CLIMATE ENERGY NEXUS
CALL TO ACTION
LECTURE 3

ENERGY SITUATION IN JAMAICA

FEB 21, 2012

WILLIAM SAUNDERS

INTRODUCTION

- PROFESSOR THE HONORABLE ANTHONY CHEN, IN THE FIRST LECTURE OF THIS SERIES, HIGHLIGHTED THE NEED FOR ACTION TO AVOID THE CHATOSPHORIC RESULTS OF INACTION ON GLOBAL CLIMATE
- AMBASSADOR ANTHONY HILL GAVE A COMPELLING VIEW OF THE GEOPOLITICS OF CLIMATE CHANGE AND ENERGY BALANCES
- OUR TASK IN TODAYS LECTURE IS TO GIVE AN OVERVIEW OF THE ENERGY SITUATION IN JAMAICA,AS WELL AS TO PROVIDE AN INDICATION OF WHAT TO EXPECT FOR THE FUTURE.
- WE WILL FOCUS ON TWO SECTORS- ELECTRICITY AND TRANSPORTATION - AS THE INDUSTRIAL COMMERCIAL SECTOR IS DOMINATED BY THE BAUXITE AND ALUMINA SECTOR WHO HAVE DIFFERENT PRIORITIES

INTRODUCTION

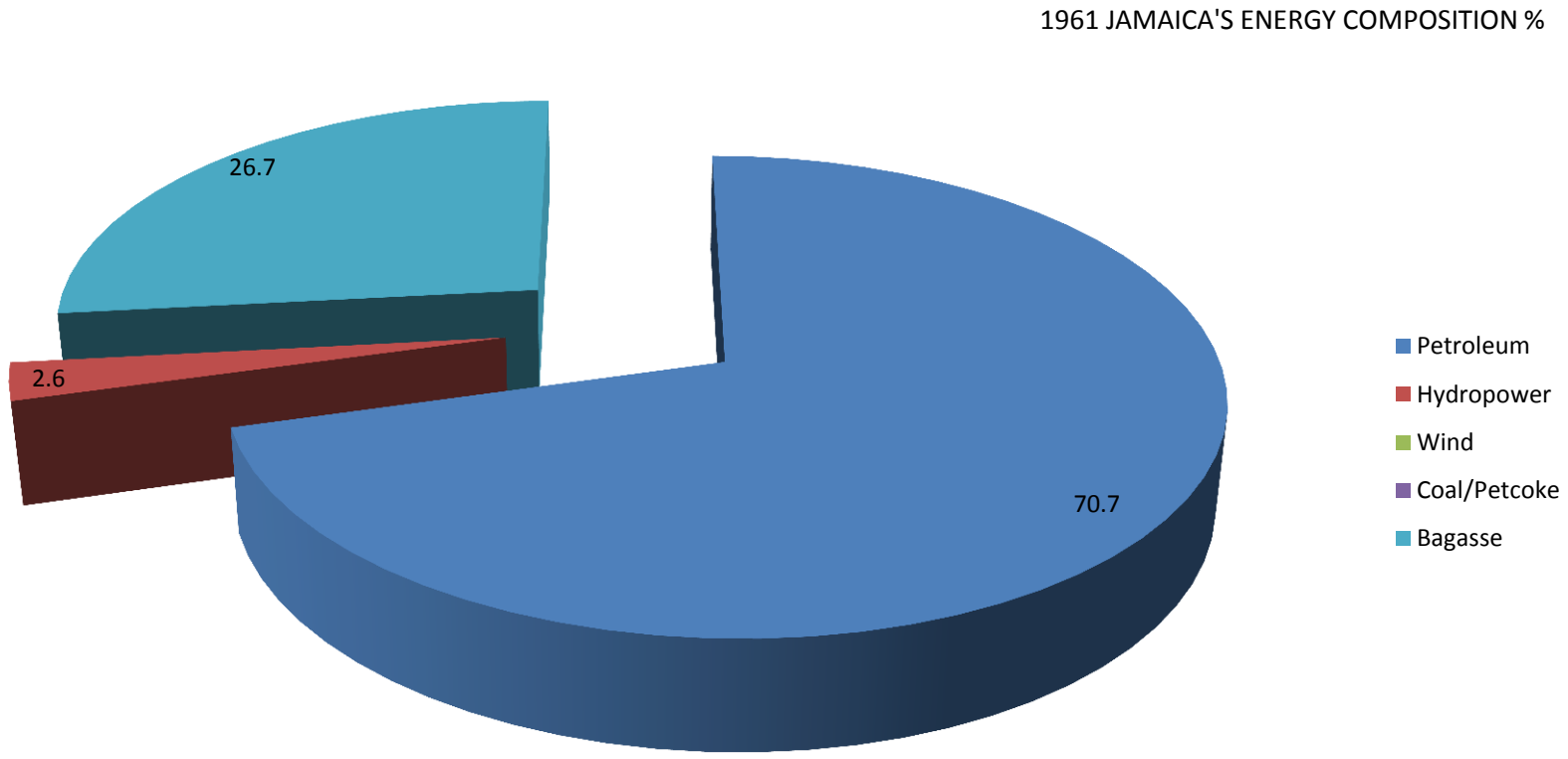
- DR. CEZLEY SAMPSON AT THE LAUNCH OF HIS BOOK “COMPETETION IN THE JAMAICAN ELECTRICITY SECTOR” WHEN ASKED WHY COMPETITION IN CALIFORNIA DID NOT RESULT IN LOWERING ELECTRICITY PRICES RESPONDED :

  “..STUPID ARRANGEMENT BORN OUT OF POLITICS”
- AFTER THIS PRESENTATION WE ASK YOU TO JUDGE THE VALIDITY OF THIS STATEMENT AS IT RELATES TO JAMAICA’S ENERGY SECTOR .
- TO KNOW WHERE YOU ARE GOING YOU SHOULD FIRST KNOW WHERE YOU ARE COMING FROM
- THIS YEAR JAMAICA CELEBRATES 50 YEARS OF POLITICAL INDEPENDENCE SO WHAT BETTER PLACE TO START THAN JAMAICA 1962

