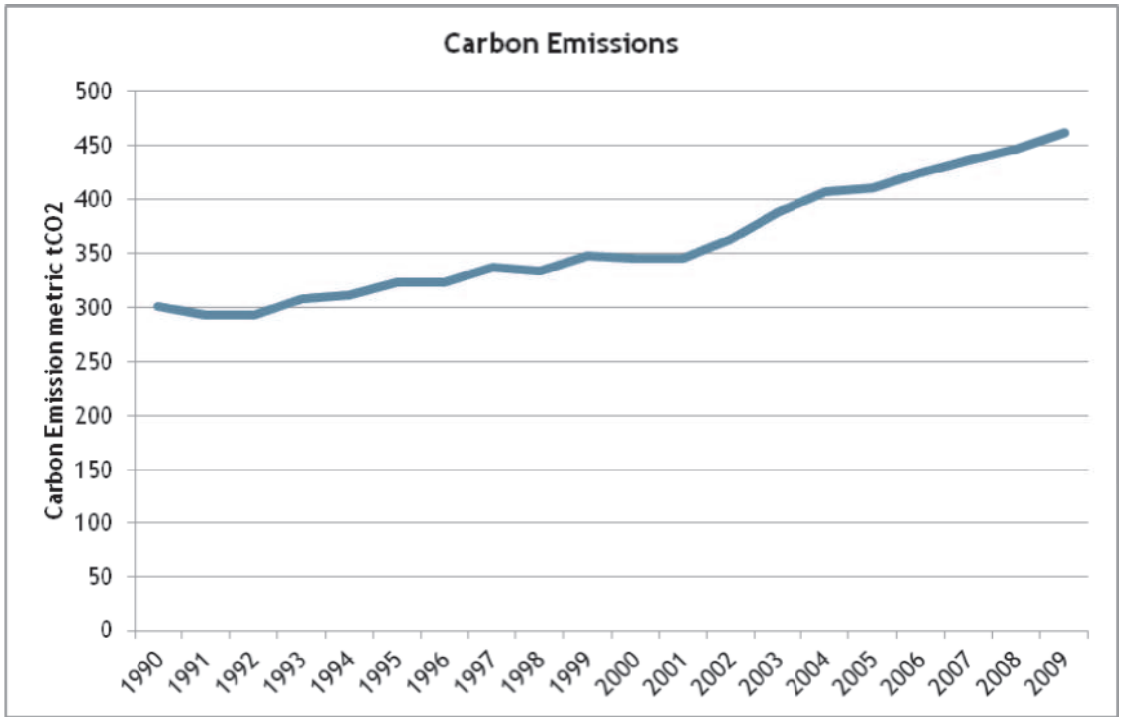


Figure 8: Antigua & Barbuda Carbon Emissions (United Nations Statistics Division, 2012)

Carbon Emission BAU Scenario

If the same pattern of generation of carbon emissions is maintained, it is expected that between 2009 and 2030, carbon emissions will increase by more than 60% relatively to 2009 values (see Figure 9). The projected carbon emissions were estimated by ITP using the registered carbon emissions data from 2000 to 2009 from the United National Statistics Division (United Nations Statistics Division, 2012).

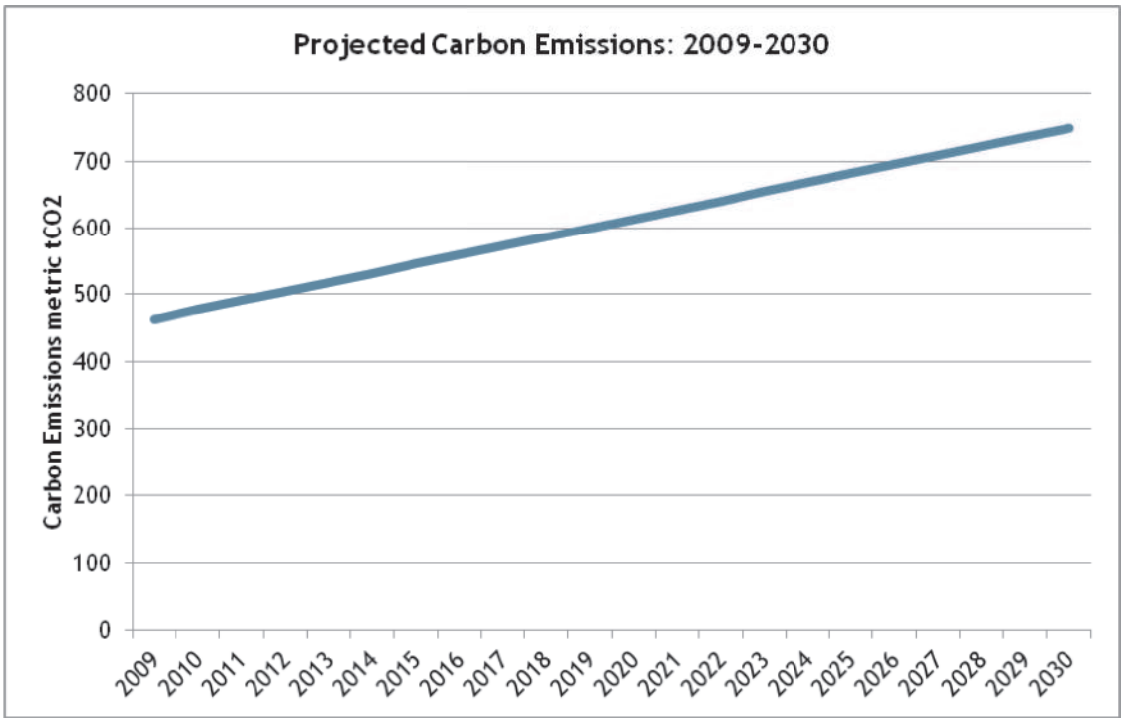


Figure 9: BAU: Projected Carbon emission until 2030 (ITP estimates)

If the contribution from each sector of activity for carbon emission generation registered in the Antigua & Barbuda 2nd National Communication to the UNFCCC is maintained, the energy industries will be responsible in 2030 for the emission of 358tCO2 and the transport sector for 368tCO2. The other sectors in total will be responsible in 2030 for the emission of 24tCO2.

5 EXPECTED OUTPUTS FROM THE SEAP

The following table summarises the general expected outputs of the SEAP.

Table 3: Expected output of the SEAP

Goals	Outcomes
Energy Cost Reduction	Implementation of least-cost solutions for the supply of energy, including source, conversion, distribution
	Implementation of least-cost solutions to reduce energy demand and consumption
	Reduction in emissions, effluents and leaks from the energy sector.
	Increased awareness of and informed behaviour by large and small consumers on energy issues.
Diversification and Efficient Use of Energy Sources	Identification and development of indigenous non-renewable sources of energy
	Application of emerging appropriate energy technologies
	Diversified energy sources by type and locale
Electricity Reliability	Modernized, reliable and efficient energy infrastructure and services in productive sectors
	Implementation of appropriate safe and reliable electricity distribution system
Environmental Protection	Internationally competitive industries and firms that apply eco-efficiency and contribute to the creation of a green economy
	Internationally competitive industries and firms that apply eco-efficiency and contribute to the creation of a green economy
	Increased awareness of and informed behaviour by large and small consumers on energy issues.
Stimulate New Economic/Business Opportunities	Establishment of policy statements, enforceable laws, regulations and institutions that create equitable and transparent opportunities for all stakeholders in the energy sector

6 STRATEGY 0: GENERAL CROSS-CUTTING STRATEGY

6.1 Objectives and Targets

This cross-cutting strategy intends to address some of the institutional and regulatory barriers identified in Antigua & Barbuda, which are transversal to the proposed specific strategies (Strategy I to III) and necessary to ensure the successful implementation of the NEP and SEAP. Non-existent regulatory agencies and lack of specific attention to the energy sector (energy is a matter that is dealt under the Cabinet of the Prime Ministry by the Government and lack a dedicated specific institution) are among the issues addressed within this strategy.

6.2 Specific Actions/Measures/Programmes to be implemented and Responsible Agencies and Stakeholders

The actions/measures identified within this strategy are necessary for the implementation of the three specific strategies (energy efficiency, renewable energy and education and awareness) or are applied to other energy sources which are not renewable. The lines of action defined in Strategy 0 include:

- The establishment and reformulation of the energy related institutional framework through the creation of an Independent Regulatory Agency, an Energy Unit and an Energy Advisory Panel;
- Finalise and adopt the NEP and SEAP and continuously seek revisions
- Analyse the possibility for diversification of energy sources apart from renewable sources of energy.

The following strategic map of policies and lines of actions indicate the proposed measures/actions for this strategy as well as identify the responsible agencies and stakeholders for its implementation.

Strategic Map of Policies and Line of Action for the Cross-cutting Strategy

Cross-Cutting Strategy	Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
01: Reformulation of the Energy Related Institutional and Organisational Framework	01.1 Create the Energy Unit	01.1.1 Develop a policy (law) creating the Energy Unit	Gov. A&B
		01.1.2 Create the Energy Unit and legally allow it to deal with all matters related with the energy sector and to be responsible for policy, regulation and standard formulation, including updating the NEP and SEAP, between other activities.	Gov. A&B
		01.1.3 Mandate the Energy Unit, by law, to: • Coordinate studies on energy resources, generation, transformation and marketing in close cooperation with the responsible operating agencies; • Foster the development of appropriate legislation for the sectors electricity, transportation, petroleum and gas through a participatory and consultative process with focus on cheaper and more sustainable services; • Foster the development and implementation of renewable energy projects with the assistance of responsible operating agencies e.g. Environment Division • Foster the development and adoption of appropriate energy efficiency programs and measures; • Promote and monitor demand-side management programs and other programs designed to encourage the purchase and adoption of energy-efficient appliances by final energy users; • Encourage private sector participation in energy efficiency measures and technologies and in renewable energy project development relevant to Antigua & Barbuda; • Organize energy awareness campaigns and capacity building events and disseminate appropriate information to private and public sector; • Monitor the implementation of energy efficiency and renewable energy projects	Gov. A&B
		01.1.4 Review on an on-going basis the existing institutional and organisational framework for performance, strengths, weakness, and lessons learnt to formulate and implement programmes of legal reforms	Energy Unit / Gov. A&B
	01.2 Create the Energy Advisory Panel	*01.2.1.* Create an Energy Advisory Panel composed of industry players (policy makers, regulator, generators, consultants and NGOs) to meet, discuss and make recommendations and advice the Energy Unit on improvements of the	Gov. A&B

Cross-Cutting Strategy	Line of Action	Measures and Actions		Responsible Agencies and Stakeholders
			NEP and SEAP	
	01.3 Create Independent Regulatory Agency	01.3.1	Create an Independent Regulatory Agency (Regulator) – independent from the Government and from the Utility	Gov. A&B
		01.3.2	Empower the regulator with enforcement powers to the improve efficiency of the system and compliance with established benchmarks, procedures and standards	Gov. A&B
02: Finalise and adopt NEP and SEAP	02.1 Finalise and adopt NEP and SEAP	02.1.1	Finalise and adopt Antigua & Barbuda NEP	Gov. A&B / Energy Unit / Energy Advisory Panel
		02.1.2	Finalise and approve Antigua & Barbuda Action Plan	Gov. A&B / Energy Unit / Energy Advisory Panel
		02.1.3	Revise on an on-going basis both the implementation of the NEP and SEAP in Antigua & Barbuda	Energy Unit / Energy Advisory Paned
0.3: Diversification of Energy Sources	03.1: Enhance the contribution of the energy sector to climate change mitigation and adaptation	03.1.1	Analyse the possibility and feasibility of introducing natural gas (e.g. Liquefied Natural Gas- LNG) to replace current heavy fuel oil for electricity generation	Environment Division/ Energy Unit / Gov. A&B / APUA
		03.1.2	Promote public and private partnerships between public and private to finance and develop energy diversification projects	Ministry of Finance and the Economy/ ABIA/ A&B Gov.
	03.2: Define a fuel diversification strategy for the short, medium and long term and develop priorities for diversification	03.2.1	Develop priorities for diversification (in a timely way based on cost, efficiency, environmental consideration and appropriate technologies)	Energy Unit/ Gov. A&B
		03.2.2	Develop LNG projects if feasible	Energy Unit/ Gov. A&B
		03.2.3	Develop legislative framework for natural gas if necessary	Gov. A&B

6.5 Expected Outcomes from the proposed Lines of Action to be implemented and Indicators to measure implementation progress

The following table summarises the expected outcomes and indicators to measure these outcomes for each of the line of action proposed under Strategy 0. This will be a tool to be used in monitoring the implementation of the SEAP.

Table 4: expected outcomes from the proposed lines of action and indicators to measure the implementation progress

NEP Goals	Line of Action	Outcomes	Indicators
-Energy Cost Reduction -Stimulate New Economic/Business Opportunities -Electricity Reliability -Environmental Protection - Diversification and Efficient Use of Energy Sources	01.1 Create the Energy Unit	• Energy unit created and running. • Energy Advisory panel created and running. • Contribution to the reduction and sustenance of overall energy intensity of the Antigua & Barbuda economy by at least 10% below a 2010 baseline within 10 years.	• Number of highly trained professionals in the EE/RE arena • Review of the existing institutional and organisational framework • Monitoring report on the implementation of RE projects and EE measures • Overall energy intensity
	01.2 Create the Energy Advisory Panel		
	01.3 Create Independent Regulatory Agency	• Independent Regulatory Agency created and running • Improved efficiency of the system and compliance with established benchmarks, procedures and standards	• % of efficiency of the utility and grid = number of barrels of HFO required for electricity generation • Overall energy intensity

	02.1 Finalise and adopt NEP and SEAP	• NEP and SEAP for Antigua & Barbuda published
		• On-going revision of the NEP and SEAP
		• NEP goals achieved
			• Overall energy intensity
			• Diversification and Efficient:
			  • RE in the electricity supply mix (electricity supply mix at the following minimum levels: 2015-5%, 2020-10%, 2030-15%)
			  • Incorporation of other sources of energy
			• Electricity Reliability: number of hours with blackouts
			• Environment Protection
			• Stimulation of new business opportunities: number of new business opportunities

	03.1: Enhance the contribution of the energy sector to climate change mitigation and adaptation	• Fuel stock for the transportation and electricity generation sectors diversified • GHG emissions reductions achieved • Framework for natural	• % of GHG emissions reductions as compared to 2010. • Number of PPPs • % Natural gas in the A&B energy mix (if natural gas framework established)

NEP Goals	Line of Action	Outcomes	Indicators
	II3.2: Define a fuel diversification strategy for the short, medium and long term and develop priorities for diversification	gas established and implemented (if necessary)	

6.6 Definition of Implementation Priorities and Timing for implementation of the Strategy

A methodology based on different criteria was developed to assess the implementation priorities and the timing of implementation of each line of action under each strategy. The methodology is summarised in Annex I.

Table 5 illustrate the results of the analysis carried out using the above referred methodology, and indicates the implementation priorities of each line of action for Strategy 0.

Table 5: Implementation priorities for Strategy 0

Cross-Cutting Strategy	Policy/Line of Action	Priority: High, Medium, Low (score)
01: Reformulation of the Energy Related Institutional and Organisational Framework	01.1 Create the Energy Unit	High (36 points)
	01.2 Create the Energy Advisory Panel	High (34 points)
	01.3 Create Independent Regulatory Agency	High (34 points)
02: Finalise and adopt NEP and SEAP	02.1 Finalise and adopt NEP and SEAP	High (45 points)
0.3: Diversification of Energy Sources	03.1: Enhance the contribution of the energy sector to climate change mitigation and adaptation	Medium (26 points)
	03.2: Define a fuel diversification strategy for the short, medium and long term and develop priorities for diversification	Medium (30 points)

The indicative timing for the implementation of the lines of action defined under this strategy is shown in Figure 10.

Cross-Cutting Strategy	Policy/Line of Action	Years			
		5	10	15	20
		Short	Medium	Long	
01: Reformulation of the Energy Related Institutional and Organisational Framework	01.1 Create the Energy Unit	D / I			
	01.2 Create the Energy Advisory Panel	D / I			
	01.3 Create Independent Regulatory Agency	D / I			
02: Finalise and adopt NEP and SEAP	02.1 Finalise and adopt NEP and SEAP initiatives	D / I	I	I	
0.3: Diversification of Energy Sources	03.1: Enhance the contribution of the energy sector to climate change mitigation and adaptation	D	D/I	I	
	03.2: Define a fuel diversification strategy for the short, medium and long term and develop priorities for diversification	D	D/I	I	

Legend: *D - Development, I - Implementation, C - Continuation*

Figure 10: Indicative timing for the implementation of the lines of action defined under Strategy 0

7 STRATEGY 1: ENERGY CONSERVATION & ENERGY EFFICIENCY

7.1 Objectives and Targets

Within this strategy Antigua & Barbuda intends to address:

- High energy intensity index;
- Low levels of energy efficiency in the electricity sector;
- Low levels of energy efficiency in the energy consuming sectors, in particular the commercial, public, residential, agro-industrial and transport sectors;
- Low levels of energy efficiency from building designs, electrical installations and low levels of energy efficiency of end use devices.

Antigua & Barbuda's NEP states the following strategic objectives in terms of energy conservation & energy efficiency (energy cost reduction):

- Prepare and implement a systematic plan to reduce and sustain overall energy intensity of the Antigua & Barbuda economy by at least 10% below a 2010 baseline within 10 years (in 2020);
- Revise building codes and support energy management programmes in order to reduce consumption at Government and public facilities, industrial plants and other large users by identifying effective measures to control and improve energy efficiency by 30% over 15 years (in 2025);
- Introduce legislation and appropriate economic incentives to fast track the mitigation of public and private fossil powered vehicles to low carbon technologies with the aim of improving efficiency in the transportation sector by 40% in 15 years (in 2025);
- Establish minimum energy efficiency standards for air conditioning, refrigeration and other appliances as well as differentiated tariff to incentivize efficiency;
- Antigua & Barbuda Government being one of the largest energy consumers will assume the lead position as driver of cost reduction initiatives by legislating and implementing cost reduction initiatives with a view to reducing its consumption and costs by 30% in 10 years (2020).
- Support energy efficiency choices through improved awareness, information and services that can deliver energy efficiency.

7.2 Specific Actions/Measures/Programmes to be implemented and Responsible Agencies and Stakeholders

In order to meet the strategic objectives, specific Programmes, Actions and Measures are proposed to be implemented. The actions and measures proposed either focus on (a) specific sector(s), are cross-sectorial or directed at the creation of an enabling energy use in general:

- Map energy end-uses, elaborate and maintain end-use statistics and monitor energy end-uses in the various energy consuming sectors of the economy;
- Define and implement incentives and financing options for the efficient use of energy;

- Define the role of APUA and other energy sector enterprises in the promotion of energy efficiency;
- Revise electricity tariffs to stimulate energy efficiency;
- Coordinate energy efficiency programmes, actions and measures with regional initiatives;
- Participate in international energy efficiency programmes and initiatives;
- Energy auditing and management: train and certify energy auditors and managers and implement energy auditing and management programmes in the public, commercial, industrial and transport sectors;
- Building codes: implement energy-related building codes for commercial, public and residential buildings;
- Energy efficiency standards & labelling: develop a comprehensive, medium- and long-term strategy for energy efficiency standards & labelling of energy-related products;
- Energy efficiency labelling: implement mandatory labelling for energy-related products, in particular household appliances;
- Energy efficiency standards: implement mandatory minimum energy efficiency standards for selected energy-related products;
- Implement a replacement programme for energy-using equipment, in particular household appliances;
- Efficient lighting: implement replacement programmes for inefficient lamps in the public, commercial and residential sectors, phase-out incandescent lamps;
- Implement a targeted energy efficiency programme in the electricity sector, focussing on the development of standards and the reduction of losses in the generation, transmission and distribution of electricity;
- Implement a targeted energy efficiency programme in the public sector, focussing on government buildings, vehicles and the procurement of energy-efficient equipment;
- Implement a targeted energy efficiency programme in the residential sector, focussing on advisory services and awareness campaigns;
- Implement a targeted energy efficiency programme in the tourist sector, focussing on energy management and air conditioning systems, in combination with renewable energy;
- Implement a targeted energy efficiency programme in the agro-industrial sector, focussing on the sustainable use of biomass and cogeneration;
- Implement a targeted energy efficiency programme in the transport sector, focussing on information, training, import duties, tax incentives, proper vehicle maintenance and the promotion of alternative transport modes and fuels.

The following strategic map highlights the strategy, policy actions and measures to be applied under the energy efficiency development strategy as well as indicate the responsible institutions for its implementation.

