Climate Change & The Socio Economic Environment

-What is the Bottom Line ?-

ENERGY

Petroleum Corporation of Jamaica

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Presentation Outline

- Energy Sector Background
- Socio - Economic Impacts
- Emissions Reductions
- The Bottom Line

Jamaica's Energy Situation

- Great dependence on imported oil, accounting for over 90% of its total energy use
- Exposed to oil price volatility and supply security issues, which threaten long term economic stability
- From 1998 to 2006 petroleum import bill increased from US$323 million to US$1.7 billion.
- Only 7% of the nations energy is obtained from Indigenous sources

Jamaica's Energy Imports & Bill

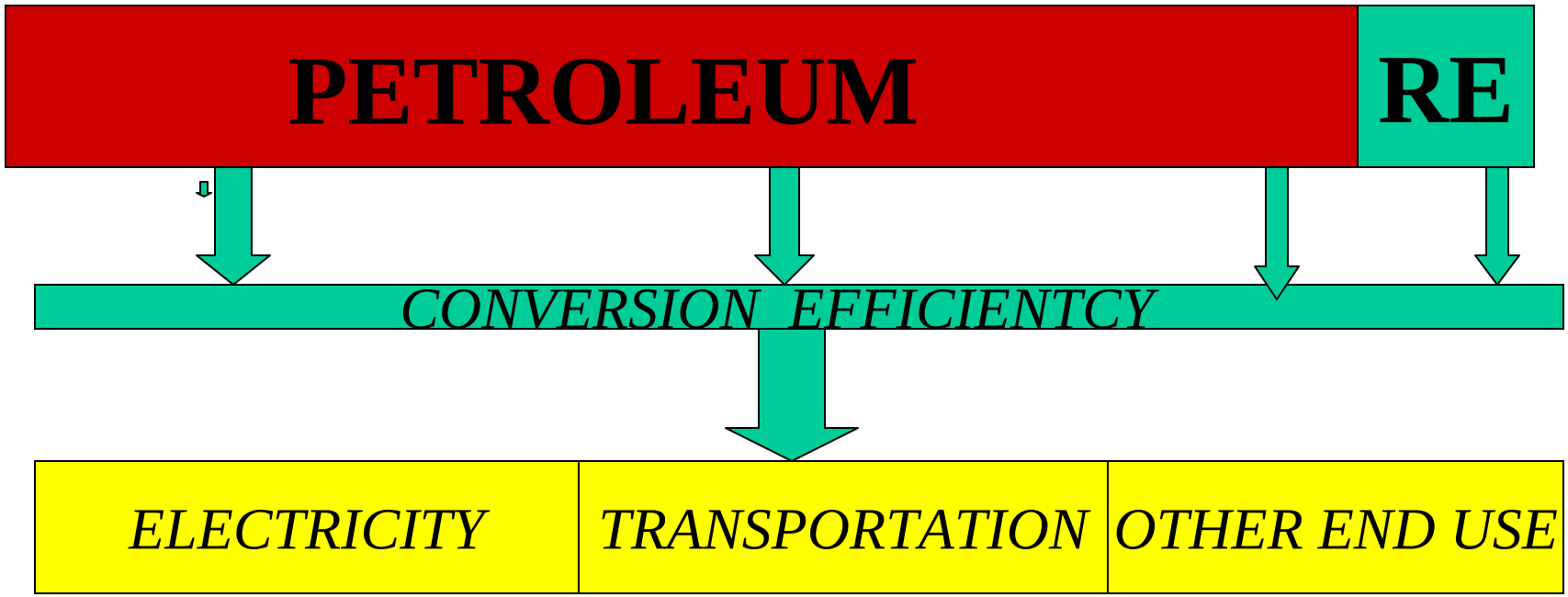
Year	Imported Petroleum Volume ('000,000 bls)	Value (US$ million)	Avg price ($/bls)
1997	22.5	444.1	19.74
1998	22.8	323.0	14.17
1999	23.2	431.1	18.58
2000	24.4	688.1	28.20
2001	24.8	596.0	24.03
2002	25.2	640.7	25.42
2003	27.1	813.1	30.00
2004	26.1	943.4	36.15
2005	26.2	1.3 billion	49.62
2006	28.6	1.73 Billion	64.43

Jamaica's Energy Policy 2006 – 2020 (Green Paper)

Objectives of the Policy:

- Security of energy supply
- Energy diversification
- Energy efficiency & conservation
- Environmental protection
- Maintaining a competitive market environment

Jamaica's Energy Supply and End Use



Electricity Sector

IMPACTS: CLIMATE CHANGE, SOCIAL AND ECONOMIC

Power Generation	**Attribute:** • Inefficient conversion • 95% is based on fossil fuel • Emission of $C0_2$ & NO_x which are GHG's • Direct link to climate change

Social & Economic Impacts:

- Supplies the Industrial, Commercial and Residential demand
- Essential engine for Ecomomic growth and development

Electricity Sector

Transmission and Distribution Systems	**Attributes:** • Losses of over 20% • Reaches all Industrial and Commercial demands • over 90% of residential demand

Socio Economic Impact:

- Good access to the means of production and convenient energy form
- Higher Energy Costs
- High theft of electricity
- Increased GHG's emissions due to higher Generation Req.