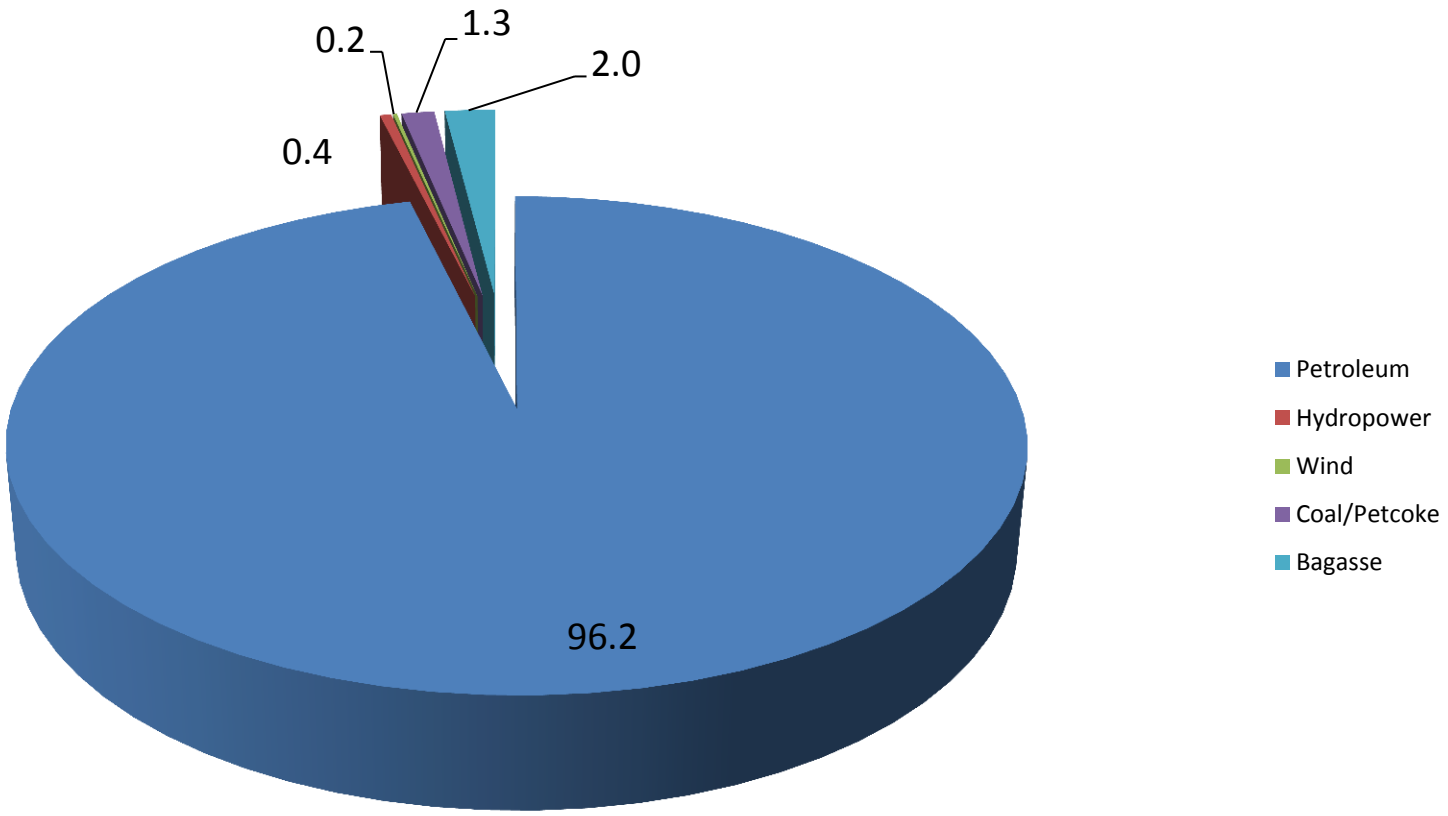
JAMAICA 1962

- In 1962 Jamaica imported £7.362 million Mineral Fuels, Lubricants and Related Materials, representing 9.24% of total imports
- Expressed another way, Fuel & Lubricant imports consumed 11.36% of the value of Domestic Exports
- In our year of independence, we produced 0.608 tons CO_2 per capita.
- 48 years later, 2010 (we do not have 2011 nor 2012 data), we imported US$1,585,555,000 of mineral fuels etc. representing 30% of total imports.
- This is also to be compared with exports in that year totaling US$1,328,245,000. Our petroleum bill was almost 1.2 times the value of all our exports.
- In 2010 we dumped 3.35 Tons of CO_2 per capita AN INCREASE OF 5.5 TIMES
- HOW DID WE GET THERE?

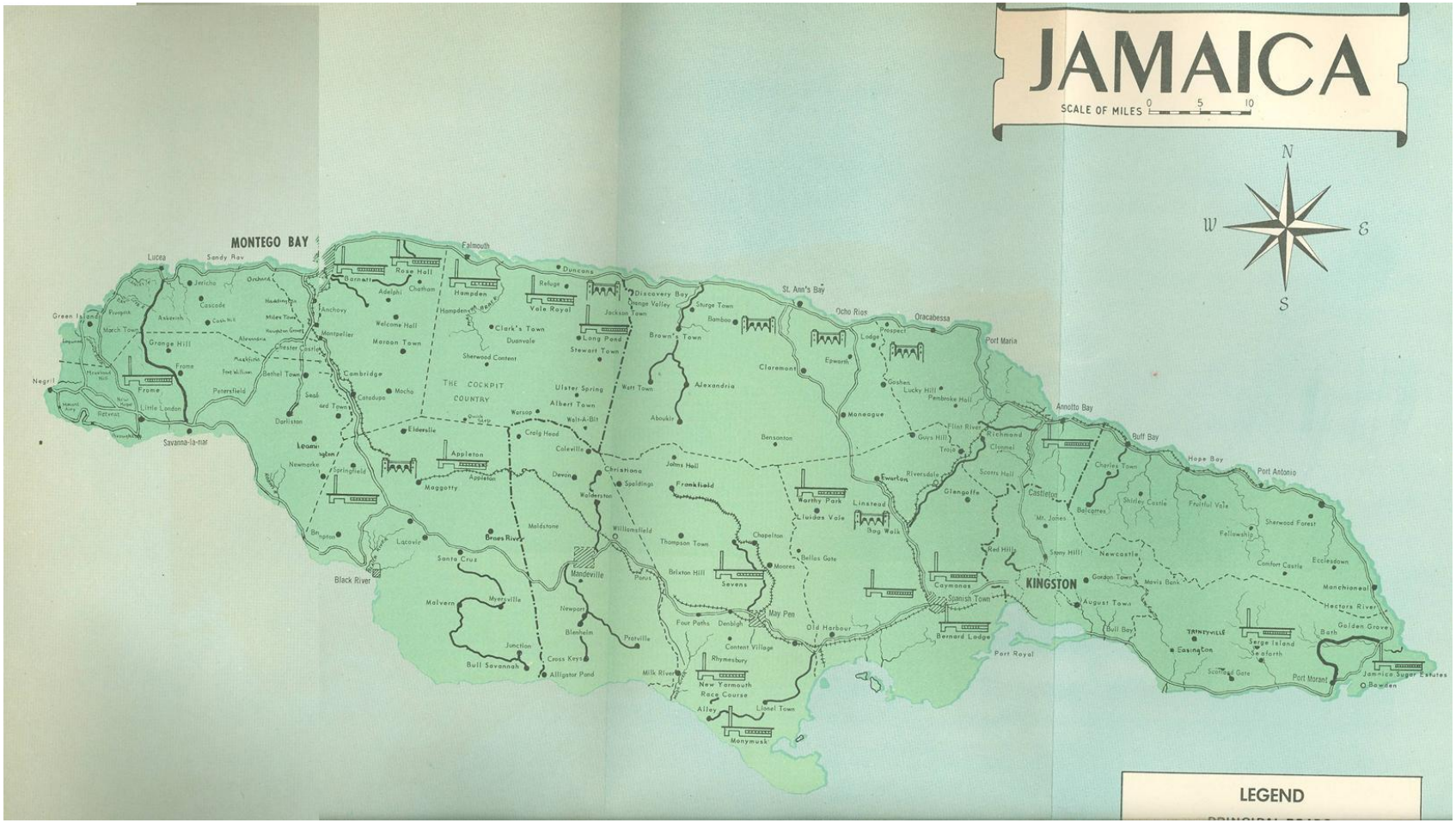
ENERGY COMPOSITION 1961



ENERGY COMPOSITION 2010



JAMAICA MAP 1962



1962- 2012

- In 1962 we started what can be described as the beginning of 10 years of rapid industrial development. In this period petroleum products were cheap.
- But there were consequences which we shall see manifesting themselves over the next 40 years
- Additionally, there were a number of dramatic changes to our consumption as well as the efficiency of use of energy.
- There were also many price changes and some significant milestones such as:
- 1962 – 1972: Experienced a very slow rate of change in the prices of crude oil and petroleum products
- 1964 - The Esso Refinery was commissioned.