Strategic Map of Policies and Line of Action for the promotion of EE

Strategy for EE development	Policy/Line of Action	Measures and Actions		Responsible Agencies and Stakeholders
I1: Create appropriate structures, instruments and tools to enable the development and implementation of energy efficiency programmes and measures	I1.1: Elaborate energy end-uses statistics and monitoring tools	*I1.1.1.*	Develop a study to map energy end-uses in the different energy-consuming sectors and to define energy efficiency baselines	Energy Unit / A&B Gov.
		I1.1.2.	Elaborate and maintain energy end-use statistics (database)	Energy Unit
		I1.1.3.	Develop and implement appropriate tools to monitor energy end-uses and the effects of energy efficiency policies and programmes	Energy Unit
	I1.2: Define and implement incentives for the efficient use of energy	*I1.2.1.*	Develop a study to identify the most cost-effective financial and fiscal incentives to promote end-use energy efficiency in the various energy consuming sectors, taking into consideration state budget constraints, the availability of public and private funds and credit facilities. Possible incentives include: subsidies (grants) and preferential loans to consumers and energy service providers, tax exemptions for investments in energy efficiency and reduced import duties for energy efficient equipment.	Energy Unit
		I1.2.2.	Design and implement a medium and long-term incentive scheme to promote energy efficiency in A&B	Energy Unit / A&B Gov.
	I1.3: Define the role of APUA and other market actors in the promotion of energy efficiency	*I1.3.1.*	Develop a study to identify and analyse the possible role of APUA and other public and private actors in energy efficiency and demand-side management programmes.	Energy Unit
		I1.3.2.	Develop a study to identify and analyse the market for energy services in A&B and the potential role of energy service companies (ESCOs), energy consultants and other service providers. The study should include an assessment of the technical, economic and institutional feasibility of various business models, like energy performance contracting and advisory services.	Energy Unit
		I1.3.3.	Develop a study to identify financing options for energy efficiency measures, involving commercial banks and credit unions.	Energy Unit
	I1.4: Revise electricity tariffs to	*I1.4.1.*	Review the tariff structure to take into account incentives for energy conservation and energy efficiency	Energy Unit

Strategy for EE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
	stimulate energy efficiency	*I1.4.2.* Introduce progressive electricity tariffs to encourage energy conservation and efficiency	Energy Unit / A&B Gov.
I.2: Coordinate national energy efficiency programmes with international and regional initiatives	I2.1: Coordinate national energy efficiency programmes with international and regional initiatives	*I2.1.1.* Participate in relevant international initiatives in the field of energy efficiency (like e.g. the Enlighten Initiative of UNEP)	Energy Unit
		I2.1.2. Coordinate national programmes and measures in the field of Building Performance (I3.2.1) and Energy Efficiency Standards and Labelling (I3.3.1) with the corresponding regional programmes on CARICOM and OECS level. Energy Efficiency Standards & Labels should be implemented on a regional level and preferably be aligned with existing international schemes (like the EU energy label or US minimum energy efficiency standards).	Energy Unit
		I2.1.3. Develop a study to identify and analyse how A&B can capitalize on international financing facilities and bilateral financial sources in the field of energy efficiency.	Energy Unit
I.3: Develop and implement horizontal energy efficiency measures	I3.1: Energy auditing and management programme	I3.1.1. Implement energy auditing and management programmes in the public, commercial, industrial and transport sectors	Energy Unit
	I3.2: Building codes	I3.2.1. Develop and enforce building codes with regard to energy efficiency for all new construction in A&B (residential, commercial and public buildings). Building codes should be developed taking into consideration both international experience and local climatic conditions and should be preferably harmonised with the Regional Building Standards developed by CROSQ.	Energy Unit/ DCA/ A&B Bureau of Standards
	I3.3: Energy efficiency standards and labelling	I3.3.1. Develop a comprehensive, medium- and long-term strategy for energy efficiency standards & labelling (EE S&L) of energy-related products. The strategy should be based on a prioritisation of products (based on market studies) and cost-benefit analyses of alternative and/or complementary instruments, like mandatory energy labelling and minimum energy performance standards (MEPS). The national EE S&L scheme should be harmonised on OECS or CARICOM level and aligned with existing schemes (like the EU labelling scheme and the EU or US minimum energy	Energy Unit/ A&B Bureau of Standards

Strategy for EE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
		performance standards).	
		I3.3.2. Implement mandatory energy labelling for energy-related products, in particular household appliances, lamps and electric motors. Mandatory labelling should be implemented with priority for products with a high share in national / sectoral energy consumptions and high-energy conservation potentials.	Energy Unit / A&B Gov.
		I3.3.3. Implement minimum energy efficiency standards (MEPS) for selected products with a high share in national / sectoral energy consumption and high energy conservation potentials (e.g. refrigeration and cooling equipment)	
	I3.4: Replacement of energy consuming equipment	I3.4.1. Design and implement an replacement programme for energy using equipment, in particular household appliances, providing incentives to consumers and safeguarding environmentally sound decommissioning and disposal of the equipment replaced.	Energy Unit / A&B Gov.
	I3.5: Energy efficient lighting	I3.5.1. Phase-out incandescent lamps, using regulatory instruments (prohibition to put on the market or minimum energy efficiency standards).	Energy Unit / A&B Gov.
		I3.5.2. Promote CFL and/or LED-lamps, using information campaigns and/or incentives to consumers in the residential and commercial sectors.	Energy Unit
I4: Develop and implement targeted sector specific energy efficiency programmes and measures	I4.1 Energy efficiency in the electricity sector	I4.1.1. Develop a study to identify inefficiencies and losses in the generation, transmission and distribution of electricity (technical and non-technical losses).	Energy Unit / APUA
		I4.1.2. Establish minimum efficiency standards for electricity generation, transmission and distribution.	Gov. A&B/ Independent Regulatory Agency
		I4.1.3. Develop and implement an electricity loss reduction programme.	Gov. A&B/ APUA
	I4.2: Energy efficiency programme in the public sector	I4.2.1. Develop and implement a programme to refurbish A&B Government buildings, including measures like: energy auditing and management, efficient lighting and air conditioning, improvement of building envelope, in combination with the use of renewable energy (e.g. for water heating).	Energy Unit / A&B Gov.
		I4.2.2. Develop and implement a programme for the mandatory procurement of	Energy Unit / A&B

Strategy for EE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
		energy efficient and environmentally friendly equipment and materials by the public sector. Energy consuming products should correspond to the highest energy efficiency class defined in energy labels and to internationally recognized endorsement marks (like Energy Star®).	Gov.
		I4.2.3. Develop and implement a programme for improved energy efficiency of Government-owned vehicles, including proper maintenance, training of drivers and the mandatory purchase of fuel-efficient vehicles.	A&B Gov.
	I4.3: Energy efficiency programme in the residential sector	I4.3.1. Provide advisory services to homeowners and tenants with regard to energy conservation and energy efficiency options in homes. The advisory services should be provided by trained and certified energy auditors from the private or public sectors (including the energy sector) and should be supported by appropriate Government incentives.	Energy Unit / Certified Energy Auditors
	I4.4: Energy efficiency programme in the tourist sector	I4.4.1. Develop and implement an energy efficiency programme for the tourist sector, focussing on the hotel and catering industry, including measures like: energy auditing and management, efficient lighting, air conditioning and water heating, improvement of building envelope, in combination with the use of renewable energy (e.g. for water heating) and the promotion of small-scale cogeneration.	Tourism Sector / Energy Unit
		I4.4.2. Conclude voluntary agreements between the A&B Government and the tourist sector regarding the purchase of energy efficient and environmentally friendly equipment and materials.	Tourism Sector / A&B Government
		I4.4.3. Conclude a voluntary agreement between the A&B Government and the tourist sector regarding energy efficiency targets, reporting and monitoring of the targets.	Tourism Sector / A&B Government/ Energy Unit
	I4.5: Energy efficiency programme in the agro-industrial	I.4.5.1. Develop and implement an energy efficiency programme for the agro-industrial sector including measures like: energy auditing and management, efficient horizontal and process technologies, including the refurbishment of industrial plants.	Agro-industrial sector / Energy Unit

Strategy for EE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
	sector[2]	I.4.5.2. Develop a study regarding the potential of the use of biomass (like eg. sugarcane bagasse) for on-site combined heat and power generation (cogeneration) in agro-industrial enterprises.	Energy Unit
		I.4.5.3. Facilitate on-site combined heat and power generation and the supply of surplus electricity to the public grid by appropriate adjustments to the Public Utilities Act.	Independent Regulatory Agency / APUA
	I4.6: Energy efficiency programme in the transport sector	I.4.6.1. Develop an energy efficiency programme for the transport sector, focussing on public transport and on private vehicles, including measures like training, improved maintenance, fiscal measures and import taxes.	Transport Sector / Energy Unit
		I.4.6.2. Review the vehicle tax system in order to discourage ownership and use of large, energy intensive cars.	A&B Gov.
		I.4.6.3. Review import duties in order to discourage the imports of large, energy intensive cars and to encourage the imports of energy efficient cars.	A&B Gov.
		I.4.6.4. Develop a study to identify the potential benefits of energy labelling and minimum fuel efficiency standards of cars in A&B.	A&B Gov./ A&B Bureau of Standards

7.3 Expected Outcomes from the Lines of Action to be implemented and Indicators to measure implementation progress

The following table summarises the expected outcomes and indicators to measure these outcomes for each of the line of action proposed under Strategy I. This will be a tool to be used in monitoring the implementation of the SEAP.

Table 6: Expected outcomes from the proposed lines of action and indicators to measure the implementation progress

Goals	Line of Action	Outcomes	Indicators
Energy Cost Reduction	I1.1: Elaborate energy end-uses statistics and monitoring tools	• Statistics on energy end-uses (database) developed and continuously updated	• End-use database available to decision makers and the public
Energy Cost Reduction Stimulate New Economic/Business Opportunities	I1.2: Define and implement incentives for the efficient use of energy	• Study on financial and fiscal incentives for EE completed • Medium and long-term incentive scheme to promote energy efficiency in A&B established and operational • Increased importation of energy efficient equipment	• % of increase in the uptake of EE measures/appliances; • Number of people/activities using the fiscal and financial incentive for EE; • Number of energy efficient equipment imported
Electricity Reliability Stimulate New Economic/Business Opportunities	I1.3: Define the role of APUA and other market actors in the promotion of energy efficiency	• Study on the role of APUA in terms of EE completed • Study on the role of ESCOs in A&B completed • Study on the financing options for EE completed • Increased no. of ESCOs in the Renewable Energy businesses(?)	• Number and turnover of established energy service providers in A&B, associated energy savings • Number of DSM interventions by APUA and energy savings realised • Number of banks / credit institutes with financing options for EE
Energy Cost Reduction	I1.4: Revise electricity tariffs to stimulate energy efficiency	• Revision of the electricity tariff to incorporate EE	• Revised tariff structure
Energy Cost Reduction Stimulate New Economic/Business Opportunities	I2.1: Coordinate national energy efficiency programmes with international and regional initiatives	• National EE programmes coordinated with international and regional initiatives	• Number of regional and international initiatives / programmes in which A&B has participated
Energy Cost Reduction	I3.1: Energy auditing and management	• Increased local capacity in the management and monitoring of EE	• Number of certified EE auditors • Number of energy audits

Goals	Line of Action	Outcomes	Indicators
Electricity Reliability Stimulate New Economic/Business Opportunities	programme	• Energy audit standards implemented • Increased number of certified energy auditors	performed • Energy savings reported
Energy Cost Reduction -Environmental Protection	I3.2: Building codes	• Building codes revised to incorporate EE requirements	• Number of buildings licenced that comply with EE measures mandated by building codes • Energy savings achieved
Energy Cost Reduction Environmental Protection	I3.3: Energy efficiency standards and labelling	• EE standards and labelling systems implemented • Minimum energy efficiency standards (MEPS) for selected products	• % of increase in the uptake of energy efficientappliances; • Number of EE labelled products (types of products and compliance rates) • Energy savings achieved
Energy Cost Reduction Environmental Protection Stimulate New Economic/Business Opportunities	I3.4: Replacement of energy consuming equipment	• Replacement programme established and operational	• % of increase in the uptake of EE measures/appliances; • Number of replaced equipment's through the replacement programme; increase in EE • Energy savings achieved
Energy Cost Reduction Environmental Protection Stimulate New Economic/Business Opportunities	I3.5: Energy efficient lighting	• Incandescent lamps phased outand replace by CFls and LED lamps	• Number of non-efficient incandescent lamps replaced by CFLs and/or LED-Lamps
Energy Cost Reduction Electricity Reliability Environmental Protection Stimulate New Economic/Business Opportunities	I4.1 Energy efficiency in the electricity sector	• Reduction of fuel demand of electricity generation plants in A&B • Reduction of energy losses in electricity generation, transmission and distribution consumption on the electricity sector • Minimum efficiency standards for electricity generation, transmission and distribution established • Electricity loss reduction programme established • Reduction of the overall	• Electricity savings achieved • Fuel savings barrel • % of loss reductions • overall energy intensity

Goals	Line of Action	Outcomes	Indicators
		energy intensity (at least 10% below 2010 baseline)	
Energy Cost Reduction	I4.2: Energy efficiency programme in the public sector	• Reduction of energy consumption in the public sector • Programme to refurbish existing A&B Government buildings • Reduction of the consumption and costs in government buildings (30% below 2010 baseline) • Programme for the mandatory procurement of energy efficient and environmentally friendly equipment and materials by the public sector implemented and operational • Programme for improved energy efficiency of Government-owned vehicles implemented and operational	• Energy savings achieved in the public sector / Government buildings • Number of EE devices imported • Number of energy efficient Government-owned vehicles running • Overall energy intensity
Energy Cost Reduction	I4.3: Energy efficiency programme in the residential sector	• Advisory services for homeowners and tenants established and running • Reduction of energy consumption in the domestic sector	• Energy savings achieved in the residential sector • Overall energy intensity
Energy Cost Reduction	I4.4: Energy efficiency programme in the tourist sector	• Energy efficiency programme for the tourist sector, focussing on the hotel and catering industry established and implemented • Voluntary agreements between the A&B Government and the tourist sector regarding the purchase of energy efficient and environmentally friendly equipment and materials	• Energy savings achieved in the tourism sector • Number of establishments (hotels etc.) participating in voluntary agreement between the Government and the Tourism sector • Overall energy intensity
Energy Cost Reduction	I4.5: Energy efficiency programme in the agro-industrial	• Energy efficiency programme for the agro-industrial sector established and	• Number of CHP projects • Electricity supplied by CHP • Energy savings achieved in the agro-industrial sector

Goals	Line of Action	Outcomes	Indicators
	sector	implemented • Study regarding the potential of the use of biomass (like eg. sugarcane bagasse) for on-site combined heat and power generation (cogeneration) in agro-industrial enterprises developed and concluded. • Generation of electricity from CHP	• Overall energy intensity
Energy Cost Reduction	I4.6: Energy efficiency programme in the transport sector	• Energy efficiency programme for the transport sector developed and implemented • New vehicle tax system in force • Import duties for cars revised and in force • Study to identify the potential benefits of energy labelling and minimum fuel efficiency standards of cars in A&B developed	• Number of fuel efficient cars • Overall energy intensity

Note: The agro-industrial sector of A&B, in particular the sugar industry, appears to be declining. It therefore still needs to be verified how many (if any) process industries could be included in line of action I4.5 (light industry will be covered under line of action I3.1).

7.4 Implementation Priorities and Timing for Implementation of the Energy Efficiency Strategy

The implementation priorities of each line of action for Strategy I: Energy Efficiency is provided in Table 7 and the indicative timing for its implementation in Figure 11.

Table 7: Implementation priorities for Strategy I

Strategy for EE development	Policy/Line of Action	Priority: High, Medium, Low (score)
I.1: Create appropriate structures, instruments and tools to enable the development and implementation of energy efficiency programmes and measures	I1.1: Elaborate energy end-uses statistics and monitoring tools	High (34 points)
	I1.2: Define and implement incentives for the efficient use of energy	High (34 points)
	I1.3: Define the role of APUA and other market actors in the promotion of energy efficiency	High (37 points)
	I1.4: Revise electricity tariffs to stimulate energy efficiency	Medium (31 points)

Strategy for EE development	Policy/Line of Action	Priority: High, Medium, Low (score)
I.2: Coordinate national energy efficiency programmes with international and regional initiatives	I2.1: Coordinate national energy efficiency programmes with international and regional initiatives	High (36 points)
I.3: Develop and implement horizontal energy efficiency measures	I3.1: Energy auditing and management programme	High (35 points)
	I3.2: Building codes	Medium (31 points)
	I3.3: Energy efficiency standards and labelling	Medium (31 points)
	I3.4: Replacement of energy consuming equipment	Medium (33 points)
	I3.5: Energy efficient lighting	Medium (33 points)
I.4: Develop and implement targeted sector specific energy efficiency programmes and measures	I4.1: Energy efficiency programme in the electricity sector	Medium (28 points)
	I4.2: Energy efficiency programme in the public sector	Medium (31 points)
	I4.3: Energy efficiency programme in the residential sector	Medium (30 points)
	I4.4: Energy efficiency programme in the tourist sector	Medium (32 points)
	I4.5: Energy efficiency programme in the agro-industrial sector	Medium (28 points)
	I4.6: Energy efficiency programme in the transport sector	Medium (28 points)

Strategy for EE development	Policy/Line of Action	Years			
		5	10	15	20
		Short	Medium	Long	
I1: Create appropriate structures, instruments and tools to enable the development and implementation of energy efficiency programmes and measures	I1.1: Elaborate energy end-uses statistics and monitoring tools	D	I	C	
	I1.2: Define and implement incentives for the efficient use of energy	D	I	C	
	I1.3: Define the role of APUA and other market actors in the promotion of energy efficiency	D			
	I1.4: Revise electricity tariffs to stimulate energy efficiency	D	I		
I2: Coordinate national energy efficiency programmes with international and regional initiatives	I2.1: Coordinate national energy efficiency programmes with international and regional initiatives	I	I	I	
I3: Develop and implement horizontal energy efficiency measures	I3.1: Energy auditing and management programme	D / I	I	C	
	I3.2: Building codes	D	I	C	
	I3.3: Energy efficiency standards and labelling	D	I	C	
	I3.4: Replacement of energy consuming equipment		D	I	
	I3.5: Energy efficient lighting	D / I	I	C	
I4: Develop and implement targeted sector specific energy efficiency programmes and measures	I4.1 Energy efficiency programme in the electricity sector		D / I	C	
	I4.2: Energy efficiency programme in the public sector	D / I	I	C	
	I4.3: Energy efficiency programme in the residential sector		D / I	C	
	I4.4: Energy efficiency programme in the tourist sector	D / I	I	C	
	I4.5: Energy efficiency programme in the agro-industrial sector		D / I	C	
	I4.6: Energy efficiency programme in the transport sector		D / I	C	

***Legend**: D - Development, I - Implementation, C - Continuation*

Figure 11: Indicative timing for the implementation of Strategy I

8 STRATEGY 2: RENEWABLE ENERGY DEVELOPMENT

8.1 Goal and Objectives

Within this strategy Antigua & Barbuda intend to address:

- High dependency on imported petroleum (fossil fuels);
- Lack of know indigenous fossil fuel sources;
- High energy import bill
- High electricity costs
- Lack of detailed data for determining renewable energy projects
- Lack of renewable energy projects
- Inexistent independent regulatory agencies

Antigua & Barbuda's NEP state the following strategic objectives in terms of diversification and efficient use of energy sources:

- Encourage the adoption of applicable renewable energy technologies and a market framework that encourages companies and individuals to invest in them
- The utility to include renewable energy in the electricity supply mix at the following minimum standards: 2015: 5%; 2020: 10% and 2030: 15%.
- Provide an enabling legal and regulatory framework for the deployment of RE technologies with particular emphasis on wind, solar and waste to energy.

8.2 Specific Actions/Measures/Programmes to be Implemented and Responsible Agencies and Stakeholders

The following strategic map highlights the strategy, policy actions and measurements to be applied under the renewable energy development strategy.