Transportation Sector

Public Transportation:	**Attributes:** • Inadequate Public System • Greater emissions of GHG's • Challenged road network (local) • Improvement in National road infrastructure

Opportunities:

- E-10 – Substitute up to 10% gasoline with ethanol
- Transform the sugar industry to a Cane industry (Biomass)
- Ethanol - environmentally friendly fuel
- Car Pooling (reduction of carbon footprint)
- Leaverage the telecommunication Infrastructure (telecommute)

Transportation Sector

Policy Issue:
Need for more diesel-powered engines, flex fuel versus gasoline

Recommendation:
Implement a lower tax on the more efficient diesel powered engines to increase the proportion of diesel-powered vehicles
Economy of scale is important for the introduction of flex fuel

Opportunities:

- Reduce imported fuel consumption and by extension, reduce GHG emissions
- Development of the Bio Diesel Industry
- Opportunities for growth in various agrcultural crops leads to greater employment

Renewable Energy

Development of indigenous energy resources	**Attributes:** • Reduction and elimination of GHG's • Removes dependence on imported fuel • Institutional focus • Forces efficient use of the resource

Opportunities:

- Distributed (onsite) Generation,
- Reduction of T & D losses
- Private sector investment in R.E (smaller individual projects)
- Reduction in GHG emissions (+ve impact on climate change)
- Trading Carbon Credits to enhance economic viability of projects

Renewable Energy Contribution to Electricity Sector

YEAR	PERIOD TARGET	CUMULATIVE TARGET
2005	5.6%	5.6%
2007	6.5%	6.5%
2010	3.5%	10%
2020	5%	15%

Renewable Energy Potential in Jamaica

Source	Existing Capacity	Estimated Potential
Wind	20.7 MW	60 MW
Hydro	23.8 MW	81.7 MW
Bagasse	940,000 boe	68 MW
Bio ethanol	40 million gallons	91 million gallons
Waste-to-energy		55 MW est.
Biogas	840 – 6,300 MWh est.	TBD
Solar	3 MWh est.	75 – 100 MWh
Photovoltaics	600 w est.	1.0 MW

Opportunities under Kyoto Protocol

- Jamaica signed the United Nations Framework Convention on Climate Change (UNFCCC) in 1995 and ratified the Kyoto Protocol in February 2005
- PCJ's Centre of Excellence for Renewable Energy has identified 700,000 tons of CO_2 that could be developed for Trading under the Clean Development Mechanism.
- Wigton Wind Farm Ltd. presently trades its Carbon Emission Reductions (CER's).

Clean Development Mechanism and Wind

- Average data pollutant savings per kWh from wind versus conventionally generated electricity are: 862 g CO_2 , 10 g SO_2 , 3 g NO_2 (BWEA, 1998)
  - The CO_2 savings are most significant
- There is a market for trading of CO_2 avoided as a result of operating renewable energy facilities
- WWF has been registered as a CDM project and has been trading its certified emission reductions (CERs).
- Cost : 5.5 Euros per ton of carbon dioxide saved between 2004 and December 2012
- US$ 3.1 million to be earned over nine years by generating electricity from wind

Energy Efficiency and Conservation

Policy Issue:
Need to improve energy efficiency and practice conservation.

Attributes:
- Reduction in Energy use leads to reduced GHG emissions
- Utilize renewable energy technology where appropriate
- Instills discipline in the use of energy

Opportunities:
- Promulgate national energy efficiency building codes

Residential and Home Owners Opportunities

- Promotion of the use of solar water heaters
- Efficient use of major household appliances
- Expanded use of Compact Fluorescent Lamps (CFL)
  - CFLs consume 70% less energy than incandescent bulbs
  - Last 10 times longer (8000-10,000 hrs.)
- Use of Photo Voltaic to get electricity from the Sun
- Use of small wing turbines
- Use of Methane from a bio- digester

Commercial, Institutions and Small Business Opportunities

- Use of high efficacy flourescent tubes and electronic ballasts
- Use of timers to reduce operating time for air conditioners
- Power factor correction
- Use of bio digesters to convert organic solid waste to Methane
- Use of efficient machines in the production process
  - Results in lower operating costs to the business and saves energy

Industrial and Large Commercial Users Opportunities

- Cogeneration
  - To get multi- End Use of Energy from one source
- Power factor correction
- Time-of-use electricity billing

Resulting in greater Economic benefit to Industry

Government and Public Sector Opportunities

- Power factor correction for NWC
- High efficiency electric motors for NWC
- Water pumping by wind power and Hybrid wind/solar solutions
- Time-of-use billing for irrigation pumps
- Retrofitting of all hospitals, health centres and educational institutions for which energy audits were carried out
- Lighting and air conditioning efficiency upgrade

ALL RESULTING IN GREATER ECONOMIC IMPACT AND MAKING A CONTRIBUTION TO REDUCED GHG.

Energy Efficiency Initiatives

UNDP/GOJ Programme of Environmental Management in Hospitals and Schools

- Implementation of energy efficiency and water conservation measures in 4 public hospitals
- Energy audits for 23 other hospitals
- Energy audits for 10 health centres
- Energy audits for 8 educational institutions

What is the Bottom Line?

Improved profits can be realized from the following:

- Cogeneration in the sugar and electricity sectors
  - Increased use of Bio-mass
- More widespread use of natural gas in the electricity sector
- Employ energy management strategies
- Utilize renewable energy resources
- Use high efficiency motors or switch to less carbon intensive energy sources for water distribution
- Transportation planning and vehicle rationalization
  - Car Pooling
- Exploit opportunities for carbon trading

Conclusion

Energy efficiency and conservation combined with the use of renewable energy solutions:

- is essential in realizing greater economic benefits,
- satisfying the social demands for energy
- while making a positive contribution to the reduction of GHG's and
- impacting positively on Climate Change.

Thank You.