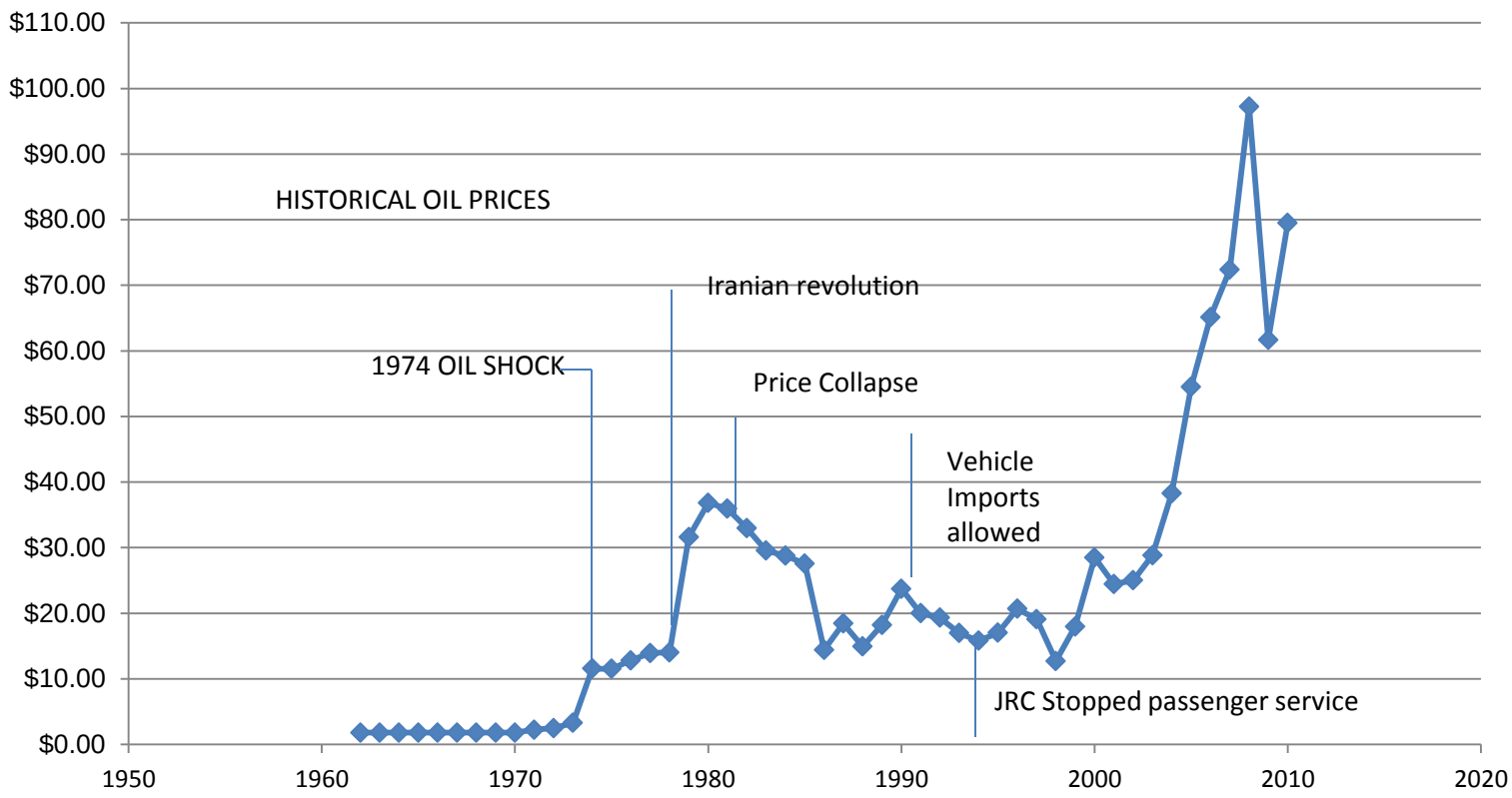
A DECISION BASED ON CHEAP OIL BACKFIRES

- Shortly after the Esso Refinery was commissioned in 1964, GOJ encouraged Esso to install at Bernard Lodge a Bagasse Board Plant.
- The arrangement was that the plant would be supplied with bagasse in exchange for fuel oil. Esso provided Bernard Lodge with oil fired steam boilers following which they were able to convince other sugar factories to do the same
- Two problems resulted. Esso who, never produced an ounce of bagasse board before did not install a successfully functioning factory so there were production and quality problems from the start.
- The second problem was not realized by Esso but by the sugar factories who switched to petroleum. When the bagasse board plant eventually closed, they had so ignored their bagasse boilers that the return to bagasse use was problematical. In some cases it was cheaper to continue use petroleum

MILESTONES

- 1973-1996: Described by John D. Hamilton in his “Historical oil shocks” as the Age of Opec
- The Age of Opec was characterized by:
  - 1973-1974 - The Opec oil Embargo/Arab Israeli War
  - 1974 : Bauxite levy introduced
  - 1978-1979 – Iranian revolution
  - 1980-1981 – Iran Iraq War
  - 1982 (October) Esso Refinery acquired by PCJ renamed Petrojam
  - 1981-1986 – The Great Price Collapse
  - 1984: Requirement for a license to import motor vehicles introduced in April
  - 1989 :Introduced an Import Policy allowing cars up to 3 years old & commercial vehicles up to 4 years old
  - 1990-1991 – First Persian War
  - 1992: October Railway closed for use by passengers. Retained only for use by Bauxite/Alumina companies
- 1997-2010 : Heralded the new Industrial Age. (Not in Jamaica)
  - 1997-1998 – East Asian Crises
  - 1999-2000 – Resumed Growth
  - 2003 - Venezuelan Unrest and second Persian Gulf War
  - 2001-2008—Japan Earthquake and Growing Demand Stagnant Supply

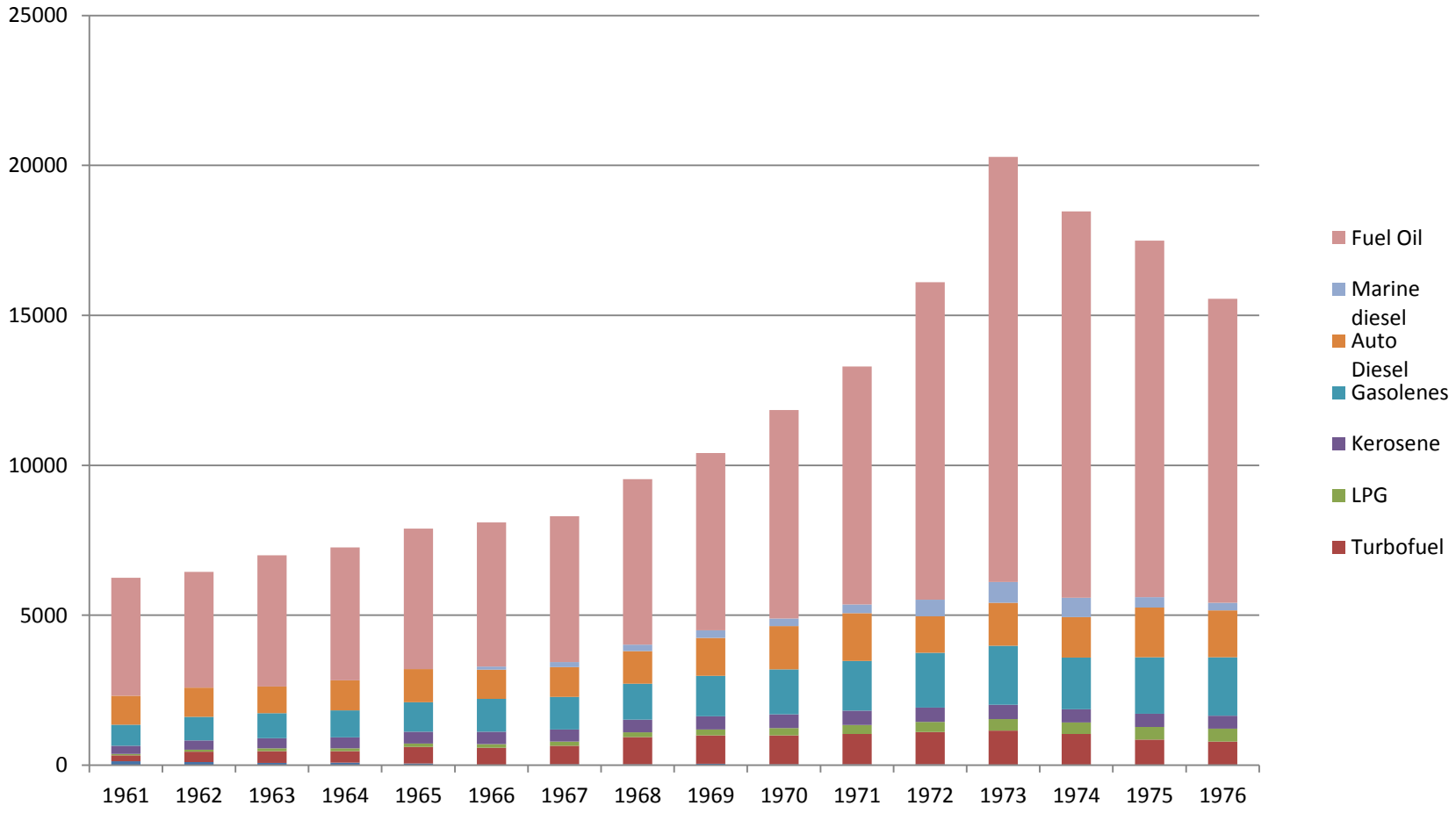
HISTORICAL CRUDE PRICES



THE EARLY YEARS POST INDEPENDENCE 1962-1976

- Over this period, we need to look at how we used petroleum and how we generated electricity
- For several years after independence, output in the manufacturing sector rose faster than the GDP
- Excluding agricultural processing, the rest of the manufacturing sector grew by an average of 10.5% per year in 1962-1967 compared with a 7.5% growth in GDP
- Economic Survey Jamaica 1975 states " In 1964 and 1965, the sector accounted for 15.5% and 15.3% respectively, of gross domestic product"
- This was reflected in energy consumption in the electricity sector where there were significant increases in demand from Commercial and Industrial users.