Strategic Map of Policies and Line of Action for the promotion of RE

Strategy for RE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
II1: Create an enabling environment for the development of renewable energy through private sector participation	II1.1: Provide Incentive package to directly stimulate renewable energy deployment	II1.1.1. Develop a study to analyse and identify the main financial and non-financial instruments for stimulating RE deployment (for example: quota system or feed-in tariff). With the results of this study develop and introduce a comprehensive and transparent package of incentives for the deployment and use of renewable energy- This package should include the options of mandate quota systems or feed-in-tariff (most viable option for A&B as decided per the study) as well as other financial and non-financial instruments identified.	Ministry of Finance and the Economy/ ABIA/Energy Unit/ Gov. A&B
		II1.1.2. Develop a study to identify innovative approaches for the establishment of sustainable structures and financial mechanism for RE	Ministry of Finance and the Economy/ ABIA/Energy Unit
		II1.1.3. Develop a study to identify and analyse how Antigua & Barbuda can capitalize on international financing facilities and bilateral financial sources	Ministry of Finance and the Economy/ ABIA
		II1.1.4. Facilitate sourcing of low cost development funds for productive enterprises for energy technology projects	Ministry of Finance and the Economy/ ABIA/ A&B Gov.
		II1.1.5. Provide appropriate incentives for the installation of solar water heaters at the residential and tourism sectors	Ministry of Finance and the Economy/ ABIA/ A&B Gov.
	II1.2: Open the market for private generation of RES electricity	II1.2.1. Review the existing licencing policy and define a clear, transparent and simplified process for requesting/approving licences for RE facilities (including distributed generation)	Energy Unit, ECERA, Ministry of Public Utilities, APUA
		II1.2.2. Mandate the Utility to accept all RES produced from licenced IPPs through the establishment of 'standard' PPAs	Independent Regulatory Agency
	II1.3: Provide incentive package	II1.3.1. Introduce an incentive package to promote the utilisation of hybrid vehicles and fuel-efficient vehicles with lower emissions	Ministry of Finance and the Economy/

Strategy for RE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
	for utilisation of cleaner technologies in the transport sector		Ministry of Transport/ A&B Transport Board
		II1.3.2. Provide incentives for the utilisation of regional bio-fuels	Gov. A&B
II.2: Integration of renewable energy in the grid	II2.1: Analysis of the impacts of integration of renewable energy in the grid	II2.1.2: Study on the impact of incorporation of RES in the grid (grid stability)	APUA, Ministry of Public Utilities
II.3: Develop appropriate renewable energy sources	II3.1: Strengthen economic and scientific data through resource assessments on the country's energy resource potential (namely wind, solar and waste to energy (WTE))	II3.1.1. Carry out resource assessments and feasibility studies on the potentials of technologies to generate energy from renewable sources. This includes, but will not be limited to: • Wind Power; • Solar Power • Biomass and WTE These assessments should be repeated every 5 to 7 years	Energy Unit/APUA/
		II3.1.2. Develop an inventory of all potential renewable energy resources ranked by its cost and full economical impact	Energy Unit
		II3.1.3. Identify local sites for the development of renewable energy (areas with high renewable energy potential) and reserve these for specific development – Renewable Energy Development Areas	Energy Unit / DCA
		II3.1.4. Develop criteria for project selection that are aligned with Government goals and objectives	Energy Unit / Gov. A&B
		II3.1.5. Identify and develop renewable energy demonstration projects	Energy Unit
		II3.1.6. Analysis of regional Inter-Island connections and the potential utilisation of natural resources abundant in neighbouring countries	Energy Unit / ECERA
	II3.2: Develop renewable energy diversification priorities (based on	II3.2.1. Prioritize renewable energy sources by economic feasibility criteria, environmental considerations including carbon abatement	Energy Unit/ Ministry of Finance and the Economy/ Environment Division

Strategy for RE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
	cost, efficiency, environmental considerations)	II3.2.2. Introduce incentives and a plan of action to foster renewable energy (wind, solar, WTE and other renewable technologies)	Energy Unit/ Ministry of Finance and the Economy/ Environment Division/ National Solid Waste Management Authority
		II3.2.3. Develop solar power projects (PV grid-tied and distributed, solar thermal concentrators, PV hybrid and stand-alone systems for homeowners and small business)	Energy Unit
		II3.2.4. Promote the production of biofuel and make the necessary studies to analyse the national/regional supply of feed stock for expansion of the already existent unit	Energy Unit/ Environmental Division
		II3.2.5. Mandate that all new hot water installations in public buildings should be solar based	Gov. A&B / DCA
		II3.2.6. Study the possibility of implementing equipment for using methane (bio-gas) produced from the landfill and waste water treatment plants	National Solid Waste Management Authority
		II3.2.7. Encourage the production of biogas from public sewage systems	National Solid Waste Management Authority
		II3.2.8. Promote the efficient conversion of WTE from solid waste disposal sites	National Solid Waste Management Authority
	II3.3: Promote the use of small renewable generation through the production of a fast track approval process and by	II3.3.1. Develop procedures and a package of incentives to ensure that renewable energy plants with capacity lower than 15MW can be built on a simplified procedure	Ministry of Finance and the Economy/ DCA/ Ministry of Public Utilities/ A&B Bureau of Standards
		II3.3.2. Support research in renewable energy and provide financing for pilot	Energy Unit / Gov.

Strategy for RE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
	streamlining the procedures and standards	demonstration projects	A&B
II4: Diversification of Energy Sources	II4.1: Promote incorporation of biodiesel	II4.1.1. Promote biodiesel and ethanol substitution in transport sector	Energy Unit/ Ministry of Transport/WIOC
		II4.1.2. Mandate West Indies Oil to accept and start supplying biodiesel	Gov. A&B
	II4.2: Diversify energy sources by type and geographical location	II4.2.1. Establish and use appropriate procurement guidelines to secure best terms and conditions for long-term contracts for energy supply	Energy Unit/ Independent Regulatory Agency
		II4.2.2. Continuously monitor and revise existing regulations to make provisions that ensure that adequate inventory levels to cushion any short-term disruption in supply	Energy Unit/ Independent Regulatory Agency/ APUA
	II4.3: Engage in multilateral/regional a/ bilateral partnerships and cooperative agreements that contribute to Antigua & Barbuda energy goals and objectives	II4.3.1. Align the NEP with foreign policy	Energy Unit
		II4.3.2. Ensure that funds retained under regional and international accords and programmes are used to meet the goals and objectives of the accords and programmes	Energy Unit
		II4.3.3. Identify multilateral/regional/bilateral partnerships and cooperative agreements and compile a register of those	Energy Unit
		II4.3.4. Continuously identify multilateral/regional/bilateral partnership and possible cooperative agreements that can be established and update the registry	Energy Unit
		II4.3.5. Research and review relevant publications on energy applications and benchmark against existing technologies	Energy Unit
II5: Application of emerging technologies	II5.1: Undertake review of new emerging technologies	II5.1.1. Develop and prepare (bi-annual) reports on new and emerging technologies	Energy Unit
II6: Establish policy, enforce laws,	II6.1: Develop transparent and	II6.1.1. Study the necessity and develop and promulgate a policy for Carbon Emission Trading	Environmental Division

Strategy for RE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
regulations and institutions that create equitable and transparent opportunities for all stakeholders in the energy sector	comprehensive policy framework for the electricity sector and or amend existing legislation	II6.1.2. Develop a new Power Sector Policy and Strategy so that: • Highlights how the utility will achieve the RE targets in the electricity supply mix (it should clearly highlight the role on IPPs in the achievement of its targets) • Identify the process for IPPs to request licences to the Utility for grid connection • It shows that it is obliged to accept all electricity generated from renewable energy sources	Gov. A&B/APUA/ Independent Regulatory Agency
		II6.1.3. Review Land Planning Policy to include reserved areas for the development of renewable energies (Renewable Energy Development Areas – REDA)	DCA / Gov. A&B
		II6.1.4. Review the current National Solid Waste Management to: • allow for recycling development and electricity generation from solid waste residues (WTE) and methane; • to include punitive measures to reduce illegal dumping and litter	National Solid Waste Management Authority / Gov. A&B
		II6.1.5. Review related policies for other sectors including transport and tourism and make recommendations to harmonise with the energy policy	Ministry of Transport/ Ministry of Tourism / Gov. A&B
		II6.1.6. Develop and operate monitoring and evaluation of energy policy implementation	Energy Unit
		II6.1.7. Conduct periodic policy reviews and use the findings to update, refine and develop new policy initiatives	Energy Unit / Gov. A&B
		II6.1.8. Establish requirements for new electricity generating plans (over a minimum scale of 1MW) to be approved by a regulator	Energy Unit / Independent Regulatory Agency
		II6.1.9. Conduct net metering and tariff reviews and introduce appropriate mechanisms for net metering and standards to encourage the development of renewable energy	Independent Regulatory Agency / ECERA
		II6.1.10. Review the tariff structure to take into account the impact of the incorporation of RES	Independent Regulatory Agency / ECERA

Strategy for RE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
	II6.2: Promote a market based approach and increase competition in the sector	II6.2.1. Cooperate with East Caribbean Energy Regulatory Authority) in setting up the new tariff structure	Independent Regulatory Agency / ECERA
		II6.2.2. Analyse and rationalise the number of existing Acts governing the sustainable development of the country	Gov. A&B / Energy Unit
	II6.3: Amend existing legislation and regulations or promulgate new ones where necessary to ensure responsible market behaviour	II6.3.1. Review on an on-going basis the existing legal framework for performance, strengths, weakness, and lessons learnt to formulate and implement programmes of legal reforms	Energy Unit
	II6.4: Develop and implement a comprehensive regulatory framework for the energy sector	II6.4.1. Develop the necessary framework for the introduction of diversification fuels	Energy Unit / Energy Advisory Panel / Gov. A&B
		II6.4.2. Monitor and regulate procurement and pricing of energy products	Energy Unit / Independent Regulatory Agency
		II6.4.3. Conduct regulatory impact assessment of relevant existing legislation	Energy Unit
		II6.4.4. Conduct regulatory impact assessment of proposed regulations	Energy Unit
	II6.5: Continuously review the existing internal regulatory framework for performance, strengths, weaknesses and lessons learnt while recognising the implications of	II6.5.1. Ensure that the implemented internal regulatory framework conforms with requirements of international agreements and protocols (such as the UNFCCC, Kyoto protocol and other bilateral and international agreements)	Environmental Division
		II6.5.2. Adopt and adapt relevant agreed international best practices in regulations	Gov. A&B
		II6.5.3. Develop institutional frameworks to coordinate policy with energy initiatives and programmes and provide integrated monitoring and enforcement of regulations and standards	Gov. A&B/ Energy Unit
		II6.5.4. Assess institutions and determine if there is efficient interactions,	Gov. A&B

Strategy for RE development	Policy/Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
	external dimensions and formulate and implement programmes of regulatory reform	adequate resources and skills sets to achieve policy and regulation implementation and to assure monitoring	
	II6.6: Review and modify national framework and industry structure for the energy sector towards the achievement of the NEP goals	II6.6.1. Identify industry structures that best facilitate the implementation of achievement of the NEP and other policies objectives	Energy Unit

8.3 Expected Outcomes from the lines of action to be implemented and indicators to measure implementation progress

The following table summarises the expected outcomes and indicators to measure these outcomes for each of the line of action proposed under Strategy II. This will be a tool to be used in monitoring the implementation of the SEAP.

Table 8: Expected outcomes from the proposed lines of action and indicators to measure the implementation progress

Goals	Line of Action	Outcomes	Indicators

Energy Cost Reduction
Stimulate New Economic/Business Opportunities
Diversification and Efficient Use of Energy Sources
	II1.1: Provide Incentive package to directly stimulate renewable energy deployment	• Study to analyse and identify the main financial and non-financial instruments for stimulating RE deployment developed
		• Study to identify innovative approaches for the establishment of sustainable structures and financial mechanism for RE developed
		• Study to identify and analyse how Antigua & Barbuda can capitalize on international financing facilities and bilateral financial sources developed
		• Incentive package for RE developed and implemented
			• Number of RE projects developed
			• Overall energy intensity (10% below a 2010 baseline within 10 years)
			• % RE in the electricity supply mix at the following minimum levels:
			  • 2015 5%
			  • 2020 10%
			  • 2030 15%

Energy Cost Reduction Diversification and Efficient Use of Energy Sources Stimulate New Economic/Business Opportunities	II1.2: Open the market for private generation of RES electricity	• Licencing process for RE facilities revised • Market open to other players (RE IPPs)	• Number of RE facilities licenced • Time required to licence a RE facility • Number of RE IPPs generating electricity • Number of PPAs established
Diversification and Efficient Use of Energy Sources Stimulate New Economic/Business Opportunities	II1.3: Provide incentive package for utilisation of cleaner technologies in the transport sector	• Incentive package to promote the utilisation of hybrid vehicles and fuel-efficient vehicles with lower emissions implemented • Regional bio-fuels	• Number of hybrid vehicles and fuel efficient vehicles in A&B • % of biodiesel used in the transport sector

Goals	Line of Action	Outcomes	Indicators
Environmental Protection		incorporated in the fuel supply	
Energy Cost Reduction Electricity Reliability	II2.1: Analysis of the impacts of integration of renewable energy in the grid	• Study of the impact of incorporation of RES in the grid (grid stability) done • Grid is upgraded / stable enough to handle Renewable energy penetration • Reduction of number and duration of operational disturbances • Faster recovery from disruptions to the energy supply.	• Electricity Reliability: number of hours with blackouts • Time required for recover from blackouts
Energy Cost Reduction Diversification and Efficient Use of Energy Sources Stimulate New Economic/Business Opportunities Environmental Protection	II3.1: Strengthen economic and scientific data through resource assessments on the country's energy resource potential (namely wind, solar and waste to energy (WTE))	• Assessment of the RE resources and available potential to be exploited developed and compiles into an inventory • Renewable Energy Development Areas identified • RE demonstration projects developed • Analysis of the regional Inter-Island connections and the potential utilisation of natural resources abundant in neighbouring countries • Reduced GHG emissions	• Potential RE capacity to be installed • RE capacity Installed • %RE incorporated into the grid • Number of RE demonstration project developed • Overall energy intensity
Energy Cost Reduction Diversification and Efficient Use of Energy Sources Stimulate New Economic/Business Opportunities Environmental Protection	II3.2: Develop renewable energy diversification priorities (based on cost, efficiency, environmental considerations)	• Plan to foster RE implementation • Increased the development of solar projects • Increased production of biofuels • Increased installation of solar water heaters; • Study the possibility of implementing equipment for using methane (bio-gas) produced from the landfill and waste water treatment plants developed • Increased development of biogas facilities • Stimulation of E-10	• RE capacity Installed • %RE incorporated into the grid • Number and capacity of PV projects implemented • Quantity of biofuel produced • Capacity of biogas (landfill and waste-water treatment plants) production plants • Electricity generated from biogas production plants

Goals	Line of Action	Outcomes	Indicators
		• program • Reduced GHG emissions	
Diversification and Efficient Use of Energy Sources Stimulate New Economic/Business Opportunities	II3.3: Promote the use of small renewable generation through the production of a fast track approval process and by streamlining the procedures and standards	• Procedures and a package of incentives to ensure that renewable energy plants with capacity lower than 15MW can be built on a simplified procedure developed	• Small scale (smaller than 15MW) RE capacity Installed • Electricity generated from RE
Energy Cost Reduction Diversification and Efficient Use of Energy Sources Stimulate New Economic/Business Opportunities Environmental Protection	II4.1: Promote incorporation of biodiesel	• Reduction of fossil fuel used in the transport sector • Agreements between West Indies Oil and biodiesel and ethanol producers established • Reduced GHG emissions	• % of fuel substituted by biodiesel and ethanol • % of RE used for transport • Number of agreements established between biodiesel and ethanol producers with West Indies Oil
Electricity Reliability Diversification and Efficient Use of Energy Sources Stimulate New Economic/Business Opportunities	II4.2: Diversify energy sources by type and geographical location	• Procurement Guidelines to secure best terms and conditions for long-term contracts for energy supply developed and implemented	
Energy Cost Reduction	II4.3: Engage in multilateral/regional a/ bilateral partnerships and cooperative agreements that contribute to Antigua & Barbuda energy goals and objectives	• Funds retained under regional and international accords and programmes used to meet the goals and objectives of the accords and programmes • Multilateral/regional/bilateral partnerships and cooperative agreements identified and registered in a register	• Quantity of regional and international funding used to meet the goals and objectives of the programmes defined under the SEAP • Number of Multilateral/regional/bilateral partnerships and cooperative agreements
Energy Cost Reduction Diversification and Efficient Use of Energy Sources Stimulate New	II5.1: Undertake review of new emerging technologies	• Bi-annual reports on new and emerging technologies developed and published	• Number of bi-annual reports published

Goals	Line of Action	Outcomes	Indicators
Economic/Business Opportunities Environmental Protection			
Energy Cost Reduction Electricity Reliability Diversification and Efficient Use of Energy Sources Stimulate New Economic/Business Opportunities Environmental Protection	II6.1: Develop transparent and comprehensive policy framework for the electricity sector and or amend existing legislation	• Carbon Emission Trading policy established and running • New Power Sector Policy and Strategy developed and implemented • Land Planning Policy to include reserved areas for the development of renewable energies (Renewable Energy Development Areas – REDA) revised and implemented • National Solid Waste Management revised and implemented • Requirements for new electricity generating plans (over a minimum scale of 1MW) established and implemented • Tariff structure to take into account the impact of the incorporation of RES revised and implemented	• Carbon emission reductions achieved • RE capacity developed • Quantity of RE installation under 1MW installed in A&B • RE generation • Overall energy intensity
Energy Cost Reduction Electricity Reliability	II6.2: Promote a market based approach and increase competition in the sector	• New tariff structure implemented and enforced	•
Energy Cost Reduction Stimulate New Economic/Business Opportunities Environmental Protection	II6.4: Develop and implement a comprehensive regulatory framework for the energy sector	• Framework for the introduction of diversification fuels developed and running • Reduction in the quantity of fossil fuel used • Reduction of the dependency on fossil fuel • Procurement and pricing of energy products clearly regulated • Reduced GHG emissions	• Quantity of fossil fuel used • % of fossil fuel used in the energy sector • Overall energy intensity

Goals	Line of Action	Outcomes	Indicators
Stimulate New Economic/Business Opportunities	II6.5: Continuously review the existing internal regulatory framework for performance, strengths, weaknesses and lessons learnt while recognising the implications of external dimensions and formulate and implement programmes of regulatory reform	• Relevant agreed international best practices and regulations adopted and adapted to A&B • Institutional frameworks to coordinate policy with energy initiatives and programmes and provide integrated monitoring and enforcement of regulations and standards developed and implemented	• Quantity of international regulation and best practices adopted by A&B
Stimulate New Economic/Business Opportunities	II6.6: Review and modify national framework and industry structure for the energy sector towards the achievement of the NEP goals	• Industry structures that best facilitate the implementation of achievement of the NEP and other policies objectives identified.	

8.4 Implementation Priorities and Timing for implementation of the Renewable Energy Development Strategy

The implementation priorities of each line of action for Strategy II: Renewable Energy is provided in Table 9 and the indicative timing for its implementation in Figure 12.

Table 9: Implementation priorities for Strategy II

Strategy for RE development	Policy/Line of Action	Priority: High, Medium, Low (score)
II1: Create an enabling environment for the development of renewable energy through private sector participation	II1.1: Provide Incentive package to directly stimulate renewable energy deployment	High (39 points)
	II1.2: Open the market for private generation of RES electricity	High (38 points)
	II1.3: Provide incentive package for utilisation of cleaner technologies in the transport sector	High (35 points)
II.2: Integration of renewable energy in the grid	II2.1: Analysis of the impacts of integration of renewable energy in the grid	High (35 points)
II.3: Develop appropriate renewable energy sources	II3.1: Strengthen economic and scientific data through resource assessments on the country's energy resource potential (namely wind, solar and waste to energy (WTE))	Medium (31 points)

Strategy for RE development	Policy/Line of Action	Priority: High, Medium, Low (score)
	II3.2: Develop renewable energy diversification priorities (based on cost, efficiency, environmental considerations)	Medium (33 points)
	II3.3: Promote the use of small renewable generation through the production of a fast track approval process and by streamlining the procedures and standards	High (40 points)
II4: Diversification of Energy Sources	II4.1: Promote incorporation of biodiesel	High (35 points)
	II4.2: Diversify energy sources by type and geographical location	Medium (28 points)
	II4.3: Engage in multilateral/regional a/ bilateral partnerships and cooperative agreements that contribute to Antigua & Barbuda energy goals and objectives	Low (18 points)
II5: Application of emerging technologies	II5.1: Undertake review of new emerging technologies	Low (19 points)
II6: Establish policy, enforce laws, regulations and institutions that create equitable and transparent opportunities for all stakeholders in the energy sector	II6.1: Develop transparent and comprehensive policy framework for the electricity sector and or amend existing legislation	Medium (33 points)
	II6.2: Promote a market based approach and increase competition in the sector	Medium (31 points)
	II6.3: Amend existing legislation and regulations or promulgate new ones where necessary to ensure responsible market behaviour	Medium (31 points)
	II6.4: Develop and implement a comprehensive regulatory framework for the energy sector	High (34 points)
	II6.5: Continuously review the existing internal regulatory framework for performance, strengths, weaknesses and lessons learnt while recognising the implications of external dimensions and formulate and implement programmes of regulatory reform	Medium (31 points)
	II6.6: Review and modify national framework and industry structure for the energy sector towards the achievement of the NEP goals	High (39 points)

Strategy for RE development	Policy/Line of Action	Years			
		5	10	15	20
		Short	Medium	Long	
II1: Create an enabling environment for the development of renewable energy through private sector participation implementation of energy efficiency programmes and measures	II1.1: Provide Incentive package to directly stimulate renewable energy deployment	D/I			
	II1.2: Open the market for private generation of RES electricity	D	I		
	II1.3: Provide incentive package for utilisation of cleaner technologies in the transport sector		D/I		
II.2: Integration of renewable energy in the grid	II2.1: Analysis of the impacts of integration of renewable energy in the grid initiatives		D	I	
II.3: Develop appropriate renewable energy sources	II3.1: Strengthen economic and scientific data through resource assessments on the country's energy resource potential (namely wind, solar and waste to energy (WTE))	D	I		
	II3.2: Develop renewable energy diversification priorities (based on cost, efficiency, environmental considerations)	D	I		
	II3.3: Promote the use of small renewable generation through the production of a fast track approval process and by streamlining the procedures and standards	D	I	C	
II4: Diversification of Energy Sources	II4.1: Promote incorporation of biodiesel		D/I	C	
	II4.2: Diversify energy sources by type and geographical location		D/I	I	
	II4.3: Engage in multilateral/regional a/ bilateral partnerships and cooperative agreements that contribute to Antigua & Barbuda energy goals and objectives		D	I	C
II5: Application of emerging technologies	II5.1: Undertake review of new emerging technologies	D/I	C	C	

Strategy for RE development	Policy/Line of Action	Years			
		5	10	15	20
		Short	Medium	Long	
II6: Establish policy, enforce laws, regulations and institutions that create equitable and transparent opportunities for all stakeholders in the energy sector	II6.1: Develop transparent and comprehensive policy framework for the electricity sector and or amend existing legislation	D/I			
	II6.2: Promote a market based approach and increase competition in the sector		I	I	
	II6.3: Amend existing legislation and regulations or promulgate new ones where necessary to ensure responsible market behavior	D/I			
	II6.4: Develop and implement a comprehensive regulatory framework for the energy sector	D/I			
	II6.5: Continuously review the existing internal regulatory framework for performance, strengths, weaknesses and lessons learnt while recognising the implications of external dimensions and formulate and implement programmes of regulatory reform	D/I	C	C	
	II6.6: Review and modify national framework and industry structure for the energy sector towards the achievement of the NEP goals	D/I			

Legend: *D - Development, I - Implementation, C - Continuation*

Figure 12: Indicative timing for the implementation of Strategy II

9 STRATEGY 3: PUBLIC EDUCATION AND AWARENESS

9.1 Goal and Objectives

Within this Strategy Antigua & Barbuda intends to address:

- Low awareness and technical capacity on energy efficiency and renewable energy;
- Low level of education on energy efficiency and renewable energy;
- Low level of resources dedicated to the energy sector;
- Low involvement of the financial sector on energy efficiency and renewable energy projects;
- Lack of certified renewable energy installers
- Lack of certified energy efficiency auditors

Antigua & Barbuda's NEP state the following strategic objectives in terms of public education and awareness:

- Support energy efficient choices through improved awareness, information and services that can deliver energy efficiency.
- Develop and implement the curriculum to equip students with the knowledge and skills to secure employment in the fields of RE and EE.
- Institutionalize educational programs to educate students in different energy topics, e.g. better ways to manage energy-usage, bringing about attitudinal change towards responsible energy use, energy responsibility, among many others.
- Establishing awareness programs on energy in the school curriculum.
- Promote the use of renewables in schools and universities.
- Establish a National Energy Education Program with the aim of promoting energy awareness by creating effective networks among students, educators, business, government and community leaders to design and deliver objective, multi-sided energy education program's activities.
- Transforming Antigua & Barbuda's energy systems requires a level of expertise, innovation and generational effort. Antigua & Barbuda needs major investments in capacity building. To achieve that, the Government will encourage direct investments to retool local and regional academic institutions as centers for research, education and workforce training in energy-related fields, both at professional and technical levels.