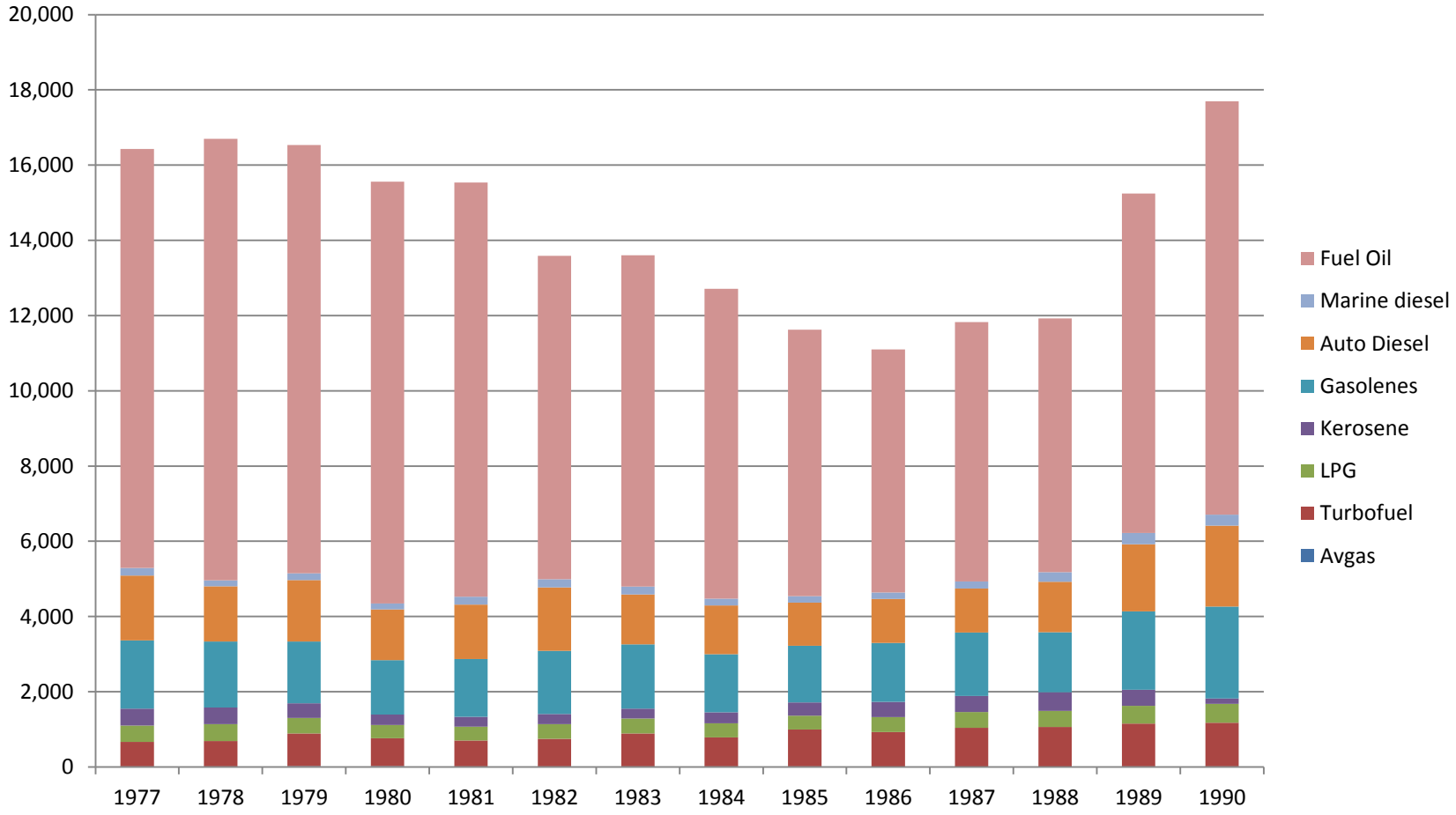
JAMAICA PETROLEUM CONSUMPTION '000 BBLS/YR
1961-1976



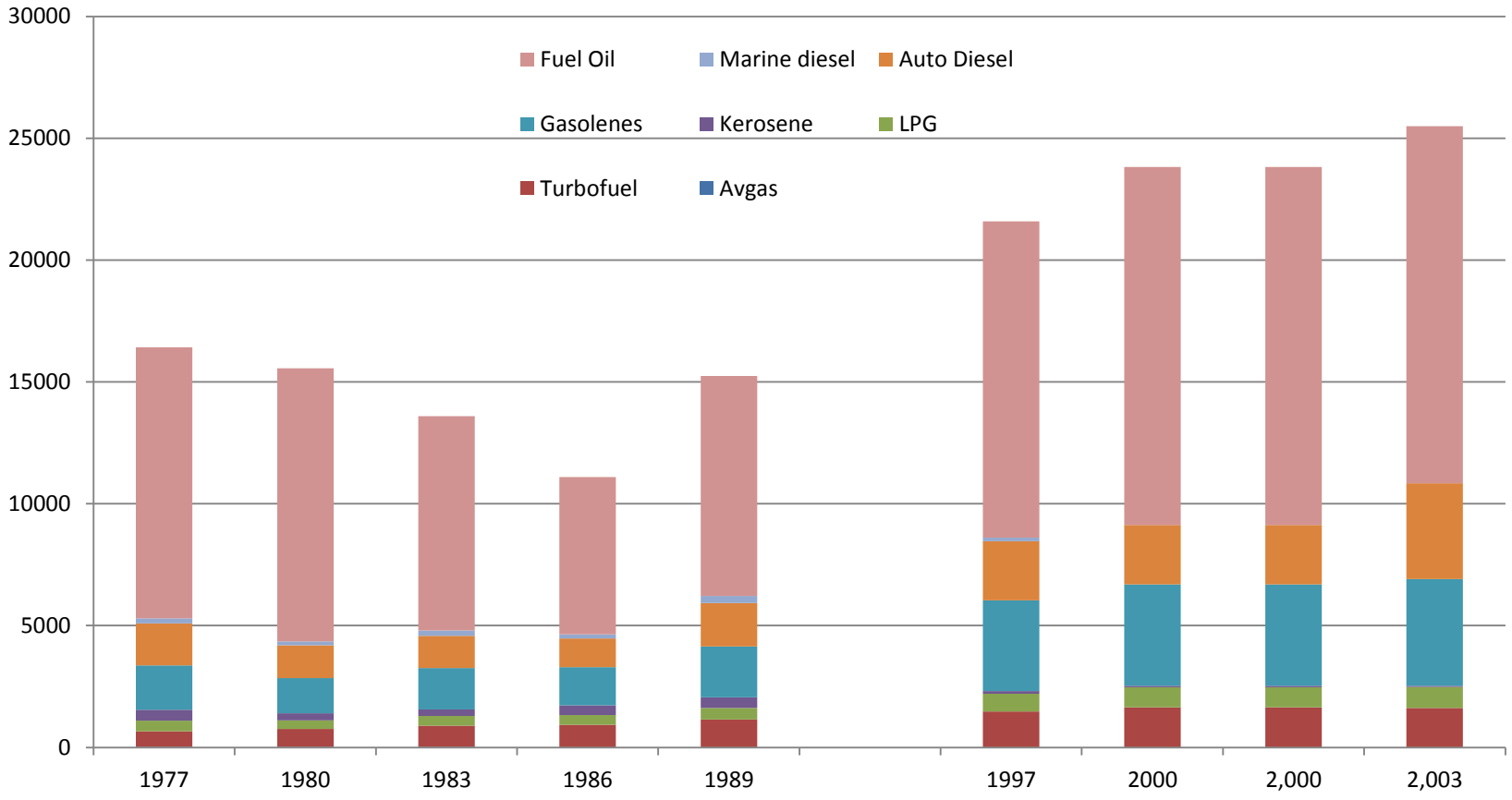
1962-1976

- Note that these figures include the bauxite and alumina sector which in 1973 consumed 10,189,000 Barrels of petroleum, or 45.8% of total consumption for that year
- No doubt the oil price shock of 1974 coupled with the bauxite levy introduced that year contributed in no small measure, to the decline of that industry.
- The bauxite alumina industry also launched a massive energy conservation program to reduce the amount of energy required to produce 1 ton of alumina

JAMAICA'S PETROLEUM CONSUMPTION '000 BBLS/YR 1977-1990



PETROLEUM CONSUMPTION 1977-2010



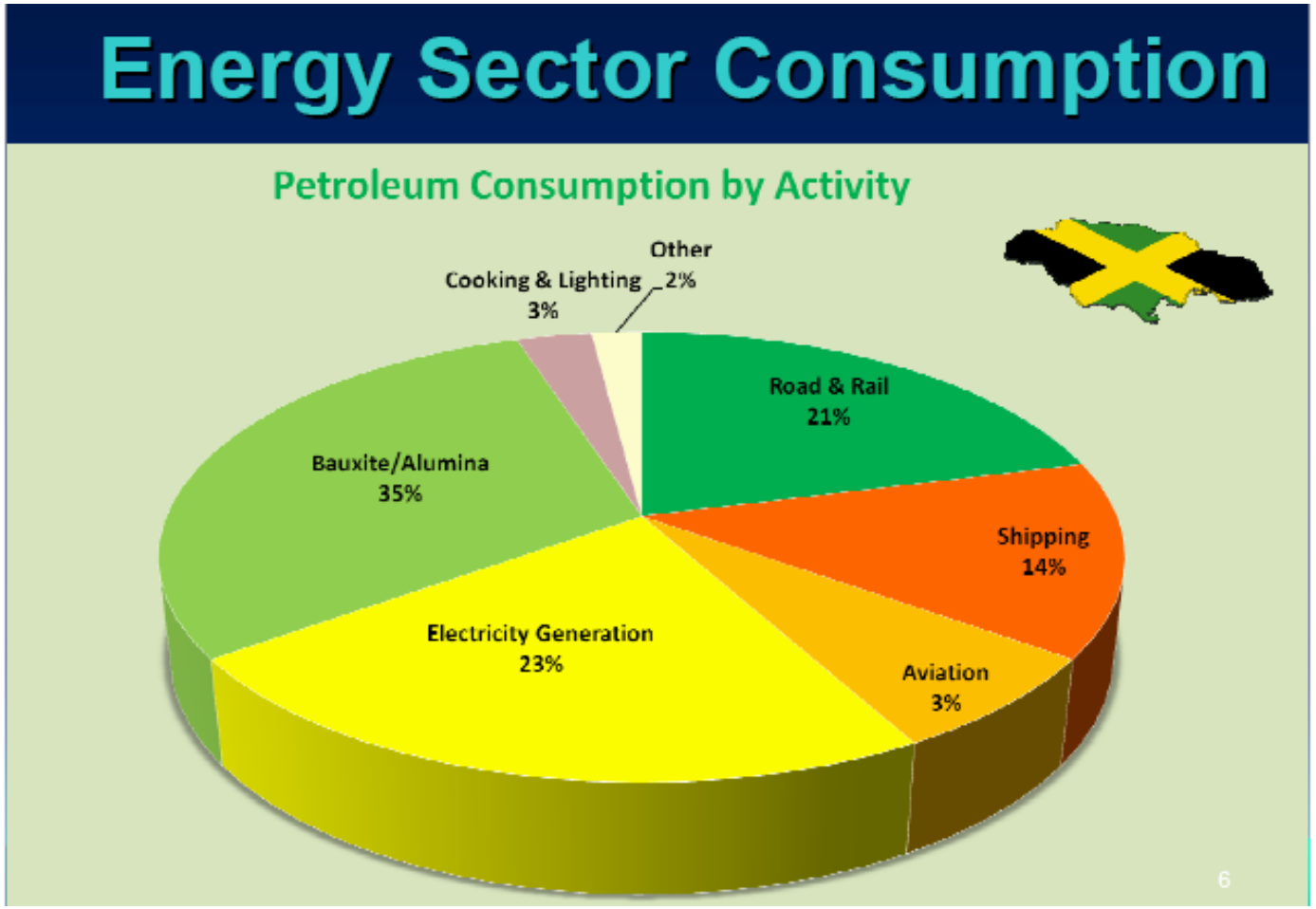
PETROLEUM CONSUMPTION

- The overall consumption pattern in Jamaica more or less followed its economic development up to the first oil price shock in 1974 that caused an immediate decline that year.
- This decline continued up to 1986 when consumption again started to increase very slightly.
- This increase in consumption particularly of the transport fuels gasolines and diesel was encouraged by the new transport policy of 1989 that allowed unfettered imports of all types of vehicles and up to 4 years old for commercial units. Consumption immediately increased sharply

PETROLEUM CONSUMPTION

- The high growth in the manufacturing sector during the decade of the sixties was largely due to a process of import substitution and quantitative restrictions on imports.
- Additionally, Jamaica's joining of CARIFTA in 1968 extended the lucrative domestic market to the regional level
- This increasing demand will be examined in more detail in two sectors, Electricity and Transportation
- The following two slides illustrate the relative contribution to demand by these sectors Electricity and Transport

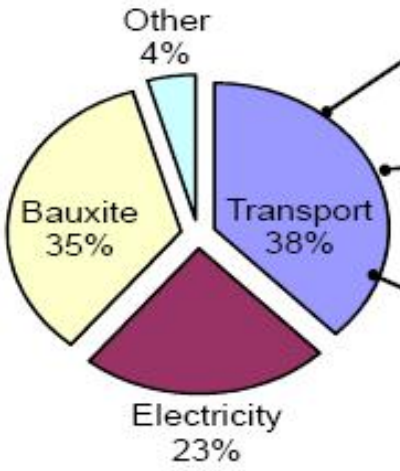
2009

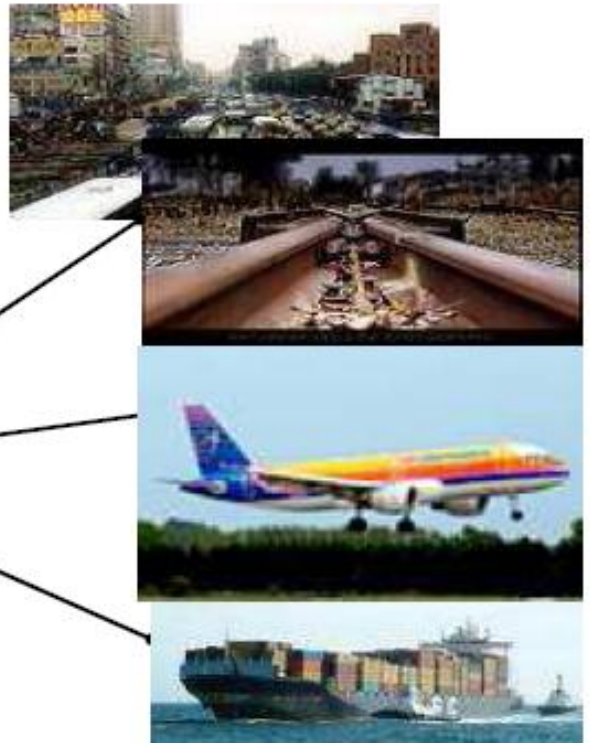

Energy Sector Consumption
Petroleum Consumption by Activity
Other
2%
Cooking & Lighting
3%
Road & Rail
21%
Bauxite/Alumina
35%
Shipping
14%
Electricity Generation
23%
Aviation
3%
6

2009

Selected Consumption

- **Primary oil consumers (96%)**
  - **Transport – 38%**
  - **Bauxite - 35%**
  - **Electricity – 23%**