9.2 Specific Actions/Measures/Programmes to be Implemented and Responsible Agencies and Stakeholders

The following strategic map highlights the strategy, policy actions and measures to be applied under the awareness and education development strategy.

Strategic Map of Policies and Line of Action for Education and Awareness

Strategy for Education and Awareness	Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
III1: Develop and Implement programmes to influence market behaviour toward sustainable energy (promote adoption of renewable energy and the efficient use of energy)	III1.1: Draft and Implement a public consumer awareness and education program and end-use statistics on energy efficiency awareness	III1.1.1 Develop and implement energy efficiency awareness and information campaigns for homeowners and tenants, focussing on raising awareness on building standards, energy efficiency labelling and replacement programmes for household appliances, efficient lighting and available energy advisory services.	Energy Unit/ Gov. A&B
		III1.1.2 Develop information campaigns to promote CFL and/or non-LED lamps to consumers in the residential and commercial sectors	Energy Unit
		III1.1.3 Develop and implement a relevant and sustained public energy information programme and information database with end of use statistics	Energy Unit
		III1.1.4 Implement end use statistics that promote public awareness of the importance of responsible energy use	Energy Unit
		III1.1.5 Develop an energy information clearing house/database with end use statistics to illustrate the efficient use of energy	Energy Unit
		III1.1.6 Develop and implement effective education and training programmes on energy conservation at all levels of the education system	Energy Unit / Ministry of Education
		III1.1.7 Develop and implement energy efficiency awareness and information campaigns targeted at customers (tourists) and employees of the tourist sector.	Energy Units / Gov. A&B / Ministry of Tourism
		III1.1.8 Develop and implement awareness and information campaigns for homeowner and tenants in order to raise awareness for policy actions I3.3, I3.4 and I3.5 in the residential sector.	Energy Unit / A&B Bureau of Standards / Gov. A&B
	III1.2: Encourage research development and timely and	III1.2.1 Develop and implement incentives to encourage tertiary institution to develop research programmes for the application and implementation of renewable energy technologies	Energy Unit/ / Ministry of Finance and the Economy/ ABIA

Strategy for Education and Awareness	Line of Action	Measures and Actions		Responsible Agencies and Stakeholders
	efficient implementation of renewable energy projects	III1.2.2	Participate in international research conferences, courses and seminars	Energy Unit
		III1.2.3	Establish studentships and scholarships in the field of EE and RE locally and internationally	Gov. A&B/ Ministry of Education
		III1.2.4	Incorporate findings from new and adapted research in decisions regarding RE implementation	Energy Unit
		III1.2.5	Study how Antigua & Barbuda can participate in carbon abatement mechanisms including carbon trading (e.g. Clean Development Mechanism)	Environmental Division
III.2: Capacity Building and Training	III.2.1: Build Capacity of the Energy Unit in the field of RE and EE	III2.1.1	Recruit permanent professional staff to be in charge of supervising and coordinating the A&B Governments energy efficiency and renewable energy programmes and measures.	Gov. A&B
		III2.1.2	Train permanent professional staff of the Energy Unit in renewable energy and energy efficiency, including RE and energy efficiency technologies, policy and programme formulation and monitoring and evaluation of programmes.	Gov. A&B
		III2.1.3	Ensure that adequate incentives are instituted and maintained so as to retain a sufficient level of trained staff	Gov. A&B
	III.2.2: Train professional staff in relevant public and private sector	III2.2.1	Ensure that adequate incentives are instituted and maintained so as to retain a sufficient level of trained staff	Gov. A&B
		III2.2.2	Train staff in the fundamentals of renewable energy technology, the principles energy efficiency, energy policy and carbon markets.	Energy Unit
		III2.2.3	Where necessary, utilise expatriate staffing as appropriate. Particularly, where the lack of skilled professionals and/or manpower acts as a constraint to the development of energy transformation objectives.	Energy Unit
		III2.2.4	Educate staff and professionals in the process of managing	Energy Unit /

Strategy for Education and Awareness	Line of Action	Measures and Actions		Responsible Agencies and Stakeholders
			administrative procedures for Renewable Energy Technology e.g. construction permits, user permits	DCA/ Environmental Division / A&B Bureau of Standards
	III2.3: Systematic inclusion of RE and EE topics in school curriculum	III2.3.1	Educate students in the fields of EE and RE via including the topics of EE and RE within natural science curriculum in primary, secondary and tertiary level schools.	Energy Unit / Ministry of Education
		III2.3.2	Introduce an harmonised programme of extracurricular activities for young people in the RE/EE field	Ministry of Education / Gov. A&B
		III2.3.3	Systematic inclusion of topics in lifelong learning training programmes, technical/vocational programs and certificate courses	Ministry of Education / Gov. A&B
		III2.3.4	Educate and train science teachers and lab technicians on the fundamentals of RE/EE for dissemination to students	Ministry of Education / Gov. A&B
		III2.3.5	Ensure an adequate number of knowledgeable local personnel entering the RE/EE field on a revolving basis from secondary and tertiary level schools	Ministry of Education / Gov. A&B
	III2.4: RE installers certification programmes	III2.4.1	Set up a system for certifying installers to ensure high quality work during project implementation	Energy Unit / APUA
	III2.5: Energy auditing and management programme	III2.5.1	Develop and implement a training programme for energy auditors and managers from the public and private sectors, including energy service providers	Energy Unit
		III2.5.2	Develop and implement a certification scheme for energy auditors and managers	Energy Unit / APUA

Strategy for Education and Awareness	Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
	III2.6: EE in the transport sector	III2.6.1 Develop and implement an information campaign for car drivers and maintenance professionals regarding energy efficient driving and maintenance practices.	Ministry of Transport
		III2.6.2 Provide training to drivers of buses and taxis on energy efficient driving practices.	Ministry of Transport
	III2.7: Articulation with other programmes and initiatives in the region	III2.7.1 Articulate RE and EE training and education programmes with other programmes in the region	Energy Unit
III3: Undertake public information sessions for the general public and target groups about support measures	III3.1: Raising public awareness and acceptance	III3.1.1 Work with related partners to develop and/or promote energy training events and education materials for the public	Energy Unit
		III3.1.2 Promote EE/RE in cooperation with local communities to inform citizens of the benefits and practical aspects of the development and use of these technologies to achieve developmental targets	Energy Unit
		III3.1.3 Placement of pilot EE/RE projects at the community level to engender support from citizens whilst allowing for greater access to the technology as an educational tool; thus reinforcing capacity and confidence.	Energy Unit
		III3.1.4 Develop a strategic awareness and marketing plan for renewable energy production, targeted on the general public, municipal and local authorities, commercial and public services, industry, households, agriculture and the energy distribution sector.	Energy Unit
		III3.1.5 Provide project information and promotional materials on economically viable projects identified in A&B to prospective local, regional and foreign investors	Energy Unit
		III3.1.6 Provide on-going communication and updates on energy initiatives to the public using targeted information campaigns which will be carried out on different levels (national, regional and municipal) through public television, radio broadcasting systems and newspaper/media.	Energy Unit

Strategy for Education and Awareness	Line of Action	Measures and Actions	Responsible Agencies and Stakeholders
		III3.1.7 Support and promote events/seminars/conferences/workshops that focus on RE/EE and successful projects which can be shared with the public	Energy Unit
		III3.1.8 Promote residential use of PV, solar thermal systems and wind turbines systems including development and distribution of wind and solar radiation maps	Energy Unit
		III3.1.9 Promote the use and benefits of solar water heaters by having road shows and grass-root advertising campaigns showcasing the financial benefits of these systems	Energy Unit
	III3.2: Identify and promote funding assistance programs for the public	III3.2.1 Encourage local banks, through capacity building, training and incentives, to provide loans and equity for the installation of small solar and wind devices to homeowners and small businesses.	Energy Unit/ Ministry of Finance and the Economy
		III3.2.2 Institute rolling public awareness sessions on various available financing opportunities for homeowners, businesses and private investors in Antigua and Barbuda who are interested in investing and/or installing renewable energy technology	Energy Unit/ Ministry of Finance and the Economy
		III3.2.3 Research EE/RE related loans, grants, rebates and incentives for homes and businesses	Energy Unit/ Ministry of Finance and the Economy

9.3 Expected outcomes from the lines of action to be implemented and indicators to measure implementation progress

The following table summarises the expected outcomes and indicators to measure these outcomes for each of the line of action proposed under Strategy III. This will be a tool to be used in monitoring the implementation of the SEAP

Table 10: Expected outcomes from the proposed lines of action and indicators to measure the implementation progress

Goals	Line of Action	Outcomes	Indicators
Energy Cost Reduction Diversification and Efficient Use of Energy Sources	III1.1: Draft and Implement a public consumer awareness and education program and end-use statistics on energy efficiency awareness	• Public consumer awareness and education program on EE developed and implemented • Increase in investment in EE practices • End use statistics implemented and available to the public on the internet in a database • Rolling Island-wide media campaigns on the benefits of adopting EE practices • Better informed populace on the fundamentals of EE and it's environmental and cost benefits	• Number of EE projects developed • Overall energy intensity (10% below a 2010 baseline within 10 years) • Number of Rolling Island-wide media campaigns
Energy Cost Reduction Diversification and Efficient Use of Energy Sources	III1.2: Encourage research development and timely and efficient implementation of renewable energy projects	• Public consumer awareness and education program on RE developed and implemented • Database of applicable RE to be implemented in A&B with a timeline and strategy for implementation developed and available to the public • Increase in investment in RE practices • Rolling Island-wide media campaigns on the benefits of adopting RE practices • Better informed populace on the fundamentals of RE and	• Number of RE projects developed • Overall energy intensity (10% below a 2010 baseline within 10 years) • Number of Rolling Island-wide media campaigns

Goals	Line of Action	Outcomes	Indicators
		it's environmental and cost benefits	
Stimulate New Economic/Business Opportunities	III.2.1: Build Capacity of the Energy Unit in the field of RE and EE	• Permanent professional staff of the Energy Unit in renewable energy and energy efficiency contracted and trained • Increased job opportunities as RE/EE sector expands. • More locals securing employment in the local and regional RE/EE sectors	• Number of people contracted for the Sustainable Energy Unit • Number of people involved in the RE/EE sector
Stimulate New Economic/Business Opportunities	III.2.2: Train professional staff in relevant public and private sector	• Proliferation of professionals equipped with a working knowledge of specific aspects of EE/RE • Increased job opportunities as RE/EE sector expands. • More locals securing employment in the local and regional RE/EE sectors	• Number of people contracted for the Sustainable Energy Unit • Number of people involved in the RE/EE sector
Stimulate New Economic/Business Opportunities	III2.3: Systematic inclusion of RE and EE topics in school curriculum	• Students and prospective researchers/professionals equipped with scholarly and practical knowledge of specific aspects of EE/RE as it relates to initiatives with the Caribbean region. • Collaboration between students/researchers in Antigua and Barbuda and the wider Caribbean region. • Harmonised programme of extracurricular activities for young people in the RE/EE field established and implemented	• Number of locals securing employment in the local and regional RE/EE sectors
Stimulate New Economic/Business Opportunities	III2.4: RE installers certification programmes	• Increased number of A&B RE Installers Certificated	• Number of certified RE installers
Stimulate New Economic/Business Opportunities	III2.5: Energy auditing and management programme	• Increased number of A&B RE energy auditors	• Number of energy auditors in A&B

Goals	Line of Action	Outcomes	Indicators
Energy Cost Reduction Stimulate New Economic/Business Opportunities Environmental protection	III2.6: EE in the transport sector	• Information campaign for car drivers and maintenance professionals regarding energy efficient driving and maintenance practices developed and implemented	• Number of informed car drivers
Energy Cost Reduction Stimulate New Economic/Business Opportunities Environmental protection	III2.7: Articulation with other programmes and initiatives in the region	• Training provided to drivers of buses and taxis on energy efficient driving practices.	• Number of informed bus and taxi drivers
Stimulate New Economic/Business Opportunities	III2.7: Articulation with other programmes and initiatives in the region	• Implemented regional RE and EE training and educational programmes	• Number of regional RE and EE training and educational programmes implemented
Energy Cost Reduction Diversification and Efficient Use of Energy Sources Stimulate New Economic/Business Opportunities	III3.1: Raising public awareness and acceptance	• Energy training events and education materials for the public developed and distributed • Increased incorporation of EE/RE in cooperation with local communities • Implement public awareness campaign	• Number of training events • Number and capacity of RE and EE projects developed in local communities • Overall energy intensity (10% below a 2010 baseline within 10 years)
Stimulate New Economic/Business Opportunities	III3.2: Identify and promote funding assistance programs for the public	• Increased of awareness of local banks and financial facilities to RE and EE projects • Increased number of loans provided by local banks and financial facilities to RE and EE projects • Increased knowledge and awareness on loans, grants, rebates and incentives for homes and businesses • Increased uptake on available loans/equity/grants from banks/Government lending facilities as related to 2010	• Number of loans equity/grants from banks/Government lending facilities provided for RE and EE project development

9.4 Implementation Priorities and Timing for implementation of the Education and Awareness Strategy

The implementation priorities of each line of action for Strategy III: Energy Efficiency is provided in Table 11 and the indicative timing for its implementation in Figure 13.

Table 11: Implementation priorities for Strategy III

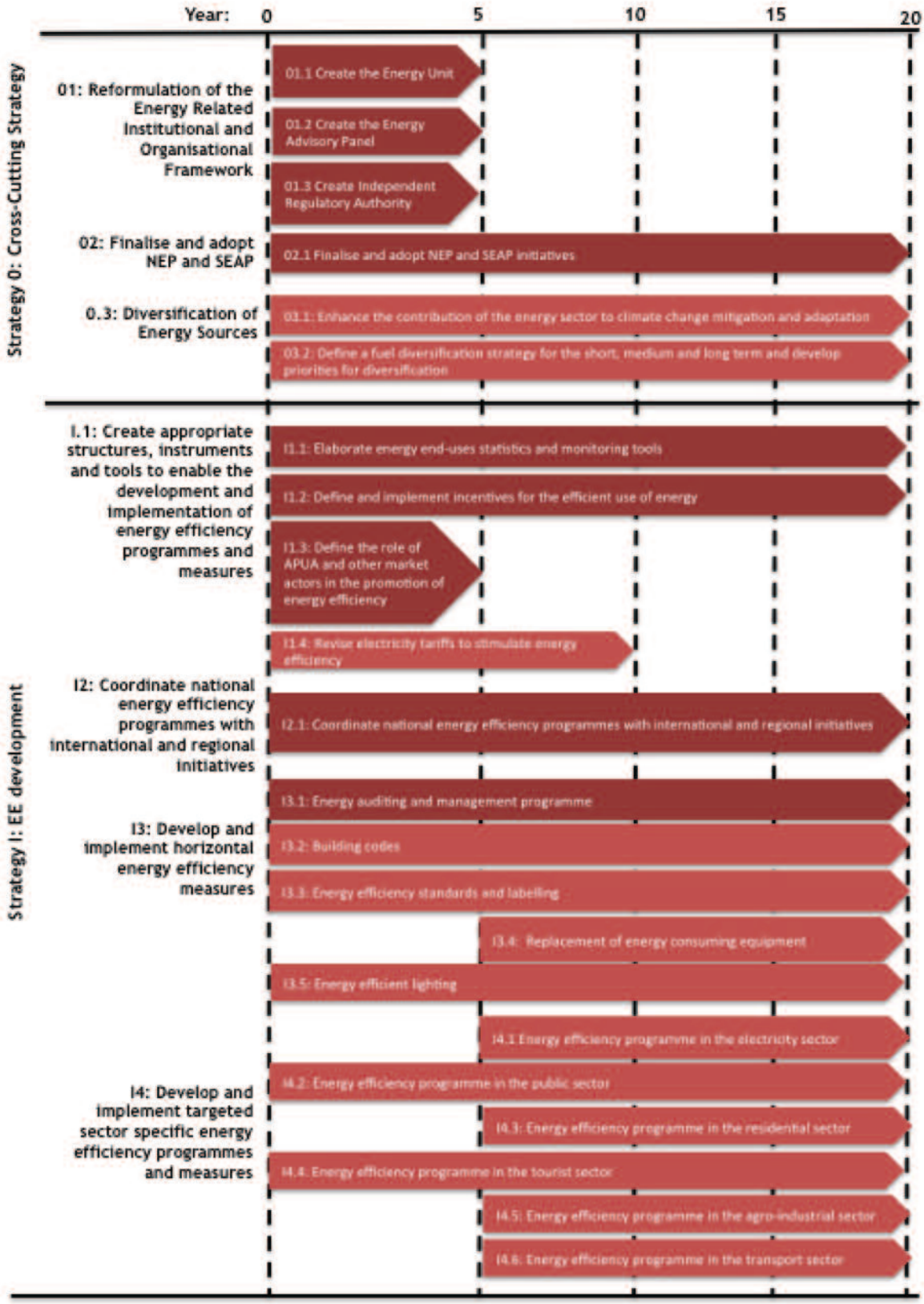
Strategy for EE development	Policy/Line of Action	Priority: High, Medium, Low (score)
III1: Develop and Implement programmes to influence non-market behaviour toward and to promote efficient use of energy	III1.1: Draft and Implement a public consumer awareness and education program and end-use statistics on energy efficiency awareness	High (34 points)
	III1.2: Encourage research development and timely and efficient implementation of renewable energy projects	Medium (24 points)
III2: Capacity Building and Training	III.2.1: Build Capacity of the Energy Unit in the field of RE and EE	Medium (33 points)
	III.2.2: Train professional staff in relevant public and private sector	Low (22 points)
	III2.3: Systematic inclusion of RE and EE topics in school curriculum	Low (20 points)
	III2.4: RE installers certification programmes	High (35 points)
	III2.5: Energy auditing and management programme	High (35 points)
	III2.6: EE in the transport sector	Medium (32 points)
	III2.7: Articulation with other programmes and initiatives in the region	High (34 points)
III3: Undertake public information sessions for the general public and target groups about support measures	III3.1 Raising public awareness and acceptance	High (40 points)
	III3.2 Identify and promote funding assistance programs for the public	High (39 points)