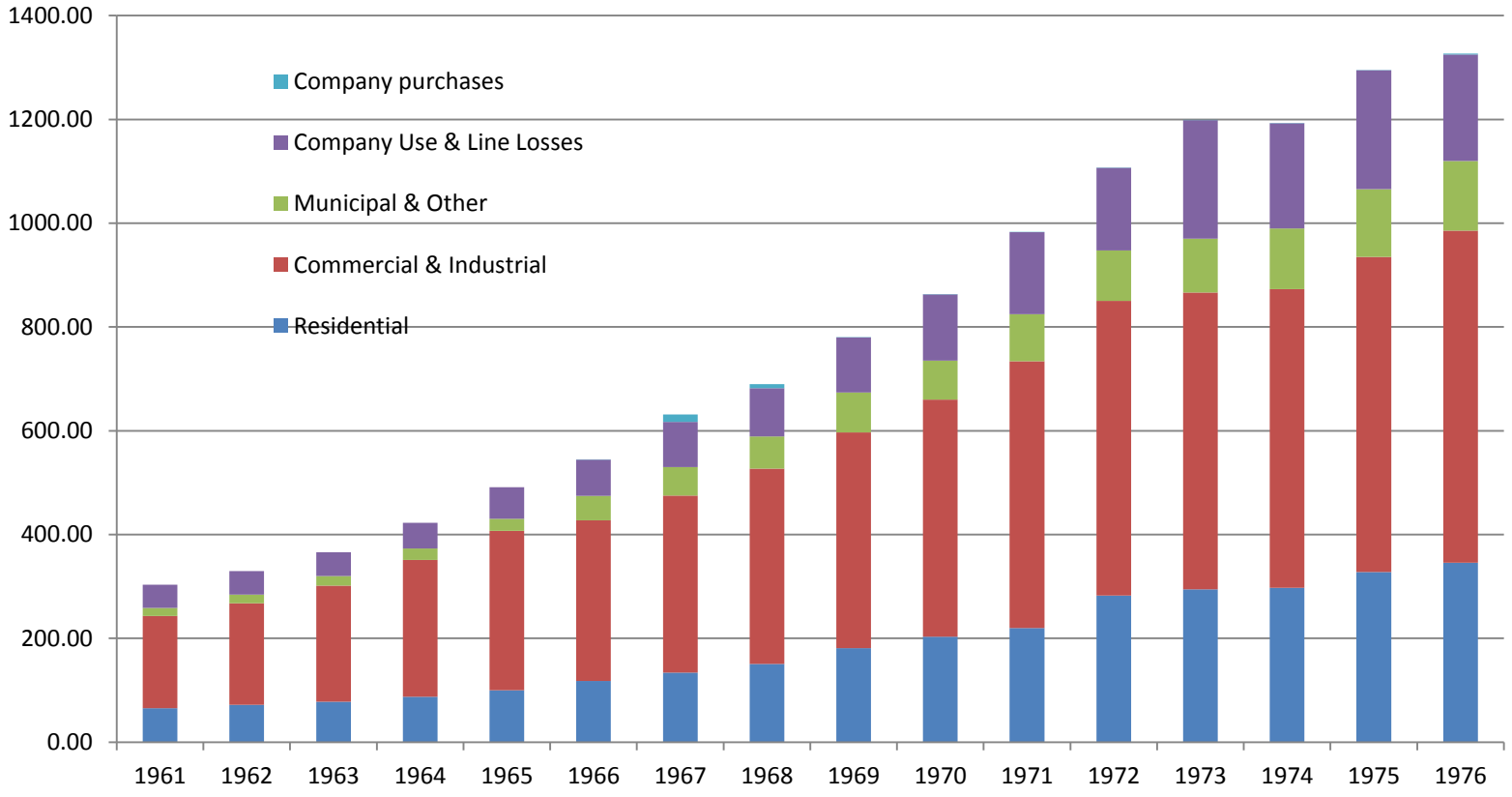




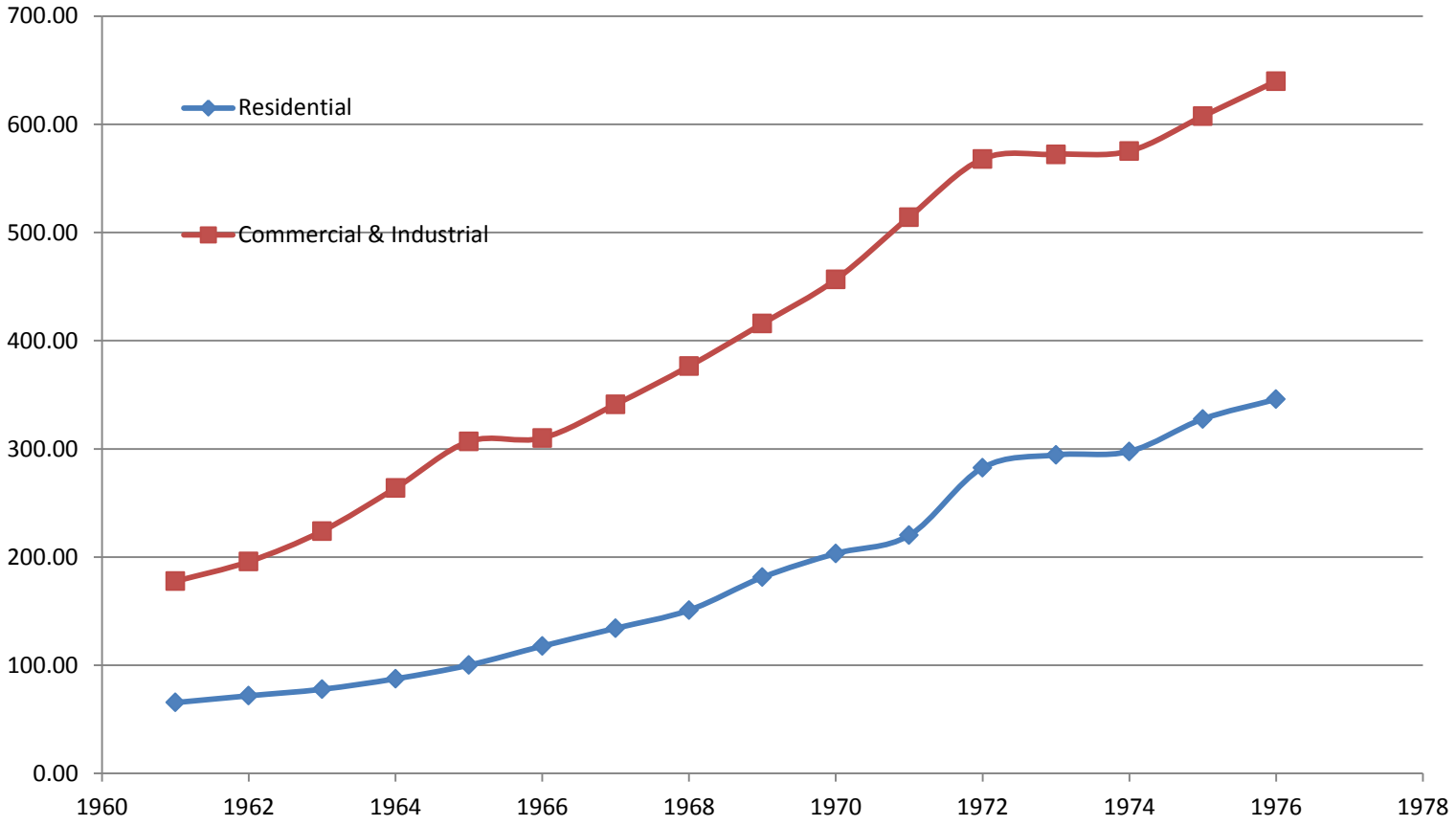
ELECTRICITY SECTOR

- The “Generation and Disposal of Electricity by JPS” as reported in the Economic Survey, Jamaica 1970, identifies specific categories for electricity sales. These are Residential, Commercial & Industrial, Other, Company Use and Line Losses.
- The next slide shows the growth in each area over the period 1962-1978

PRODUCTION OF ELECTRICITY
MILLION KWH



RESIDENTIAL & INDUSTRIAL/COMMERCIAL MILLION KWH



ELECTRICITY

- This growth in the demand was not accompanied by a concomitant increase in generating efficiency nor efficiency in use of electricity
- No doubt due to low fuel prices, the type of new generating unit required over this period, was selected more on the basis of cost than of efficiency
- The result can be seen in the next slides which show capacity added to the system over the years 1962-1976 followed by their efficiencies

GENERATING EFFICIENCIES

- Electric power plant efficiency **η** is defined as the ratio between the useful electricity output from the generating unit, in a specific time, and the energy value of the energy source supplied to the unit in the same time period.
- For this presentation we will use the ratio BTU/Kilowatt
- For electricity generation based on steam turbines 65% of all prime energy is wasted as heat.
- The maximum theoretical energy efficiency is defined in more detail by the Rankine cycle. For modern practical systems this is about 40% but less for older generating plant.
- The efficiency falls still further if fuels with lower energy content such as biomass are used to supply the plant.
- JPS system efficiencies over the period is illustrated in the next slide

GENERATING PLANT 1966-1970
MW INSTALLED

Generating Plant Capacities JPS	1966	1967	1968	1969	1970
Steam	80	80	113	108	165.5
Hydro	21.2	21.2	20.5	16	12
Diesel	16.5	24.9	23.3	23.3	22.8
Gas Turbine	0	0	0	32	32
TOTALS	117.7	126.1	156.8	179.3	232.3

Plant	Type	Rating	Heat Rate	Fuel Efficiency
		MW	BTU/kWh	%
Old Harbour 1	Steam	30	15,500	22.0
Old Harbour 2	Steam	60	14,500	23.5
Old Harbour 3	Steam	68.5	12,800	26.7
Old Harbour 4	Steam	68.5	12,500	27.3
Hunts Bay 6	Steam	68.5	12,800	26.7
	Subtotal	295.5		
JPS Diesels		36	9,000	37.9
Gas Turbines		150	15,500	22.0
Combined Cycle		120	7,500	45.5
JEP	MS Diesel	74	8,300	41.1
JPPC	LS Diesel	60	7700	44.3
Jamalco	Cogen	11	7500	45.5
Total thermal		**746.5**		

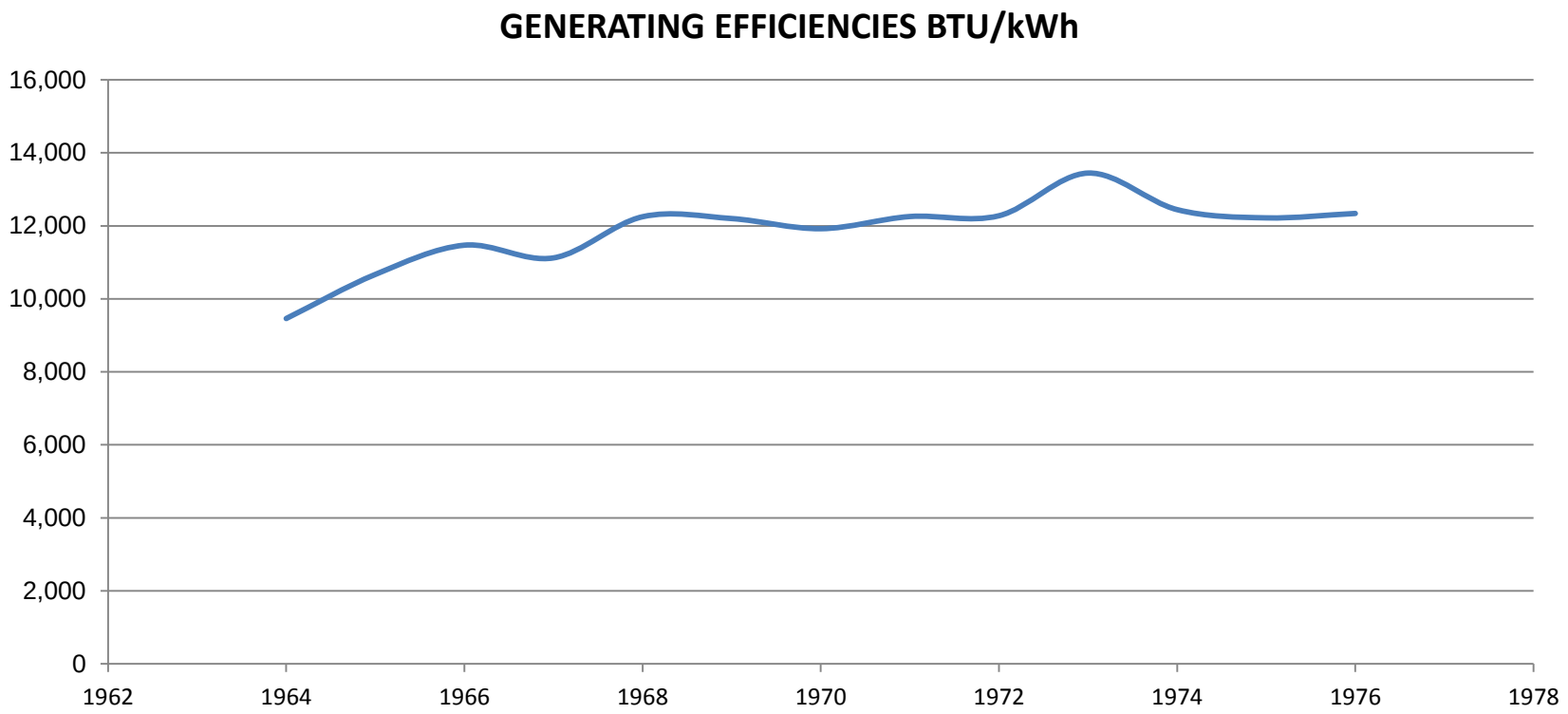
Plus about 20 MW hydro and 20 MW wind

Hydro averages about 12 MW annually, wind 7MW

Average contribution to total energy generation by type if plant varies.

In Nov, 04, it was steam 42%, gas turbines 22.5%, Hydro 3.7%, wind negligible
Ipps 31.3%

GENERATING EFFICIENCY



NEW GENERATING PLANT: 1970 TO PRESENT

- In 1970 GOJ effectively took control of the electricity sector
- Shortly after acquisition of JPS, Government procured new plant including the largest units now in the system: Old Harbour 3 & 4 (1972, 1973)and Hunts Bay B6 (1976) rated at 68 MW each.
- These units did not represent the highest efficiency then available.
- All three operated at average efficiencies of 12,500 BTU/kWh to be compared with efficiencies of 10,000 BTU/kWh available at the time.
- The next JPS investment was the low speed diesel at Rockfort (1985) at 9,200 BTU/kWh followed by JPPC (1996) also a slow speed unit, but with an efficiency of 8,000 BTU/kWh.
- Subsequent experience showed that the medium speed diesels such as the JEP units operate at efficiencies comparable to the JPPC unit but at lower investment costs.

JPS NORTH COAST VOLTAGE STABILITY

- In 1998 JPS conducted a “Least Cost Expansion Study” that recommended new coal burning plant at Old Harbour for the next major investment in generating plant.
- Regretfully Government did not allow this as there was the belief that Jamaica could obtain cheap LNG from Trinidad.
- In 2001 JPS was privatized and the new owners wanted to peruse the coal alternative as there was no agreement on the price of LNG. Time was of the essence as demand was growing.
- Additionally JPS were experiencing problems of voltage stability in the North Coast areas, especially Montego Bay.
- To correct this problem JPS proposed the installation of diesels burning HFO (like the JEP) but this proposal was refused due to the restriction of bunkering HFO in Montego Bay

STOP GAP MEASURES

- As a stop-gap measure JPS installed Combined Cycle Gas Turbines (CCGT) burning expensive diesel oil until LNG was made available. These units have efficiencies of about 7,500 BTU/kWh
- LNG remains unavailable. The cost of a litre of diesel is currently about J$100/litre whereas HFO costs about J$65 /litre. (65% less so theoretically the cost per kilowatt would be 35% less using an HFO Internal combustion units like JEP, rather than burn diesel in a CC GT) The diesel price here, includes taxes which are waived for the Combined Cycle unit
- The inability of government to source LNG has resulted in yet another stop gap measure, that is the 60 MW JEP HFO burning diesel in Kingston which is yet to be commissioned.
- The indecision/inability of Government to source LNG at acceptable prices and their refusal to have allowed the coal alternative has resulted in JPS having to dispatch less efficient gas turbines that operate at about 15,500 BTU/kWh
- It is important to recognize that Government has never released a study which indicates that LNG is the most economic fuel for power generation in Jamaica.

STOP GAP MEASURES

- Furthermore Government has been promising LNG for more than a decade with no success to date. Interestingly, I am reliably advised that Dom Rep is paying US$24 per million BTU (Equivalent to HFO at US$140 per barrel) This is to be compared with US$8 per million BTU used by the OUR.(US$48 per bbl HFO)
- The available studies conducted by JPS and by reputable international consultants eg. World Bank, indicate that coal would be the most economic choice
- In the mean time the cost of electricity remains high. But this cannot be blamed entirely on the price of the fuel as much of this could have been saved with the installation of more efficient units.
- For example if the average efficiency was reduced to 9,000 BTU/kWh with the installation of new coal plant in 2005, then comparable costs today would be lower and the CO_2 emissions between 2005 and 2010 reduced by 1.2 million tons.
- There is no doubt that natural gas, although still a petroleum , is by far the most superior hydrocarbon fuel, that its adverse environmental impact is lower and the investment, operational and maintenance costs are lower than would be experienced with coal.