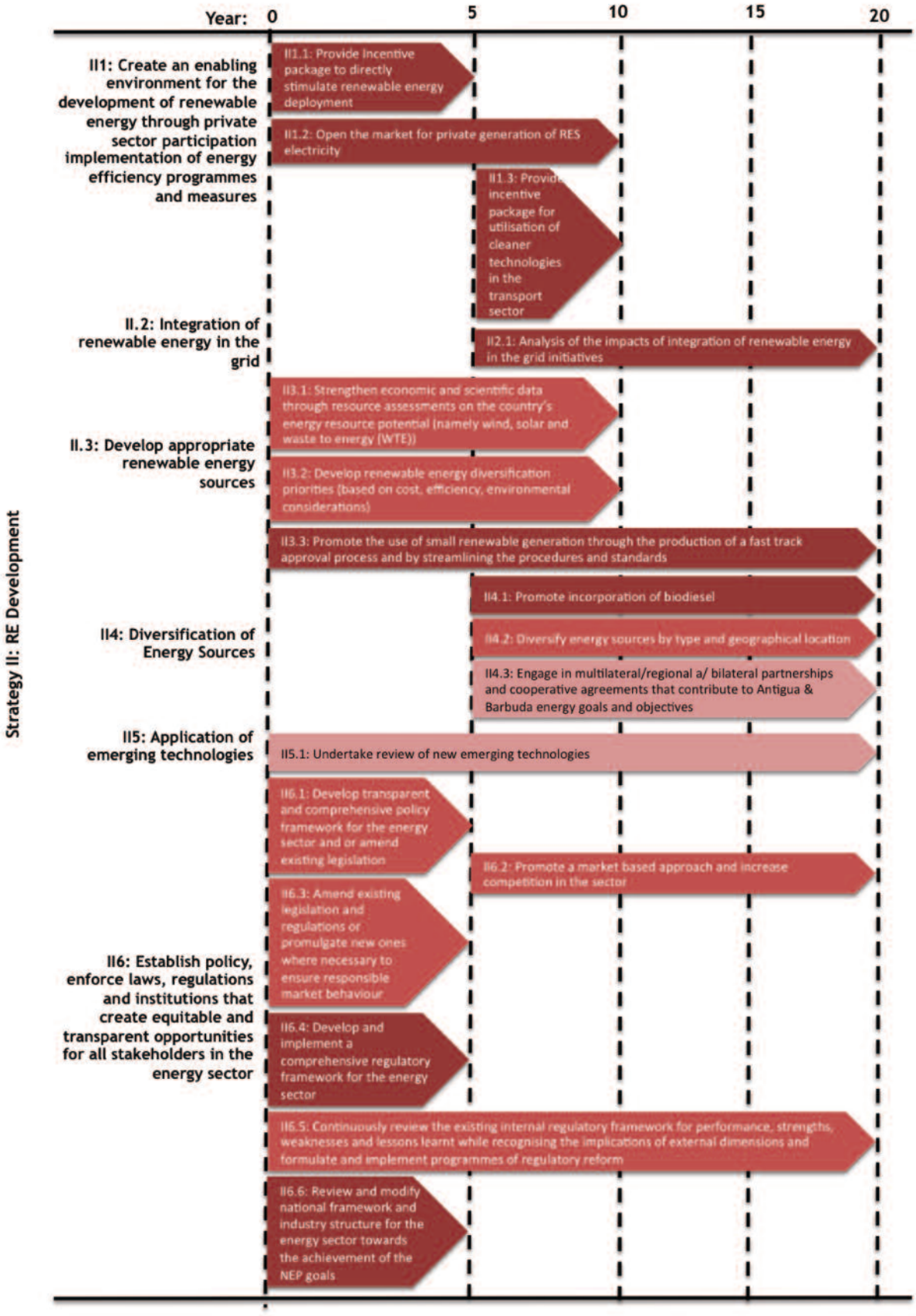
Strategy for Education and Awareness	Policy/Line of Action	Years			
		5	10	15	20
		Short	Medium	Long	
III1: Develop and Implement programmes to influence market behaviour toward sustainable energy (promote adoption of renewable energy and the efficient use of energy)	III1.1: Draft and Implement a public consumer awareness and education program and end-use statistics on energy efficiency awareness	D/I			
	III1.2: Encourage research development and timely and efficient implementation of renewable energy projects		D/I	I	
III.2: Capacity Building and Training	III.2.1: Build Capacity of the Energy Unit in the field of RE and EE	D/I	C	C	
	III.2.2: Train professional staff in relevant public and private sector	D/I	C	C	
	III2.3: Systematic inclusion of RE and EE topics in school curriculum	D/I	C	C	
	III2.4: RE installers certification programmes	D/I	C	C	
	III2.5: Energy auditing and management programme	D/I	C	C	
	III2.6: EE in the transport sector		D/I		
	III2.7: Articulation with other programmes and initiatives in the region		D/I	C	
III3: Undertake public information sessions for the general public and target groups about support measures	III3.1: Raising public awareness and acceptance	D/I	I	I	
	III3.2: Identify and promote funding assistance programs for the public	D	I	C	

Legend: *D - Development, I - Implementation, C - Continuation*

Figure 13: Indicative timing for the implementation of Strategy III

10 ROADMAP FOR SEAP IMPLEMENTATION




Year:
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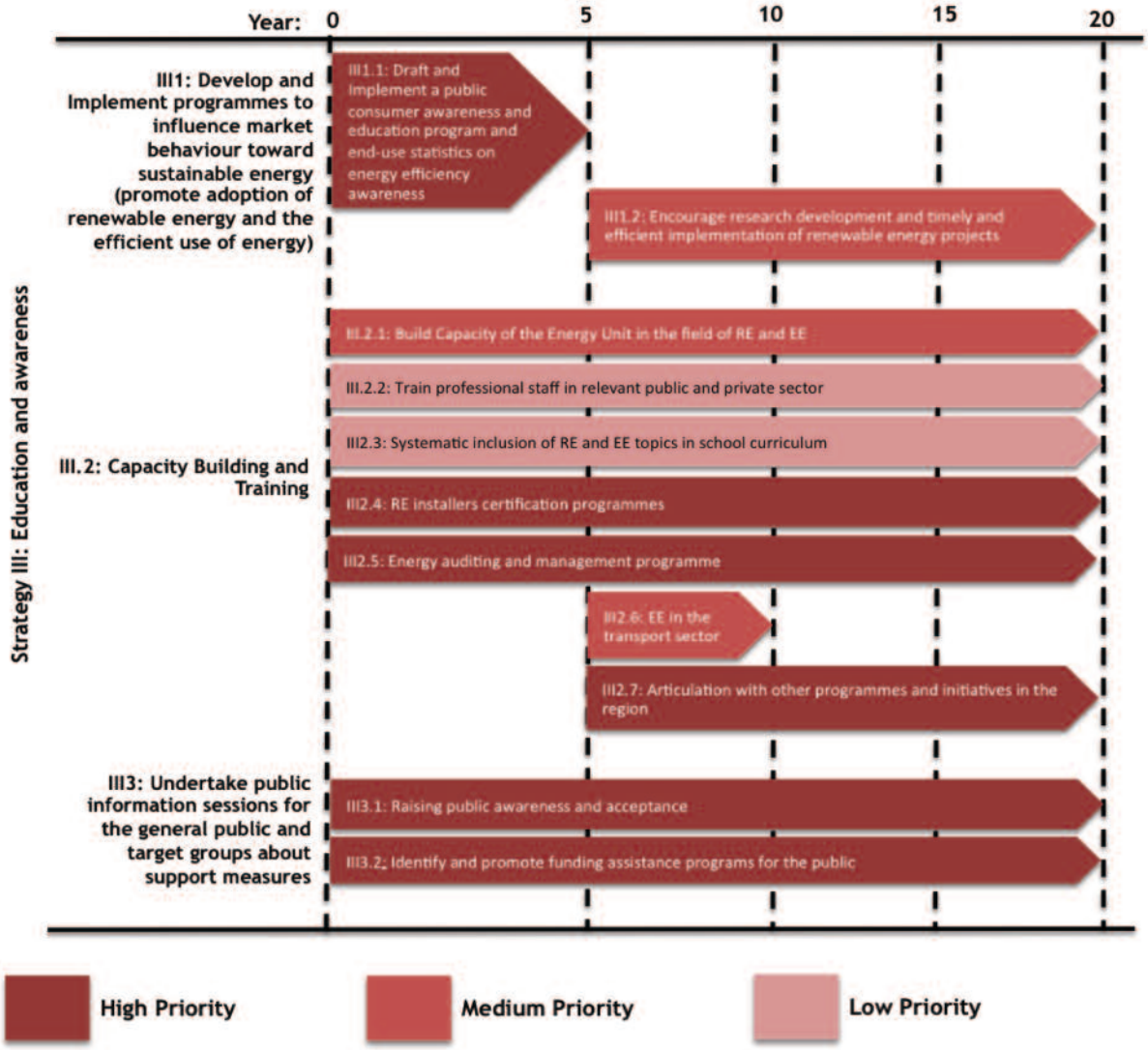
Strategy II: RE Development
II1: Create an enabling environment for the development of renewable energy through private sector participation implementation of energy efficiency programmes and measures
II1.1: Provide incentive package to directly stimulate renewable energy deployment
II1.2: Open the market for private generation of RES electricity
II1.3: Provide incentive package for utilisation of cleaner technologies in the transport sector
II.2: Integration of renewable energy in the grid
II2.1: Analysis of the impacts of integration of renewable energy in the grid initiatives
II.3: Develop appropriate renewable energy sources
II3.1: Strengthen economic and scientific data through resource assessments on the country's energy resource potential (namely wind, solar and waste to energy (WTE))
II3.2: Develop renewable energy diversification priorities (based on cost, efficiency, environmental considerations)
II3.3: Promote the use of small renewable generation through the production of a fast track approval process and by streamlining the procedures and standards
II4: Diversification of Energy Sources
II4.1: Promote incorporation of biodiesel
II4.2: Diversify energy sources by type and geographical location
II4.3: Engage in multilateral/regional a/ bilateral partnerships and cooperative agreements that contribute to Antigua & Barbuda energy goals and objectives
II5: Application of emerging technologies
II5.1: Undertake review of new emerging technologies
II6: Establish policy, enforce laws, regulations and institutions that create equitable and transparent opportunities for all stakeholders in the energy sector
II6.1: Develop transparent and comprehensive policy framework for the energy sector and or amend existing legislation
II6.2: Promote a market based approach and increase competition in the sector
II6.3: Amend existing legislation and regulations or promulgate new ones where necessary to ensure responsible market behaviour
II6.4: Develop and implement a comprehensive regulatory framework for the energy sector
II6.5: Continuously review the existing internal regulatory framework for performance, strengths, weaknesses and lessons learnt while recognising the implications of external dimensions and formulate and implement programmes of regulatory reform
II6.6: Review and modify national framework and industry structure for the energy sector towards the achievement of the NEP goals



11 ESTIMATED COST AND POTENTIAL SOURCES OF FUNDING

11.1 Estimated Cost

The potential cost of each action/measure/programme was estimated by the consultants. This was done by taking into account the costs of similar actions/measures/programmes being undertaken in CARICOM or OECD countries as well as employing the previous experience of the Consultants. The figures estimated were then aggregated per strategy, so as to provide a general budget figure for the implementation of this SEAP.

The estimated figures include: costs for policy development; costs for establishing and managing the Energy Unit, Energy Advisory Panels, and Independent Regulatory Agency; consultancy costs for carrying out resource assessments; costs for technical and non-technical capacity building and awareness raising activities; between others. They do not include renewable energy and energy efficiency technologies costs (as first projects need to be identified), construction and implementation costs. Annex II provides the estimated figures per measure for each of the four strategies here proposed.

The following table summarises the needed estimated budget for SEAP implementation.

Strategy	Estimated Costs in (EC$)
Strategy 0: Cross Cutting Strategy	$8,251,200
Strategy I: Energy Efficiency Development	$6,880,950
Strategy II: Renewable Energy Strategy	$5,095,575
Strategy III: Awareness and Education Strategy	$5,794,350
Total Costs of the SEAP	**$26,022,075**

Annex III provides a brief overview on potential sources of funding that can be used by Antigua & Barbuda to finance the implementation of the activities highlighted in the SEAP.

ANNEX I – METHODOLOGY FOR THE DEFINITION OF THE IMPLEMENTATION PRIORITIES

The implementation priorities of the defined lines of action under each proposed strategy were defined having into account the following criteria:

- Contribution to the goals in the NEP;
- The influence on existing and future policies across sectors;
- The impact / reach;
- Environmental impact (GHG emission reductions)
- Feasibility
- Synergies with existing programmes
- Cost benefit

Having these criteria in mind the following steps were followed in the definition of implementation priorities:

1) Attribution of points for each of the criterion

Each line of action proposed was analysed and points were attributed for each of the criteria above referred according to the table shown below.

Criteria	Points	Motive
Contributes directly to the goals in the NEP (the goals are: the NEP five goals (energy cost reduction, diversification of energy sources, electricity reliability improvement, environmental protection and stimulate new economic opportunities)	1	The action meets at least 1 of the goals of the NEP and relies on other actions
	2	The action meets at least 2 goals of the NEP and relies on the implementations of actions defined for energy cost reduction and diversification
	3	The action contributes to the main goals of Energy Cost Reduction and Diversification and Efficient use of Sources and at least 1 other goal in the NEP. These actions make up the main foundation, and preceeds all other actions
Will influence existing and future policies across sectors	1	The action requires new policies / legislation
	2	The action bolsters other existing policies / legislation / requires modification of existing legislation
	3	The action bolsters existing and proposed policies and supporting legislation e.g. ABIA Act, APUA Act, NSWMA Act / requires no additional legislation
Impact / Reach	1	The impact /reach of the action is at a Community / Sector level
	2	The impact /reach of the action is at a National OR Community / Sector level
	3	The impact /reach of the action is at the National and Community / Sector level
Environmental impact (GHG reduction)	1	Low
	2	Medium
	3	High
Feasibility	1	Requires new resources and regulations
	2	Requires modification of existing regulations and resources
	3	No modification required

Criteria	Points	Motive
Synergies with existing programmes	1	No synergies with existing programmes
	2	Can have an impact on existing programmes
	3	Will have a strong impact on exisiting and proposed programmes
Cost-Benefit	1	Cost of programme and investments likely to exceed benefits (positive cost)
	2	Benefits likely to exceed cost of programmes and investments (negative cost)
	3	Benefits likely to exceed cost + policy can mobilize private investment

2) Attribution of weights to the different criterion

For each criterion, weights were attributed to reflect its importance. The following weights have been attributed:

- Contribution to the goals in the NEP = 3
- The influence on existing and future policies across sectors= 2
- The impact / reach = 2
- Environmental impact (GHG emission reductions) = 2
- Feasibility = 2
- Synergies with existing programmes = 1
- Cost benefit = 3

3) Calculation of the score of each line of action

For each line of action, a final score was estimated by multiplying the weight by the points attributed for a given criterion and by summing all the criteria's scores.

$$\text{Score Line of Action} = \sum (\text{Points Criterion } i \times \text{Weight Criterion } i)$$

Where I, represent the different criterion selected for the analysis.

3) Definition of the Implementation Priorities

Having the scores calculated for each line of action and having into account that the maximum that one line of action could score is 45 points and that the minimum that a line of action could score is 15, the following implementation priority classification was attributed to each line of action:

- High: Line of action with scores between 34-45 points;
- Medium: Line of action with scores between 24-33 points; and
- Low: Line of action with scores between 15–23.

ANNEX II – ESTIMATED FIGURES PER MEASURE FOR EACH OF THE FOUR STRATEGIES PROPOSED UNDER THE SEAP

Strategy 0: Cross-cutting Strategy

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total (US)	Local mandays	# of local people	Int'l man days	Number of int'l people	Total (US)	unit price	#	Total (US)	
01: Reformulation of the Energy Related Institutional and Organisational Framework												
01.1 Create the Energy Unit												
01.1.1 Develop a policy creating the Energy Unit	**$27,000**	**$10,000**	$10,000	10	2							6 days for developing the policy
01.1.2 Create the Energy Unit to deal with all matters related with the energy sector and to be responsible for policy, regulation and standard formulation, including updating the NEP and SEAP, between other activities.	**$5,184,000**	**$1,920,000**	$-								$1,920,000	The unit would be composed by 4 staff. Cost 30000/staff/yr for 16 years

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total (US)	Local mandays	# of local people	Int'l man days	Number of int'l people	Total (US)	unit price	#	Total (US)	
01.1.3 Mandate the Energy Unit to: • Coordinate studies on energy resources, generation, transformation and marketing in close cooperation with the responsible operating agencies; • Foster the development of appropriate legislation for the sectors electricity, transportation, petroleum and gas through a participatory and consultative process with focus on cheaper and more sustainable services; • Foster the development and implementation of renewable energy projects • Foster the development and adoption of appropriate energy efficiency programs and measures; • Promote and monitor demand-side management programs and other programs designed to encourage the purchase and adoption of energy-efficient appliances by final energy users; • Encourage private sector participation in energy efficiency measures and technologies and in renewable energy project development relevant to Antigua & Barbuda; • Organize energy awareness campaigns and capacity building events and disseminate appropriate information to private and public sector; • Monitor the implementation of energy efficiency and renewable energy projects	$-	$-	0									No cost

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total (US)	Local mandays	# of local people	Int'l man days	Number of int'l people	Total (US)	unit price	#	Total (US)	
01.1.4 Review on an on-going basis the existing institutional and organisational framework for performance, strengths, weakness, and lessons learnt to formulate and implement programmes of legal reforms	$-	$-	$-									This should be done every two years and it is estimated to take 3 days of national staff of the energy unit. As this will be included in the salaries of the energy unit staff considered under strategy III, in here there is no cost associated.
01.2 Create the Energy Advisory Panel												
01.2.1. Create an Energy Advisory Panel composed of industry players (policy makers, regulator, generators, consultants and NGOs) to meet, discuss and make recommendations and advice the Energy Unit on improvements of the NEP and SEAP	**$13,500**	**$5,000**	$5,000	10	1							6 days for developing the policy
01.3 Create Independent Regulatory Authority												
01.3.1 Create an Independent Regulatory Authority (Regulator) – independent from the Government and from the Utility	**$132,300**	**$49,000**	$49,000	14								
01.3.2 Empower the regulator with enforcement powers to the improve efficiency of the system and compliance with established benchmarks, procedures and standards	**$2,592,000**	**$960,000**	$960,000		2							2 people in the regulatoryauthority at 30000US/staff/year
02: Finalise and adopt NEP and SEAP	**$-**											

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total (US)	Local mandays	# of local people	Int'l man days	Number of int'l people	Total (US)	unit price	#	Total (US)	
02.1 Finalise and adopt NEP and SEAP	**$-**											
02.1.1 Finalise and adopt Antigua & Barbuda NEP	**$-**	**$-**	$-									No cost as this is part of this consultancy
02.1.2 Finalise and approve Antigua & Barbuda Action Plan	**$-**	**$-**	$-									No cost as this is part of this consultancy
02.1.3 Revise on an on-going basis both the implementation of the NEP and SEAP in Antigua & Barbuda	**$-**	**$-**	$-									No cost as it is included in the salary of the Energy Unit
0.3: Diversification of Energy Sources	**$-**											
03.1: Enhance the contribution of the energy sector to climate change mitigation and adaptation	**$-**											
03.1.1 Analyse the possibility and feasibility of introducing natural gas (e.g. Liquefied Natural Gas- LNG) to replace current heavy fuel oil for electricity generation	**$120,150**	**$44,500**	$37,500	12	2	15	2	$7,000	$3,500	2		1 trip for the international experts was considered
03.1.2 Promote public and private partnerships between public and private to finance and develop energy diversification projects	**$-**											No cost. Part of the role of the Energy Unit
03.2: Define a fuel diversification strategy for the short, medium and long term and develop priorities for diversification	**$-**											
03.2.1 Develop priorities for diversification (in a timely way based on cost, efficiency, environmental consideration and appropriate technologies)	**$124,875**	**$46,250**	$42,750	20	3	15	1	$3,500	$3,500	1		

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total (US)	Local mandays	# of local people	Int'l man days	Number of int'l people	Total (US)	unit price	#	Total (US)	
03.2.2 Develop LNG projects if feasible	**$-**											These costs will only exist if LNG projects are feasible and possibly if existent will be incured by the developer of the project (depends on the agreements reached)
03.2.3 Develop legislative framework for natural gas if necessary	**$57,375**	**$21,250**	$17,750	10	1	15	1	$3,500	$3,500	1		

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
I1: Create appropriate structures, instruments and tools to enable the development and implementation of energy efficiency programmes and measures												
I1.1: Elaborate energy end-uses statistics and monitoring tools												
I1.1.1. Develop a study to map energy end-uses in the different energy-consuming sectors and to define energy efficiency baselines	**$168,750**	**$62,500**	$55,500	30	2	30	1	$7,000	$3,500	2		
I1.1.2. Elaborate and maintain energy end-use statistics	**$120,150**	**$44,500**	$34,000	0	2	40	1	$10,500	$3,500	3		Elaboration of statistics only. Local experts should be staff of Energy Unit and Statistics Office. Should also be maintained by staff of Energy Unit and Statistics Office.
I1.1.3. Develop and implement appropriate tools to monitor energy end-uses and the effects of energy efficiency policies and programmess	**$110,700**	**$41,000**	$34,000	0	2	40	1	$7,000	$3,500	2		Local staff should be permanent professional staff of Energy Unit.

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
I1.2: Define and implement incentives for the efficient use of energy												
I1.2.1. Develop a study to identify the most cost-effective financial and fiscal incentives to promote end-use energy efficiency in the various energy consuming sectors, taking into consideration state budget constraints, the availability of public and private funds and credit facilities. Possible incentives include: subsidies (grants) and preferential loans to consumers and energy service providers, tax exemptions for investments in energy efficiency and reduced import duties for energy efficient equipment.	**$183,600**	**$68,000**	$54,000	20	2	20	2	$14,000	$3,500	4		
I1.2.2. Design and implement a medium and long-term incentive scheme to promote energy efficiency in A&B	**$110,700**	**$41,000**	$34,000	0	2	40	1	$7,000	$3,500	2		Local staff should be permanent professional staff of Energy Unit.
I1.3: Define the role of APUA and other market actors in the promotion of energy efficiency												
I1.3.1. Develop a study to identify and analyse the possible role of APUA and other public and private actors in energy efficiency and demand-side management programmes.	**$118,800**	**$44,000**	$37,000	40	1	20	1	$7,000	$3,500	2		
I1.3.2. Develop a study to identify and analyse the market for energy services in A&B and the potential role of energy service companies (ESCOs), energy consultants and other service providers. The study should include an assessment of the technical, economic and institutional feasibility of	**$141,750**	**$52,500**	$45,500	20	2	30	1	$7,000	$3,500	2		

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implement ation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
various business models, like energy performance contracting and advisory services.												
I1.3.3. Develop a study to indentify financing options for energy efficiency measures, involving commercial banks and credit unions.	**$78,300**	**$29,000**	$22,000	10	1	20	1	$7,000	$3,500	2		
I1.4: Revise electricity tariffs to stimulate energy efficiency												
I1.4.1. Review the tariff structure to take into account incentives for energy conservation and energy efficiency.	**$118,800**	**$44,000**	$37,000	40	1	20	1	$7,000	$3,500	2		
I1.4.2. Introduce progressive electricity tariffs to encourage energy conservation and efficiency.	**$-**	**$-**	$-	0	2	0	0	$-		0		No specific budget assigned. Should be the task of the permanent staff of the Energy Unit.
I.2: Coordinate national energy efficiency programmes with international and regional initiatives												
I2.1: Coordinate national energy efficiency programmes with international and regional initiatives												
I2.1.1. Participate in relevant international initiatives in the field of energy efficiency (like e.g. the Enlighten Initiative of UNEP).	**$-**	**$-**	$-	0		0	0	$-		0		No specific budget assigned. Should be the task of the permanent staff of the Energy Unit.

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
I2.1.2. Coordinate national programmes and measures in the field of Building Performance (I3.2.1) and Energy Efficiency Standards and Labelling (I3.3.1) with the corresponding regional programmes on CARICOM and OECS level. Energy Efficiency Standards & Labels should be implemented on a regional level and preferably be aligned with existing international schemes (like the EU energy label or US minimum energy efficiency standards).	**$-**	**$-**	$-	0		0	0	$-		0		No specific budget assigned. Should be the task of the permanent staff of the Energy Unit.
I2.1.3. Develop a study to identify and analyse how A&B can capitalize on international financing facilities and bilateral financial sources in the field of energy efficiency.	**$82,350**	**$30,500**	$27,000	20	1	20	1	$3,500	$3,500	1		
I.3: Develop and implement horizontal energy efficiency measures												
I3.1: Energy auditing and management programme												
I3.1.1. Implement energy auditing and management programmes in the public, commercial, industrial and transport sectors	**$270,000**	**$100,000**	$-	0	0	0	0	$-		0	$100,000	Assuming the implementation of 100 energy audits, which include advise to implement an energy management system (EMS); each audit receiving US$ 1,000 of Government support.
I3.2: Building codes												

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
I3.2.1. Develop and enforce building codes with regard to energy efficiency for all new construction in A&B (residential, commercial and public buildings). Building codes should be developed taking into consideration both international experience and local climatic conditions and should be preferably harmonized with the Regional Building Standards developed by CROSQ.	**$228,150**	**$84,500**	$74,000	40	2	40	1	$10,500	$3,500	3		Budget for development of the building codes (in coordination with CROQS activities). Enforcement will be the task of professional staff of the Energy Unit.
I3.3: Energy efficiency standards and labeling												
I3.3.1. Develop a comprehensive, medium- and long-term strategy for energy efficiency standards & labeling (EE S&L) of energy-related products. The strategy should be based on a prioritization of products (based on market studies) and cost-benefit analyses of alternative and/or complementary instruments, like mandatory energy labeling and minimum energy performance standards (MEPS). The national EE S&L scheme should be harmonized on OECS or CARICOM level and aligned with existing schemes (like the EU labeling scheme and the EU or US minimum energy performance standards).	**$218,700**	**$81,000**	$74,000	40	2	20	2	$7,000	$3,500	2		Although there is an activity on OECS level (financed by the ACP-EU energy facility and carried out by a team of GIZ). However there will be a need for local adaption and implementation.

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
I3.3.2. Implement mandatory energy labelling for energy-related products, in particular household appliances, lamps and electric motors. Mandatory labelling should be implemented with priority for products with a high share in national / sectoral energy consumptions and high energy conservation potentials.	**$272,700**	**$101,000**	$94,000	60	2	40	1	$7,000	$3,500	2		Budget does not include market control, which will be a task of the permanent staff of the A&B Government / the Energy Unit.
I3.3.3. Implement minimum energy efficiency standards (MEPS) for selected products with a high share in national / sectoral energy consumption and high energy conservation potentials (e.g. refrigeration and cooling equipment).	**$337,500**	**$125,000**	$111,000	60	2	30	2	$14,000	$3,500	4		Budget does not include market control, which will be a task of the permanent staff of the A&B Government / the Energy Unit.
I3.4: Replacement of energy consuming equipment												
I3.4.1. Design and implement an replacement programme for energy using equipment, in particular household appliances, providing incentives to consumers and safeguarding environmentally sound decommissioning and disposal of the equipment replaced.	**$191,700**	**$71,000**	$64,000	30	2	40	1	$7,000	$3,500	2		Budget for design of the programme. Does not include implementation of the programme, including incentives and costs of infrastructure for decommissioning and disposal of equipment replaced.
I3.5: Energy efficient lighting												
I3.5.1. Phase-out incandescent lamps, using regulatory instruments (prohibition to put on the market or minimum energy efficiency standards).	**$191,700**	**$71,000**	$64,000	30	2	40	1	$7,000	$3,500	2		Budget does not include market control, which will be a task of the permanent staff of the A&B Government / the Energy Unit.

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implement ation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
I3.5.2. Promote CFL and/or LED-lamps, using information campaigns and/or incentives to consumers in the residential and commercial sectors.	$-	$-										Budget for information on CFL is included in Strategy III
I4: Develop and implement targeted sector specific energy efficiency programmes and measures												
I4.1 Energy efficiency in the electricity sector												
I4.1.1. Develop a study to identify inefficiencies and losses in the generation, transmission and distribution of electricity (technical and non-technical losses).	**$164,700**	**$61,000**	$54,000	40	1	40	1	$7,000	$3,500	2		
I4.1.2. Establish minimum efficiency standards for electricity generation, transmission and distribution.	**$191,700**	**$71,000**	$64,000	30	2	40	1	$7,000	$3,500	2		
I4.1.3. Develop and implement an electricity loss reduction programme.	**$141,750**	**$52,500**	$45,500	40	1	30	1	$7,000	$3,500	2		Budget for development of the programme; does not include implementation, which will be a task of the permanent professional staff of the Energy Unit.
I4.2: Energy efficiency programme in the public sector												
I4.2.1. Develop and implement a programme to refurbish A&B Government buildings, including measures like: energy auditing and management, efficient lighting and air conditioning, improvement of building envelope, in combination with the use of renewable energy (e.g. for water heating).	**$534,600**	**$198,000**	$91,000	40	2	30	2	$7,000	$3,500	2	$100,000	Budget includes 10 full energy audits of public buildings, with an estimated cost of US$ 10,000 per audit. Budget does not include investments.

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implement ation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
I4.2.2. Develop and implement a programme for the mandatory procurement of energy efficient and environmentally friendly equipment and materials by the public sector. Energy consuming products should correspond to the highest energy efficiency class defined in energy labels and to internationally recognized endorsement marks (like Energy Star®).	**$141,750**	**$52,500**	$45,500	40	1	30	1	$7,000	$3,500	2		Budget for development and initial implementation of the programme. Implementation and continuation will be task of permanent professional staff of A&B Government / Energy Unit.
I4.2.3. Develop and implement a programme for improved energy efficiency of Government-owned vehicles, including proper maintenance, training of drivers and the mandatory purchase of fuel-efficient vehicles.	**$222,750**	**$82,500**	$55,500	30	2	30	1	$7,000	$3,500	2	$20,000	Budget includes costs of 2 - 4 training workshops for drivers of offical Government vehicles.
I4.3: Energy efficiency programme in the residential sector												
I4.3.1. Provide advisory services to homeowners and tenants with regard to energy conservation and energy efficiency options in homes. The advisory services should be provided by trained and certified energy auditors from the private or public sectors (including the energy sector) and should be supported by appropriate Government incentives.	**$919,350**	**$340,500**	$37,000	40	1	20	1	$3,500	$3,500	1	$300,000	There are approximately 30,000 dwellings in A&B. Assuming that in the short-term (first 5 years) advisory services will be accepted by 10% of the homeowners / tenants and the Government will contribute US$ 100 to each service. Administration of the programme will be the task of permanent professional staff of the Energy Unit.
I4.4: Energy efficiency programme in the tourist sector												

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
I4.4.1. Develop and implement an energy efficiency programme for the tourist sector, focussing on the hotel and catering industry, including measures like: energy auditing and management, efficient lighting, air conditioning and water heating, improvement of building envelope, in combination with the use of renewable energy (e.g. for water heating) and the promotion of small-scale cogeneration.	**$480,600**	**$178,000**	$91,000	40	2	30	2	$7,000	$3,500	2	$80,000	Estimated 50 - 100 hotels, excluding (according to AHTA and A&B websites). Estimated number of rooms: 5,000 (own calculation from statistics of tourist arrivals by air in 2009 (234,410)). Assuming the implementation of 50 energy audits and EMS, each audit receiving US$ 1,000 of Government support. Implementation of 3 workshops for the tourist sector. Budget does not include cost of investments.
I4.4.2. Develop and implement energy efficiency awareness and information campaigns targeted at customers (tourists) and employees.	**$244,350**	**$90,500**	$37,000	40	1	20	1	$3,500	$3,500	1	$50,000	Targets are approx. 250,000 tourist / year and an estimated number of 6,000 employees (25% of the workforce of the A&B service sector)
I4.4.3. Conclude voluntary agreements between the A&B Government and the tourist sector regarding the purchase of energy efficient and environmentally friendly equipment and materials.	**$109,350**	**$40,500**	$37,000	40	1	20	1	$3,500	$3,500	1		
I4.4.4. Conclude a voluntary agreement between the A&B Government and the tourist sector regarding energy efficiency targets, reporting and monitoring of the targets.	**$109,350**	**$40,500**	$37,000	40	1	20	1	$3,500	$3,500	1		

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
I4.5: Energy efficiency programme in the agro-industrial sector												
I4.5.1. Develop and implement an energy efficiency programme for the agro-industrial sector including measures like: energy auditing and management, efficient horizontal and process technologies, including the refurbishment of industrial plants.	**$109,350**	**$40,500**	$37,000	40	1	20	1	$3,500	$3,500	1		The agro-industrial sector of A&B, in particular the sugar industry, appears to be declining. It still needs to be verified how many (if any) process industries could be included in this programme (light industry will be covered under activity I3.1.3). Assuming that there are only a few process industries in A&B.
I4.5.2. Develop a study regarding the potential of the use of biomass (like eg. sugarcane bagasse) for on-site combined heat and power generation (cogeneration) in agro-industrial enterprises.	**$45,900**	**$17,000**	$13,500	10	1	10	1	$3,500	$3,500	1		Also this activity depends on the number of agro-industrial process industries in A&B, same assumption as above.
I4.5.3. Facilitate on-site combined heat and power generation and the supply of surplus electricity to the public grid by appropriate adjustments to the Public Utilities Act.	**$109,350**	**$40,500**	$37,000	40	1	20	1	$3,500	$3,500	1		Same comment and assumption, although adjustments to the Public Utilities Act with regard to acceptance / remuneration of surplus electricity applies also to small-scale cogeneration (or tri-generation) and to distributed renewable energy (PV).

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other Estimated implementation costs	Comment
			Total(USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	total	
I4.6: Energy efficiency programme in the transport sector												
I4.6.1. Develop an energy efficiency programme for the transport sector, focussing on public transport and on private vehicles, including measures like training, improved maintenance, fiscal measures and import taxes.	**$164,700**	**$61,000**	$54,000	20	2	40	1	$7,000	$3,500	2		
I4.6.4. Review the vehicle tax system in order to discourage ownership and use of large, energy intensive cars.	**$82,350**	**$30,500**	$27,000	20	1	20	1	$3,500	$3,500	1		
I4.6.5. Review import duties in order to discourage the imports of large, energy intensive cars and to encourage the imports of energy efficient cars.	**$82,350**	**$30,500**	$27,000	20	1	20	1	$3,500	$3,500	1		
I4.6.6. Develop a study to identify the potential benefits of energy labelling and minimum fuel efficiency standards of cars in A&B.	**$82,350**	**$30,500**	$27,000	20	1	20	1	$3,500	$3,500	1		

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comment
			Total (USD)	Local mandays	# of local people	Int'l mand ays	Number of int'l people	Total (USD)	unit price	#	Total (USD)	
II1: Create an enabling environment for the development of renewable energy through private sector participation												
II1.1: Provide Incentive package to directly stimulate renewable energy deployment												
II1.1.1. Develop a study to analyse and identify the main financial and non-financial instruments for stimulating RE deployment (for example: quota system or feed-in tariff). With the results of this study develop and introduce a comprehensive and transparent package of incentives for the deployment and use of renewable energy- This package should include the options of mandate quota systems or feed-in-tariff (most viable option for A&B as decided per the study) as well as other financial and non-financial instruments identified.	**$237,600**	**$88,000**	$81,000	30	2	30	2	$7,000	$3,500	2		
II1.1.2. Develop a study to identify innovative approaches for the establishment of sustainable structures and financial mechanism for RE	**$55,350**	**$20,500**	$17,000			20	1	$3,500	$3,500	1		
II1.1.3. Develop a study to identify and analyse how Antigua & Barbuda can capitalize on international financing facilities and bilateral financial sources	**$59,400**	**$22,000**	$22,000	10	1	20	1					
II1.1.4. Facilitate sourcing of low cost development funds for productive enterprises for energy technology projects	**$-**	**$-**	$-					-				This needs to be assessed at a latter stage

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comment
			Total (USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	Total (USD)	
II1.1.5. Provide appropriate incentives for the installation of solar water heaters at the residential and tourism sectors	**$54,675**	**$20,250**	$20,250	15	1	15	1					
II1.2: Open the market for private generation of RES electricity												
II1.2.1. Review the existing licencing policy and define a clear, transparent and simplified process for requesting/approving licences for RE facilities (including distributed generation)	**$36,450**	**$13,500**	$13,500	10	1	10	1			0		
II1.2.2. Mandate the Utility to accept all RES produced from licenced IPPs through the establishment of 'standard' PPAs	**$27,000**	**$10,000**	$10,000	10	2	0	0			0		
II1.3: Provide incentive package for utilisation of cleaner technologies in the transport sector												
II1.3.1. Introduce an incentive package to promote the utilisation of hybrid vehicles and fuel-efficient vehicles with lower emissions	**$74,925**	**$27,750**	$27,750	15	2	15	1	-				
II1.3.2. Provide incentives for the utilisation of regional bio-fuels	**$74,925**	**$27,750**	$27,750	15	2	15	1					
II.2: Integration of renewable energy in the grid												
II2.1: Analysis of the impacts of integration of renewable energy in the grid												
II2.1.2: Study on the impact of incorporation of RES in the grid (grid stability)	**$72,900**	**$27,000**	$27,000	20	1	20	1					
II.3: Develop appropriate renewable energy sources												
II3.1: Strengthen economic and scientific data through resource assessments on the country's energy resource potential												

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comment
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(namely wind, solar and waste to energy (WTE))												
II3.1.1. Carry out resource assessments and feasibility studies on the potentials of technologies to generate energy from renewable sources. This includes, but will not be limited to:												
· Wind Power;	**$132,300**	**$49,000**	$37,000	20	2	10	2	$7,000	3500	2	$5,000	rent cars, equipment
· Solar Power	**$132,300**	**$49,000**	$37,000	20	2	10	2	$7,000	3500	2	$5,000	rent cars, equipment
· Biomass and WTE	**$178,200**	**$66,000**	$54,000	20	2	20	2	$7,000	3500	2	$5,000	rent cars, equipment
These assessments should be repeated every 5 to 7 years	**$648,000**	**$240,000**	$60,000	40	3			-			$180,000	repeat it every 5 years
II3.1.2. Develop an inventory of all potential renewable energy resources ranked by its cost and full economical impact	**$32,400**	**$12,000**	$8,500			10	1	$3,500	$3,500	1		
II3.1.3. Identify local sites for the development of renewable energy (areas with high renewable energy potential) and reserve these for specific development – Renewable Energy Development Areas	**$113,400**	**$42,000**	$28,500	20	2	10	1	$3,500	$3,500	1	$10,000	field work
II3.1.4. Develop criteria for project selection that are aligned with Government goals and objectives	**$36,450**	**$13,500**	$13,500	10	1	10	1					
II3.1.5. Identify and develop renewable energy demonstration projects	**$-**	**$-**										This is contemplated in Strategy III
II3.1.6. Analysis of regional Inter-Island connections and the potential utilisation of natural resources abundant in neighboring countries	**$158,625**	**$58,750**	$38,250			15	3	$10,500	$3,500	3	$10,000	if field work is included
II3.2: Develop renewable energy diversification priorities (based on cost, efficiency, environmental considerations)												

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comment
			Total (USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	Total (USD)	
II3.2.1. Prioritize renewable energy sources by economic feasibility criteria, environmental considerations including carbon abatement	**$72,900**	**$27,000**	$27,000	20	1	20	1					
II3.2.2. Introduce incentives and a plan of action to foster renewable energy (wind, solar, WTE and other renewable technologies)	**$136,350**	**$50,500**	$47,000	30	2	20	1	$3,500	$3,500	1		
II3.2.3. Develop solar power projects (PV grid-tied and distributed, solar thermal concentrators, PV hybrid and stand-alone systems for homeowners and small business)	**$-**	**$-**	$-									To be analyzed at a latter stage. Also investors can support these costs
II3.2.4. Promote the production of biofuel and make the necessary studies to analyse the national/regional supply of feed stock for expansion of the already existent unit	**$99,900**	**$37,000**	$27,000	20	1	20	1				$10,000	for field work/data collection
II3.2.5. Mandate that all new hot water installations in public buildings should be solar based	**$27,000**	**$10,000**	$10,000	10	2							
II3.2.6. Study the possibility of implementing equipment for using methane (bio-gas) produced from the landfill and waste water treatment plants	**$78,300**	**$29,000**	$25,500			30	1	$3,500	$3,500	1		
II3.2.7. Encourage the production of biogas from public sewage systems	**$-**	**$-**	$-									No cost
II3.2.8. Promote the efficient conversion of WTE from solid waste disposal sites	**$-**		$-									No costs
II3.3: Promote the use of small renewable generation through the production of a fast track approval process and by streamlining the procedures and standards												

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comment
			Total (USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	Total (USD)	
II3.3.1. Develop procedures and a package of incentives to ensure that renewable energy plants with capacity lower than 15MW can be built on a simplified procedure	**$49,950**	**$18,500**	$18,500	10	2	10	1					
II3.3.2. Support research in renewable energy and provide financing for pilot demonstration projects	**$-**	**$-**	$-									Costs to be assessed at a later stage
II4: Diversification of Energy Sources		**$-**										
II4.1: Promote incorporation of biodiesel		**$-**										
II4.1.1. Promote biodiesel and ethanol substitution in transport sector	**$180,900**	**$67,000**	$37,000	20	2	20	1				$30,000	Dissemination campaign
II4.1.2. Mandate West Indies Oil to accept and start supplying biodiesel	**$27,000**	**$10,000**	$10,000	10	2							
II4.2: Diversify energy sources by type and geographical location												
II4.2.1. Establish and use appropriate procurement guidelines to secure best terms and conditions for long-term contracts for energy supply	**$72,900**	**$27,000**	$27,000	20	1	20	1					
II4.2.2. Continuously monitor and revise existing regulations to make provisions that ensure that adequate inventory levels to cushion any short-term disruption in supply	**$-**	**$-**	$-									No costs as this should be carried out by the Energy Unit
II4.3: Engage in multilateral/regional a/ bilateral partnerships and cooperative agreements that contribute to Antigua & Barbuda energy goals and objectives												
II4.3.1. Align the NEP with foreign policy	**$-**	**$-**	$-									No costs as this should be carried out by the Energy Unit

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comment
			Total (USD)	Local mandays	# of local people	Int'l mand ays	Number of int'l people	Total (USD)	unit price	#	Total (USD)	
II4.3.2. Ensure that funds retained under regional and international accords and programmes are used to meet the goals and objectives of the accords and programmes	**$-**	**$-**	$-									No costs as this should be carried out by the Energy Unit
II4.3.3. Identify multilateral/regional/bilateral partnerships and cooperative agreements and compile a register of those	**$45,900**	**$17,000**	$17,000			20	1					
II4.3.4. Continuously identify multilateral/regional/bilateral partnership and possible cooperative agreements that can be established and update the registry	**$-**	**$-**	$-									No costs as this should be carried out by the Energy Unit
II4.3.5. Research and review relevant publications on energy applications and benchmark against existing technologies	**$-**	**$-**	$-									No costs as this should be carried out by the Energy Unit
II5: Application of emerging technologies												
II5.1: Undertake review of new emerging technologies												
II5.1.1. Develop and prepare (bi-annual) reports on new and emerging technologies	**$453,600**	**$168,000**	$20,000	40	1						$148,000	Printing included (1000 per year). During the next 16 year 8 reports should be published.
II6: Establish policy, enforce laws, regulations and institutions that create equitable and transparent opportunities for all stakeholders in the energy sector												
II6.1: Develop transparent and comprehensive policy framework for the electricity sector and or amend existing legislation												

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comment
			Total (USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	Total (USD)	
II6.1.1. Study the necessity and develop and promulgate a policy for Carbon Emission Trading	**$99,900**	**$37,000**	$37,000	20	2	20	1					
II6.1.2. Develop a new Power Sector Policy and Strategy so that: • Highlights how the utility will achieve the RE targets in the electricity supply mix (it should clearly highlight the role on IPPs in the achievement of its targets) • Identify the process for IPPs to request licences to the Utility for grid connection • It shows that it is obliged to accept all electricity generated from renewable energy sources	**$99,900**	**$37,000**	$37,000	20	2	20	1					
II6.1.3. Review Land Planning Policy to include reserved areas for the development of renewable energies (Renewable Energy Development Areas – REDA)	**$99,900**	**$37,000**	$37,000	20	2	20	1					
II6.1.4. Review the current National Solid Waste Management to: • allow for recycling development and electricity generation from solid waste residues (WTE) and methane; • to include punitive measures to reduce illegal dumping and litter	**$99,900**	**$37,000**	$37,000	20	2	20	1					
II6.1.5. Review related policies for other sectors including transport and tourism and make recommendations to harmonise with the energy policy	**$99,900**	**$37,000**	$37,000	20	2	20	1					
II6.1.6. Develop and operate monitoring and evaluation of energy policy implementation	**$59,400**	**$22,000**	$22,000	44	1							

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comment
			Total (USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	Total (USD)	
II6.1.7. Conduct periodic policy reviews and use the findings to update, refine and develop new policy initiatives	**$74,250**	**$27,500**	$27,500	28	2							
II6.1.8. Establish requirements for new electricity generating plans (over a minimum scale of 1MW) to be approved by a regulator	**$72,900**	**$27,000**	$27,000	20	1	20	1					
II6.1.9. Conduct net metering and tariff reviews and introduce appropriate mechanisms for net metering and standards to encourage the development of renewable energy	**$91,125**	**$33,750**	$33,750	25	1	25	1					
II6.1.10. Review the tariff structure to take into account the impact of the incorporation of RES	**$118,800**	**$44,000**	$40,500	30	1	30	1	$3,500	$3,500	1		
II6.2: Promote a market based approach and increase competition in the sector												
II6.2.1. Cooperate with East Caribbean Energy Regulatory Authority) in setting up the new tariff structure	**$81,000**	**$30,000**	$30,000	30	2							
II6.2.2. Analyse and rationalise the number of existing Acts governing the sustainable development of the country	**$81,000**	**$30,000**	$30,000	30	2							
II6.3: Amend existing legislation and regulations or promulgate new ones where necessary to ensure responsible market behavior	**$-**											
II5.3.1. Review on an on-going basis the existing legal framework for performance, strengths, weakness, and lessons learnt to formulate and implement programmes of legal reforms	**$-**	**$-**	$-									Costs contemplated under strategy 0

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comment
			Total (USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	Total (USD)	
II6.4: Develop and implement a comprehensive regulatory framework for the energy sector												
II6.4.1. Develop the necessary framework for the introduction of diversification fuels	**$99,900**	**$37,000**	$37,000	20	2	20	1					
II6.4.2. Monitor and regulate procurement and pricing of energy products	**$99,900**	**$37,000**	$37,000	20	2	20	1					
II6.4.3. Conduct regulatory impact assessment of relevant existing legislation	**$27,000**	**$10,000**	$10,000	20	1							
II6.4.4. Conduct regulatory impact assessment of proposed regulations	**$13,500**	**$5,000**	$5,000	10	1							
II6.5: Continuously review the existing internal regulatory framework for performance, strengths, weaknesses and lessons learnt while recognizing the implications of external dimensions and formulate and implement programmes of regulatory reform												
II6.5.1. Ensure that the implemented internal regulatory framework conforms with requirements of international agreements and protocols (such as the UNFCCC, Kyoto protocol and other bilateral and international agreements)	**$99,900**	**$37,000**	$37,000	20	2	20	1					
II6.5.2. Adopt and adapt relevant agreed international best practices in regulations	**$99,900**	**$37,000**	$37,000	20	2	20	1					
II6.5.3. Develop institutional frameworks to coordinate policy with energy initiatives and programmes and provide integrated monitoring and enforcement of regulations and standards	**$126,900**	**$47,000**	$47,000	30	2	20	1					

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comment
			Total (USD)	Local mandays	# of local people	Int'l mandays	Number of int'l people	Total (USD)	unit price	#	Total (USD)	
II6.5.4. Assess institutions and determine if there is efficient interactions, adequate resources and skills sets to achieve policy and regulation implementation and to assure monitoring	**$81,000**	**$30,000**	$30,000	30	2							
II6.6: Review and modify national framework and industry structure for the energy sector towards the achievement of the NEP goals												
II5.6.4. Identify industry structures that best facilitate the implementation of achievement of the NEP and other policies objectives	**$-**	**$-**	$-									No cost

Strategy III: Public Education & Awareness

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comments
			Total (USD)	Local man days	# of local people	Int'l mandays	# of int'l people	Total (USD)	unit price	#	Total (USD)	
III1: Develop and Implement programmes to influence market behaviour toward sustainable energy (promote adoption of renewable energy and the efficient use of energy)												
III1.1: Draft and Implement a public consumer awareness and education program and end-use statistics on energy efficiency awareness												
III1.1.1 Develop and implement energy efficiency awareness and information campaigns for homeowners and tenants, focusing on raising awareness on building standards, energy efficiency labeling and replacement programmes for household appliances, efficient lighting and available energy advisory services.	**$756,000**	**$280,000**	$-					$-			$280,000	2 year programme involving: - a team of three locals (1 technical, 1 communication specialist and 1 administrative specialist) = 120000 - organisation of workshops and awareness campaigns = 180000
III1.1.2 Develop information campaigns to promote CFL and/or non-LED lamps to consumers in the residential and commercial sectors	**$244,350**	**$90,500**	$37,000	40	1	20	1	$3,500	$3,500	1	$50,000	Budget for information campaigns. Budget does not include incentives, neither the cost of permanent professional staff of A&B Government / Energy Unit.
III1.1.3 Develop and implement a relevant and sustained public energy information programme and information database with end of use statistics	**$54,000**	**$20,000**	$-					$-			$20,000	The contents created in the above programme are made available in a website. Cost: website design, adaptation of contents and site maintenance

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comments
			Total (USD)	Local man days	# of local people	Int'l mandays	# of int'l people	Total (USD)	unit price	#	Total (USD)	
III1.1.4 Implement end use statistics that promote public awareness of the importance of responsible energy use	**$-**	**$-**	$-					$-				This will be carried out by the Energy Unit and thus included in Strategy 0: Action 01.1.2
III1.1.5 Develop an energy information clearing house/database with end use statistics to illustrate the efficient use of energy	**$113,400**	**$42,000**	$-					$-			$42,000	Work to be done by the Energy Unit and thus salaries included contemplated in Strategy 0: Action 01.1.2. This costs include the house renting for 5 years where EE concept is demonstrated (renting of 700USD was considered)
III1.1.6 Develop and implement effective education and training programmes on energy conservation at all levels of the education system	**$128,250**	**$47,500**	$30,000	60	1			$17,500	$500	35		This includes costs for the development of the curriculum 1 person and costs for excursions to the clearing house by the students (7 excursions per year for 5 years were considered and each excursion would cost around 500USD)
III1.1.7 Develop and implement energy efficiency awareness and information campaigns targeted at customers (tourists) and employees of the tourist sector.	**$244,350**	**$90,500**	$37,000	40	1	20	1	$3,500	$3,500	1	$50,000	Targets are approx. 250,000 tourist / year and an estimated number of 6,000 employees (25% of the workforce of the A&B service sector)

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comments
			Total (USD)	Local man days	# of local people	Int'l mandays	# of int'l people	Total (USD)	unit price	#	Total (USD)	
III1.1.8 Develop and implement awareness and information campaigns for homeowner and tenants in order to raise awareness for policy actions I3.3, I3.4 and I3.5 in the residential sector.	**$244,350**	**$90,500**	$37,000	40	1	20	1	$3,500	3500	1	$50,000	Budget for awareness and information campaigns. Budget does not include the cost of permanent professional staff of A&B Government / Energy Unit.
III1.2: Encourage research development and timely and efficient implementation of renewable energy projects												
III1.2.1 Develop and implement incentives to encourage tertiary institution to develop research programmes for the application and implementation of renewable energy technologies	**$148,500**	**$55,000**	$51,500	35	1	40	1	$3,500	3500	1		Consider that a study to develop incentives will be done which include international and national consultants
III1.2.2 Participate in international research conferences, courses and seminars	**$221,400**	**$82,000**	$-					$82,000	2000	41		Two persons from the Energy Unit, travelling 3 times a year to international conferences and courses during the first 5 years + 1 person travelling to conferences every year from the 5 year onwards (11 years more). 2000 USD was assumed as a general figure for flights, fees and accommodation.
III1.2.3 Establish studentships and scholarships in the field of RE locally and internationally	**$162,000**	**$60,000**	$-					$-			$60,000	6 scholarships to develop a thesis on sustainable energy: 10000 each

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comments
			Total (USD)	Local man days	# of local people	Int'l mandays	# of int'l people	Total (USD)	unit price	#	Total (USD)	
III1.2.4 Incorporate findings from new and adapted research in decisions regarding RE implementation	**$-**	**$-**	$-									This costs are included in the Energy Unit salaries
III1.2.5 Study how Antigua & Barbuda can participate in carbon abatement mechanisms including carbon trading (e.g. Clean Development Mechanism)	**$114,750**	**$42,500**	$39,000	10	1	40	1	$3,500	3500	1		Specific study on the benefits that can be yielded from CDM and other carbon finance should be carried out.
III.2: Capacity Building and Training												
III.2.1: Build Capacity of the Energy Unit in the field of RE and EE												
III2.1.1 Recruit permanent professional staff to be in charge of supervising and coordinating the A&B Governments energy efficiency and renewable energy programmes and measures.	**$-**	**$-**						$-				Contemplated in Strategy 0: Action 01.1.2
III2.1.2 Train permanent professional staff of the Energy Unit in renewable energy and energy efficiency, including RE and energy efficiency technologies, policy and programme formulation and monitoring and evaluation of programmes.	**$151,200**	**$56,000**	$34,000	0	0	40	1	$7,000	3500	2	$15,000	This also include venue two times for 5 days.
III2.1.3 Ensure that adequate incentives are instituted and maintained so as to retain a sufficient level of trained staff	**$-**	**$-**	$-									No costs associated. The salaries and type of work in the Energy Unit should be sufficient for maintaining staff
III.2.2: Train professional staff in relevant public and private sector	**$-**		$-									
III2.2.1 Ensure that adequate incentives are instituted and maintained so as to retain a sufficient level of trained staff	**$-**	**$-**	$-					$-				Can't think of a cost for this

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comments
			Total (USD)	Local man days	# of local people	Int'l mandays	# of int'l people	Total (USD)	unit price	#	Total (USD)	
III2.2.2 Train staff in the fundamentals of renewable energy technology, the principles energy efficiency, energy policy and carbon markets.	**$175,500**	**$65,000**	$25,500			30	1	$3,500	$3,500	1	$36,000	One international expert should be able to givethree courses each of 4-5 days to cover university and gov staff, and some private sector.
III2.2.3 Where necessary, utilise expatriate staffing as appropriate. Particularly, where the lack of skilled professionals and/or manpower acts as a constraint to the development of energy transformation objectives.	**$-**	**$-**	$-									This is already contemplated in the international consultants used for training purposes.
III2.2.4 Educate staff and professionals in the process of managing administrative procedures for Renewable Energy Technology e.g. construction permits, user permits	**$98,550**	**$36,500**	$13,250	26.5	1						$23,250	2 workshops of 1 day per year in the first 5 years, one workshop every two years during the remaining 11 years
III2.3: Systematic inclusion of RE and EE topics in school curriculum												
III2.3.1 Educate students in the fields of EE and RE via including the topics of EE and RE within natural science curriculum in primary, secondary and tertiary level schools.	**$159,975**	**$59,250**	$49,250	30	3	5	1	$2,500	500	5	$7,500	The expert from item 2.1.2 could provide an adapted course for a group of teachers. The teachers would then have to develop educational content to be used in the different school grades. The costs include 5 days of workshop (workshop place by 1500USD/day) + extra days of stay for the international expert (5 days at 500USD/day of per diem) + 3 teachers developing Curriculums for 30 days each

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comments
			Total (USD)	Local man days	# of local people	Int'l mandays	# of int'l people	Total (USD)	unit price	#	Total (USD)	
												for inclusion in the schools
III2.3.2 Introduce an harmonised programme of extracurricular activities for young people in the RE/EE field	**$151,200**	**$56,000**	$-					$56,000	500	112		7 travels per year at 500USD each per year during the implementation of the SEAP
III2.3.3 Systematic inclusion of topics in lifelong learning training programmes, technical/vocational programs and certificate courses	**$321,300**	**$119,000**	$115,500	60	3	30	1	$3,500	3500	1		Design and preparation of courses.
III2.3.4 Educate and train science teachers and lab technicians on the fundamentals of RE/EE for dissemination to students	**$-**	**$-**	$-					$-				This is already covered in III2.2.2
III2.3.5 Ensure an adequate number of knowledgeable local personnel entering the RE/EE field on a revolving basis from secondary and tertiary level schools	**$-**	**$-**	$-					$-				No costs
III2.4: RE installers certification programmes												
III2.4.1 Set up a system for certifying installers to ensure high quality work during project implementation	**$480,600**	**$178,000**	$93,500			110	$1	$82,500	1500	55	$2,000	2 classes per year * 5 days per class * 2 years + 2000 usd for equipment. 1 classe every two years*5*days during the rest of the SEAP
III2.5: Energy auditing and management programme	$-											

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comments
			Total (USD)	Local man days	# of local people	Int'l mandays	# of int'l people	Total (USD)	unit price	#	Total (USD)	
III2.5.1 Develop and implement a training programme for energy auditors and managers from the public and private sectors, including energy service providers	**$491,400**	**$182,000**	$128,000	60	2	40	2	$14,000	3500	4	$40,000	Includes training needs assessment, setting up the training programme and 4 training courses of about one week each.
III2.5.2 Develop and implement a certification scheme for energy auditors and managers	**$164,700**	**$61,000**	$54,000	40	1	40	1	$7,000	3500	2		Budget for development of the certification scheme. Scheme to be implemented and continued by professional staff of Energy Unit.
III2.6: EE in the transport sector												
III2.6.1 Develop and implement an information campaign for car drivers and maintenance professionals regarding energy efficient driving and maintenance practices.	**$244,350**	**$90,500**	$37,000	40	1	20	1	$3,500	3500	1	$50,000	
III2.6.2 Provide training to drivers of buses and taxis on energy efficient driving practices.	**$299,700**	**$111,000**	$74,000	40	2	40	1	$7,000	3500	2	$30,000	Budget includes costs of 3 - 4 training workshops for bus and taxi drivers.
III2.7: Articulation with other programmes and initiatives in the region	**$-**											
III2.7.1 Articulate RE and EE training and education programmes with other programmes in the region	**$-**											No Costs. This is included in the duties of the Energy Unit
III3: Undertake public information sessions for the general public and target groups about support measures												
III3.1: Raising public awareness and acceptance												

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comments
			Total (USD)	Local man days	# of local people	Int'l mandays	# of int'l people	Total (USD)	unit price	#	Total (USD)	
III3.1.1 Work with related partners to develop and/or promote energy training events and education materials for the public	**$-**	**$-**	$-									No costs are assumed
III3.1.2 Promote EE/RE in cooperation with local communities to inform citizens of the benefits and practical aspects of the development and use of these technologies to achieve developmental targets	**$40,500**	**$15,000**	$-					$-			$15,000	A flayer in the electricity bill regarding EE and RE
III3.1.3 Placement of pilot EE/RE projects at the community level to engender support from citizens whilst allowing for greater access to the technology as an educational tool; thus reinforcing capacity and confidence.	**$135,000**	**$50,000**	$-					$-			$50,000	10 PV pilot projects in schools and Gov. buildings. Without local data is difficult to estimate costs and sizes. Assumption: 5000usd per 2-3kWh systems If there are systems available in the market, maybe try micro wind turbine.
III3.1.4 Develop a strategic awareness and marketing plan for renewable energy production, targeted on the general public, municipal and local authorities, commercial and public services, industry, households, agriculture and the energy distribution sector.	**$81,000**	**$30,000**	$-					$-			$30,000	No Costs. This is included in the duties of the Energy Unit

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comments
			Total (USD)	Local man days	# of local people	Int'l mandays	# of int'l people	Total (USD)	unit price	#	Total (USD)	
III3.1.5 Provide project information and promotional materials on economically viable projects identified in A&B to prospective local, regional and foreign investors	**$15,000**										$15,000	Flyers developed whenever new projects enter in production. The costs of developing the flyers are included in the Energy Unit Salaries
III3.1.6 Provide on-going communication and updates on energy initiatives to the public using targeted information campaigns which will be carried out on different levels (national, regional and municipal) through public television, radio broadcasting systems and newspaper/media.	**$108,000**	**$40,000**	$-					$-			$40,000	Updates should be done on the website of the Energy Unit, and on TV. $40000 were allocated for TV spots/newspaper
III3.1.7 Support and promote events/seminars/conferences/workshops that focus on RE/EE and successful projects which can be shared with the public	**$-**	**$-**	$-					$-				No Costs. This is included in the duties of the Energy Unit
III3.1.8 Promote residential use of PV and wind turbines systems including development and distribution of wind and solar radiation maps	**$40,500**	**$15,000**	$-					$-			$15,000	Guide with simple rules regarding the identification of suitable sites should be prepared and distributed. The costs for preparing the guide are assumed to be included in the Energy Unit salaries
III3.1.9 Promote the use and benefits of solar water heaters by having road shows and grass-root advertising campaigns showcasing the financial benefits of these systems	**$43,200**	**$16,000**	$-					$12,000	4000	3	$4,000	Plus rental of a van for 3months (4000) and equipment (4000) for demonstrating the technology.

Measures and Actions	Budget (East Caribbean Dollars)	Budget (USD)	Estimated personnel costs to implement the action/measure					Estimated Expenses and Consumables to implement the action/measure			Other estimated implementation costs	Comments
			Total (USD)	Local man days	# of local people	Int'l mandays	# of int'l people	Total (USD)	unit price	#	Total (USD)	
III3.2: Identify and promote funding assistance programs for the public												
III3.2.1 Encourage local banks, through capacity building, training and incentives, to provide loans and equity for the installation of small solar and wind devices to homeowners and small businesses.	**$107,325**	**$39,750**	$29,750			35	1	$7,000	3500	2	$3,000	Training programme directed at financial institutions. Includes analysis of the market, preparation of workshops and 2 workshops of 1 day with financial institutions.
III3.2.2 Institute rolling public awareness sessions on various available financing opportunities for homeowners, businesses and private investors in Antigua and Barbuda who are interested in investing and/or installing renewable energy technology	**$54,000**	**$20,000**	$15,000	15	2			$-			$5,000	10 half-day workshops across the islands. Use of local staff. 500usd per workshop for food and drinks
III3.2.3 Research EE/RE related loans, grants, rebates and incentives for homes and businesses	**$-**	**$-**	$-					$-				No cost. Part of the duties of the Ministry of Finance and the energy unit

ANNEX III – POTENTIAL SOURCES OF FUNDING

There are several potential sources of funding that Antigua & Barbuda can access to finance the implementation of the activities highlighted in the SEAP. The following sources of funding are described below:

1. Global Environmental Facility (GEF);
2. The Organisation of American States (OAS);
3. The Inter-American Development Bank (IDB);
4. PETROCARIBE;
5. United Nations Development Programme (UNDP);
6. Deutsche Gesellschaft für Internationale Zusammenarbeit(GIZ)
7. European Commission Financing (EU);
8. World Bank;
9. The Agence France de Development (AFD), Fonds Francais pour l'Environnement Mondial (FFEM) and French Environment and Energy Agency (ADEME);
10. West Indies Power Holding BV;
11. Environmental Foundation of Jamaica (EFJ);
12. Inter-American Foundation (IAF);
13. Petroleum Corporation of Jamaica (PCJ);
14. Food and Agriculture Organisation of the United Nations (FAO); and
15. Department for International Development (DFID).
16. Caribbean Development Bank (CBD)
17. IRENA
18. China
19. CCCCC/SIDS-DOCK
20. KfW Development Bank

Examples:

Global Environment Facility

Who is the GEF?

The GEF, established in 1991 as a pilot project in the World Bank, is an independent financial organisation devoted to providing support to developing countries, in the form of financing, for projects related directly to biodiversity, climate change and renewable energy, land degradation, the ozone layer, and persistent organic pollutants.

'As the financial mechanism of the UNFCCC, GEF allocates and disburses about $250 million dollars per year in projects in energy efficiency, renewable energies, and sustainable transportation.'[3]

[3] Global Environment Facility: http://www.gefweb.org/interior.aspx?id=232

As the particular goal of the GEF speaks to the provision of sustainable, affordable electricity services while meeting respective efforts in climate change targets, projects committed to **Climate Change Mitigation** and **Climate Change Adaptation** are the two main financial mechanisms available from the GEF. Projects under these actions must address:

a) The role of Renewable Energy, Energy Efficiency and Sustainable Transport in the reduction (and/or avoidance) of Green House Gas (GHG) emissions.
b) Research and Intervention into projects which will complement efforts undertaken by the UNFCC. These include the implementation of capacity building exercises, new low GHG technologies and the submission of National Communications which includes a report on national inventories of GHGs.

This facility articulates the need for strengthened practices in energy conservation, renewable technology investment and climate change prevention; and as such, is the largest provider of funding for projects, through contingent loans and grants, which encourages the use of small scale, stand-alone systems, which produces a two-pronged outcome:

a) The improved provision of electricity services to the rural community
b) Expansion of the use of Renewable Energy Technology (RET) due to improved affordability through the supplementary funds provided by the GEF.

What is the Role of the GEF in the Caribbean?

The GEF's presence in the Caribbean is mainly experienced through the establishment of the Caribbean Renewable Energy Technical Assistance Facility (CRETAF). CRETAF collaborates with the Caribbean Renewable Energy Fund, which is a GEF sponsored loan facility. CRETAF supplies early stage loans for renewable energy project preparation in the form of grant financing to countries participating in the Caribbean Renewable Energy Development Programme (CREDP). The GEF funded approximately US$1.3million to support this program.[4]

The GEF also supported the first project of the Caribbean Community. The Caribbean Planning for Adaptation Global Climate Change project (CPACC) supports pilot vulnerability assessments in Barbados, Grenada and Guyana, support capacity training, monitors sea level and climate change in 12 Caribbean nations. This project has been followed with the ongoing Mainstreaming Adaptation to Climate Change project which seeks to further develop the knowledge garnered from CPACC.

The Organisation of American States (OAS)

Who is the OAS?

The OAS was established in 1948 to achieve the guiding principles of democracy, human rights, security and development amongst its member states.

In an effort to promote development mechanisms, all OAS states have recognized that access to affordable energy is one of the main drivers for socio-economic growth. In the forum of energy, the OAS has established strategies to assist member states in achieving developmental goals.

Out of this recognition and collaboration between the OAS and the Department of Sustainable Development (DSD), the **Sustainable Energy Partnership of the Americas (SEPA)** and the **Renewable Energy in the Americas (REIA)** initiatives were established.

[4] CRETAF: http://www.caricom.org/jsp/projects/cretaf.jsp?menu=projects

SEPA was initiated from the DSD's Energy and Climate Change Division and was designed to support and contribute to[5]:

a) the advancement of energy security
b) the reduction of the impact of fossil fuels market fluctuation
c) the lowering of carbon emissions throughout the region by generation and strengthening regional markets for cleaner and renewable energy, and fostering the exchange of information and experiences pertaining to sustainable energy.

In order to meet these developmental goals, a plan of action has been developed by the Energy and Climate Change Division. Objectives include:

a) Developing an enabling environment by encouraging private-public investment. This increases the availability of funding for initiatives that promote renewable energy and energy efficiency projects.
b) Building adequate governance and regulatory frameworks so as to improve market conditions for these initiatives
c) Supporting the development of human and institutional capacity essential for research and development into the use and management of sustainable energy system.

REIA was created in 1992 by a consortium of US, Latin America and Caribbean (LAC)[6] interests to increase access to modern, sustainable energy services by focusing on renewable energy solutions as well as energy efficiency practices.

The objectives of the REIA include:

a) To identify and promote viable renewable energy and energy efficiency project opportunities in the LAC region.
b) to provide technical assistance and training on matters related to sustainable energy development.
c) To develop and assist in accessing innovative financing mechanisms suited to the technical characteristics of renewable energy and energy efficiency.

What is the role of the OAS in the Caribbean?

The OAS has played many roles in the development of policy frameworks, information platforms and public-private financing mechanisms. So far, the OAS has been responsible for:

a) **Caribbean Sustainable Energy Program (CSEP)** – established to accelerate the transition to sustainable energy and address several barriers to RE establishment in seven LAC project countries. The OAS has partnered with CARICOM, CREDP, CARILEC and REEP from November 2008 to October 2011 to ensure the success of this program.
b) **Geo-Caraibes Project -** will implement a regional strategy that will create the conditions for successful deployment of commercially viable geothermal power production and overcome the barriers to the development of geothermal power in the three Project Countries.
c) **Global Sustainable Energy Islands Initiative (GSEII) –** is jointly administred by the Climate Institute, Organization of American States, Winrock International, Counterpart International, Energy and Security Group and the International Network for Sustainable Energy in Denmark. The Global Sustainable Energy Islands Initiative (GSEII), a consortium of

[5] Sustainable Energy Partnership for the Americas, Program Description - http://www.sepa-americas.net/quienes_somos.php?ID=3

[6] These include the nations of: 1) St. Vincent and the Grenadines 2) Barbados 3) Trinidad and Tobago 4) US Virgin Islands 5)Grenada 6) Guyana 7) Dominica 8) St Kitts and Nevis 9) St Lucia 10) Brazil 11) Peru 12) Chile 13) Bolivia 14) Argentina 15) Costa Rica 16) Guatemala 17) Nicaragua 18) Honduras

international NGOs and multi-lateral institutions, has been organized to support the interest of all small island states and potential donors by bringing renewable energy and energy efficiency projects, models, and concepts together in a sustainable plan for small island nations The GSEII is currently focused on the Caribbean nations of St Kitts and Nevis, Dominica, Grenada and St. Lucia. Thus far, the GSEII has assisted St Lucia in formulating the National Sustainable Energy Plan 2001 and is committed to assisting other island nations in energy developmental goals.

d) **Promotion of bio-fuel projects in the Caribbean** – The OAS along with the International Development Bank, Inter-American Institute for Cooperation on Agriculture(IICA) and the Government of Guyana (GoG) signed an MOU in 2007 which stated that the parties agree to explore ways in which sustainable energy and biofuel projects can be promoted and financed in the Caribbean region.

The Inter-American Development Bank (IDB)

Who is the IDB?

The IDB was established in 1959 in the LAC region and is currently the main source of multialateral funding. The IDB Group consists of the Inter American Investment Corporation (IIC), and the Multilateral Investment Fund (MIF) provides solutions to development challenges by partnering with public and private sector, thus reaching its clients ranging from central governments to city authorities and businesses.

The IDB lends money but also provides grants. It also offers research and consultancy support in key developmental areas crucial to the Caribbean. (education, agriculture, energy). One of the priority initiatives for the IDB in LAC is the Sustainable Energy and Climate Change Initiative (SECCI). The goals of the SECCI include:

- Renewable Energy and Energy Efficiency development
- Sustainable Biofuel Development
- Access to Carbon Markets
- Adapation to Climate Change

What is the role of the IDB in the Caribbean?

Since 2001, the IDB has financed approximately US$2 billion in energy efficiency and renewable energy projects in Latin America and the Caribbean. Recent projects in the scope of SECCI include:

a) Promotion of Energy Efficient Residential Lighting in Bahamas (2009)
b) Strengthening the Energy Sector in the Bahamas (2009)
c) Support to promote energy efficiency, energy conservation and sustainable energy Jamaica (2009)
d) Wind and Solar Development program Jamaica (2009)
e) Unserved Areas Electrification Program Guyana - (2007)

PETROCARIBE

Who/What is Petrocaribe?

The Petrocaribe organisation was established in 2005 as a compartment of the Caracas Agreement, and is an energy cooperation agreement between the Government of Venezuela and twelve[7] of the fifteen members of CARICOM, Honduras and Guatemala. This agreement allows for members to

[7] Antigua and Barbuda, Bahamas, Belize, Cuba, Dominica, Dominican Republic, Grenada, Guyana, Jamaica, Nicaragua, Suriname, St Lucia, St Kitts and Nevis, St Vincent and the Grenadines

purchase oil on conditions of a preferential payment. The deal functions by a means of a discount whereby contracting countries are required to pay a percentage of the market price, with the remaining cost converted into long term, low interest loans. When market prices rise above US$50 per gallon, as they are now, participating countries will receive a 40 percent discount that will accrue as a 25-year, 1 percent interest loan. If prices rise above US$100, this discount will rise to 50 percent. The agreement involves the refining of crude oil from Venezuela shipping to Caribbean states, possibly in Petrocaribe owned/contracted vessels wholesaling to existing retailers and even undertaking retailing where necessary. The payment system allows for a few nations to buy oil at market price and pay 75% of the purchase price within 30 days. The remaining 25% is paid over 15 years with one year's moratorium at an interest rate of 2% per annum. This agreement is reviewed annually.

What is the role of PETROCARIBE in the Caribbean?

In June 2009, at the 6th Petrocaribe summit, the strengthening and pace of adoption of alternative energy sources, energy efficiency measures was part of the accord that was put forth by the summit.

In light of this, The Jamaican government is waiting for final approval on funding approved by PetroCaribe for 13 renewable energy and efficiency projects on the island; one of which is solar powered street lighting. The funding, which totals US$160 million, will be offered either as soft loans or grants, depending on decisions reached at the PetroCaribe Summit, which has not yet been officially scheduled.

Additionally, there have been some strides in developing geothermal power in Honduras and Nicaragua. The ALBA Caribe bank, initiated from the Petrocaribe accord, has allowed member states to invest in $222 million in social and energy development programs. These include the installation of 10 million compact fluorescent lightbulbs in Dominican Republic and 1.8 million in Nicaragua.

United Nations Development Programme (UNDP)

Who is the UNDP?

The UNDP is the development program conducted by the UN. The UNDP is committed to finding solutions for and developing on a global scale:

a) Democratic Governance
b) Poverty Reduction
c) Crisis Prevention and Recovery
d) Environment and Energy
e) HIV/AIDS

The UNDP is committed to setting and meeting developmental goals in developing nations by focusing on the key developmental issues highlighted above. The UNDP also assists developing nations in attracting and utilising aid effectively.

UNDP's work on Energy and the Environment focuses mainly on:

a) Framework for strategie and sustainable development
b) Effective water governance
c) Access to sustainable energy services
d) Sustianable land management to combat desertification and land degradation
e) Conservation and Sustainable use of biodiversity

The activities pursued by the UNDP to achieve these objectives concentrate on the strengthening of capacity to address the dynamic energy sector which has also initiated climate change reservations.

The UNDP assists governments to address issues on a global and national level by seeking out and sharing best practices, providing policy advice and creating a database to share projects to establish a community of learning and linkages.

What is the role of the UNDP in the Caribbean?

The UNDP has supported major Renewable Energy transitions in the Caribbean with the development of major database platforms and programs. By partnering with CARICOM and the GEF, the UNDP was able to launch the bio-energy page on CIPORE; the Caribbean Information Platform on Renewable Energy. The Caribbean Renewable Energy Development Program (CREDP)1998 is also part funded by the UNDP. This program is an initiative of the energy minister of CARICOM and is devoted to change the market environment for Renewable Energy in the Caribbean by reducing political, market and financing barriers.

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

What is the GIZ?

This facility is an international cooperation enterprise for sustainable development with a global focus. The GIZ is dedicated to promoting sustainability in all nations. The scope of 'sustainability' includes:

a) Supporting economic growth for more prosperity in partner countries
b) Ensuring equal opportunities amongst social classes
c) Using natural resources for the benefit of present and future generations.

The GIZ assists in the formulation of regulatory framework and human and institutional capacity to meet the goals and company concept of 'sustainable development'. The facility works at government level as well as associations, industry, local populations and international donors. As renewable energy and energy efficiency falls under the umbrella of 'sustainable development', GIZ is also committed to providing solutions for developing countries with interests in harnessing natural resources to meet daily needs.

What is the role of the GIZ in the Caribbean?

The GIZ has played an important role in the development of the CREDP. The GIZ was also successful in their 'Sustainable, fair and equitable globalization' project which was lead by the United Nations Economic Commission for Latin America and the Caribbean (ECLAC). The facility was able to achieve results in sustainable development, integrated management of natural resources and dealing with climate change.

The GIZ was also responsible for the first wind assessment conducted in Dominica in 2003, where specific sites in the North-East were identified, but the Government was warned of interconnection and distribution issues. This facility was also conducted similar studies in Grenada and St Vincent. The GIZ was a major player in the advisory service presented to the Government of Guyana with respect to biofuels and Jamaica's renewable energy policy.

European Commission Financing (EU)

The European Commission is committed to meeting Millennium Development Goals by contributing, by way of financing development projects, in developing countries. By tackling poverty, boosting local economies and strengthening governance in the weakest of nations, the support provided by the EU is used so as to secure the long-term future of developing countries.

The European Development Fund (EDF) is the main facility for providing aid for enhancing development in African Caribbean Pacific (ACP) countries and Overseas countries and territories

(OCT). The European Commission finances most if its developmental programs through the EDF with contributions totalling 22.7billion euro for the period of 2008-2013.

What is the role of the EU in the Caribbean?

In 2008, the Caribbean Forum of African Caribbean and Pacific (ACP) States (CARIFORUM) and the European Commission, signed a Financing Agreement totaling US$ 2.45 million to support the Caribbean Region in the Sustainable Management of its Energy Resources. As part of this total, CARICOM is contributing US$ 200,000.

The project seeks to:

a) Increase capacity development in the Caribbean region
b) Increase investment into renewable energy projects
c) Exploiting carbon trading investment opportunities

Dominica has benefitted from EU funding under its 'Geothermal Energy Development in the Caribbean' project. This project seeks to explore the geothermal energy potential in Dominica based upon the results of an OAS Study conducted in 2005.

European contributions to Caribbean efforts in renewable energy are also felt through the Euro-Caribbean Forum which is committed to assisting in the Caribbean region by:

a) Sharing information and results derived from RET projects including replication of European experiences
b) Indentifying potential RE projects in the Caribbean
c) Promoting trade in RE devices and systems

World Bank

The World Bank is an avid supporter of renewable energy development in developing countries. For the year 2009, the World Bank reached record high investments for new renewable energy and energy efficiency with loans totalling US$3.1billion. The World Bank comprises of two institutions: **the International Bank for Reconstruction and Development (IBRD)** and the **International Development Association (IDA).** The bank provides low interest loans, interest-free credits and grants to developing countries to support projects aimed at enhancing growth on a national scale.

By focusing on achieving the Millennium Development Goals the Bank delivers technical, financial and other assistance to those most in need of guidance and where it can make the greatest impact and promote socio-economic growth.

What is the role of the World Bank in the Caribbean?

The World Bank has supported many projects geared towards Climate Change and Renewable Energy Sector development in the Caribbean. In 2003 the World Bank launched the Mainstreaming Adaptation to Climate Change Project for LAC countries. As SIDS are most vulnerable to the effects of Climate change, the world bank accepted the tasks of preparing the Caribbean islands of the associated and projected impacts of climate change and continued increases in carbon dioxide emissions.

The Agence France de Development (AFD), Fonds Francais pour l'Environnement Mondial (FFEM) and French Environment and Energy Agency (ADEME)

These French institutions are the main funding agencies currently responsible for geothermal feasibility, development and interconnection standards in Dominica. These three agencies are multi-lateral international funding agencies providing structured grants and loans for the development of projects enabling growth in developing countries.

West Indies Power Holding BV

This is a Caribbean based IPP specializing in Geothermal development. WIPH is owned by Caribbean and European shareholders and is registered in the Netherland Antilles. WIPH is in charge of geothermal development in Nevis and Dominica. The first geothermal power plant in Nevis is expected to be completed in 2010.

Environmental Foundation of Jamaica (EFJ)

The EFJ was established in 1993 between the Government of Jamaica and the US, with the prime role as supporter and promoter of sustainable activities which are geared towards the conservation and management of natural resources. To date, the facility has approved 1,134 projects to the tune of US$24 million.

In the year 2008-2009, the EFJ has supported projects with an alternative energy focus; the main project being the Mango Valley and Dallas Castle Farmers. The funds obtained from the EFJ were used to implement solar and biogas energy systems. This in turn provided light and power from their agro-processing industries.

Inter-American Foundation (IAF)

This facility is an independent agency of the US government that provides grants to nongovernmental and community-based organizations in Latin America and the Caribbean for innovative, sustainable and participatory self-help programs. The IAF provides grants and fellowships under the following opportunities:

a) Investment into grassroots development as part of the community community's outreach or objectives.
b) Partnership with the Institute of International Education (IIE) to supply fellowships which support dissertation work by candidates for PhD programs in the US.

What is the role of the IAF in the Caribbean?

Thus far, the IAF has provided parallel funding alongside the EFJ, Jamaica to support the introduction and implementation of alternative power generation for cottage industries in 2009.

Petroleum Corporation of Jamaica (PCJ)

Is a Jamaican Statuatory corporation, which operates under the Ministry of Energy and Mining with the exclusive rights to explore for oil, to develop and manage Jamaica's petroleum and natural resources. However, since 1995 the PCJ has been mandated to develop indigenous renewable energy resources to prevent adverse effects on the environment and to assist the Government in realizing the goals of Jamaica Energy Sector policy. As such the PCJ has supported renewable energy development by:

a) Implementing the Energy Conservation Incentive in Schools in 1993
b) Commissioning the Caribbean's first large Wind Farm, Wigton with a capacity of 20.7MW.
c) Establishing the Centre of Excellence in Renewable Energy in 2006 which is mandated to develop and diversify Jamaica's energy mix with the use of RE, research, education and demonstration of new technologies and methods.

As such, the PCJ has partnered with the IDB in 2009 to commence a three year study on wind and solar options for Jamaica. PCJ is contributing 22% of total costs of this project amounting to US$230,000.

Food and Agriculture Organisation of the United Nations (FAO)

The FAO supports the implementation of sustainable energy practices that will protect the natural resource base which will halt the actions of natural resource degradation, increase conflicts over

scarce resources etc. The FAO of the UN supports both developed and developing countries in battling hunger as well as modernising and improving agricultural practices.

The Natural Resource and Environment department is committed to developing and sharing technical and policy advice and knowledge to promote sustainable use of the earth's resources in agricultural and bio-energy efforts.

As such, the FAO partnered with the EFJ in 2008 to assist in funding the Dallas Castle & Mango Valley Farm Group with solar and biogas energy systems which will enhance the farming and energy practices of these two communities.

Department for International Development (DFID)

The DFID was installed by the UK government in 1997 to assist in meeting international and national targets:

a) Millennium Development Goals of 2015
b) UK Government's Public Service Agreements

As such the DFID works to relief the effects of poverty in developing nations all over the world. To achieve this, the DFID works with a wide variety of international bodies, organizations, charities and NGOs including the World Bank, United Nations, As such 40% of DFID funding is distributed through multi-lateral agencies.

In terms of renewable energy services, the DFID has played a major role in the Caribbean Island of Montserrat providing support services in the form of procurement and exploration services to determine the geothermal and wind potential in the island.


Goat Point
Rabbit Island
Goat Island
Kid Island
Atlantic Ocean
The Caves
3 mi
3 km
Cedar Tree Point
Man of War Island
The Highlands
Codrington Bay
Codrington
Caribbean Sea
Barbuda
Palmetto Point
Martello Tower
The Castle
Coco Point
Spanish Point
Antigua
Dickenson Bay
Runaway Bay
Cedar Grove
Long Island
International Airport
North Sound
Guiana Island
Ft. James
Crump Island
Potters Village
Five Islands
St. John
Parham
Nonsuch Bay
Golden Grove
Betty's Hope
Willikies
Green Island
Jennings
All Saints
Bolands
Potworks Dam
Jolly Harbour
Bethseda
Crab Hill
Mount Obama
Liberta
Freetown
Half Moon Bay
Johnson's Point
Falmouth
English Harbour
Old Road
Willoughby Bay
Caribbean Sea
Rendezvous Bay
Nelson's Dockyard