LNG VS COAL?

- Additionally, the costs of LNG as published in documents available to the public indicate that the overall costs per kWh would be lower with coal.
- Its adverse environmental effects can be maintained at levels that do not represent hazards to the public.
- Indeed the CO_2 emissions will be less than currently experienced and infinitesimal by global standards.
- It should also be noted that Puerto Rico and the Dominican Republic are the only two countries in the Caribbean that now have LNG power generating plants and both are currently installing coal plants.
- I know it is difficult to convince an audience such as yourselves that clean coal is possible. It is. But I am not advocating the unrestricted development of coal burning plants

LIMITING CARBON DIOXIDE PRODUCTION

- Government with the assistance of experts like Professor Chen should develop maximum limits for CO_2 emissions based on a number of factors including the amount of forest and vegetation etc that absorb the gas
- Based on these limits one can evaluate the contribution the project will make to the established limits.
- Exchanges would be allowed. For example fly ash from a coal burner could be used to make cement, thereby an exchange can be made based on the respective level of resulting emissions.

- BUT WHAT ABOUT THE RENEWABLES?

ELECTRICITY-THE FUTURE

- The most promising of these are cogeneration from bagasse and wind for commercial units.
- There is also the potential of cogeneration from the bauxite companies whenever they become operational.
- In regard to these plants the greatest constraining factor for their re-commissioning is the cost of energy. And coal seems to be the only realistic alternative

WIGTON

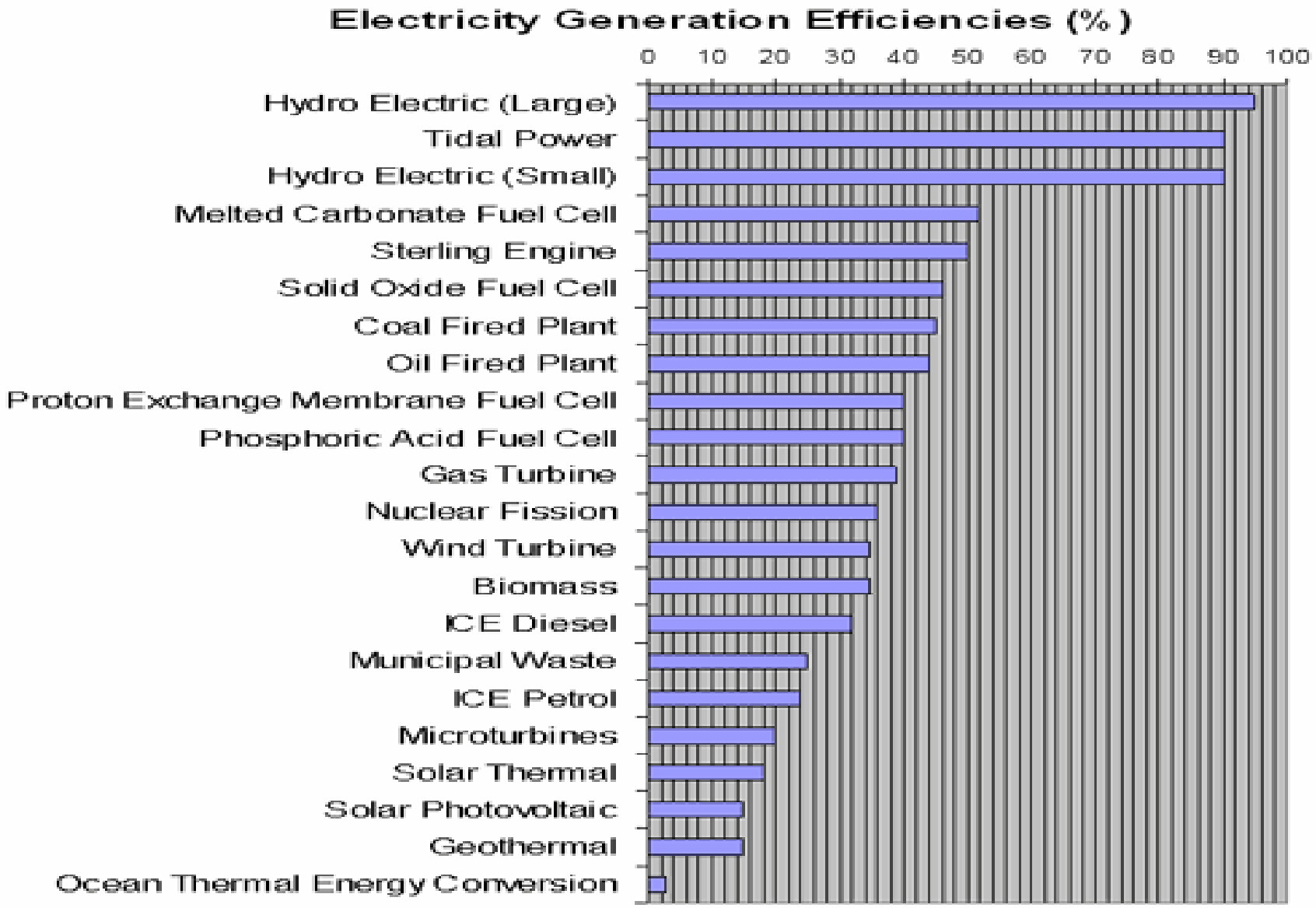
- Wigton Wind Farms was the brain child of Dr. Raymond Wright, then Group Managing Director of Petroleum Corporation of Jamaica (PCJ) an idea germinated by the vision of Dr. Anthony Chen who pioneered wind energy in Jamaica. Dr. Chen initiated a wind mapping programme in 1978, from which was spawned Jamaica's first wind powered generator, installed at Munroe College in February 1996. Interestingly, this 225 kW generator was the first grid connected wind energy source in the English speaking Caribbean
- It took Dr. Wright over seven years to convince the Board of PCJ and Government to install a wind energy plant at Wigton, comprising 23 X 900kW turbines, totaling 20.7 MW, which began generating electricity in April 2004

WIGTON

- Up to 2010, Wigton generated 306 million Kilowatt hours of electricity contributing about 1.2% of our total power requirements, saving about 210,000 tons of Carbon dioxide emissions and 180,000 barrels of oil. To put this into a more easily understood perspective, the amount of electricity generated to date by Wigton could power about 22,000 homes with electricity.
- Wigton 2 is an 18 MW expansion comprised of 9 X 2 MW turbines. This facility delivers 53 million kWh, equivalent to powering 24,000 homes, saves 32,400 barrels of oil, avoiding 46,000 tons of carbon dioxide emissions.
- Despite Wigton's success in generating power and saving millions each year, the OUR is not convinced that wind energy is an economically viable option for Jamaica.

WIND POWER

- Following on the success of Wigton, The Jamaica Public Service Company Ltd. (JPS) in 2010, installed four wind turbines as their Wind Power Plant at Munro in St. Elizabeth adding 3 megawatts of power to the national grid.
- JPS promise more wind generators.
- Available for immediate installation is Wigton3 anticipated at 40 MW. And this is to be located in Manchester.
- The main constraining factor is the investment, as Wigton is a publicly owned company operating under the Financial constraints of GOJ.
- A suggestion on how to deal with investments of this kind will follow at the end of this presentation


Electricity Generation Efficiencies (%)
0
10
20
30
40
50
60
70
80
90
100
Hydro Electric (Large)
Tidal Power
Hydro Electric (Small)
Melted Carbonate Fuel Cell
Sterling Engine
Solid Oxide Fuel Cell
Coal Fired Plant
Oil Fired Plant
Proton Exchange Membrane Fuel Cell
Phosphoric Acid Fuel Cell
Gas Turbine
Nuclear Fission
Wind Turbine
Biomass
ICE Diesel
Municipal Waste
ICE Petrol
Microturbines
Solar Thermal
Solar Photovoltaic
Geothermal
Ocean Thermal Energy Conversion

DECLINING OVERALL DEMAND & INCREASE IN TRANSPORTATION FUELS 1977-1990

- As a result of the increased price resulting from the first oil shock, demand started to drop primarily in fuel oil consumption by the bauxite/alumina industry who launched a massive conservation program to reduce the energy consumption per ton of alumina produced
- Heavy Fuel Oil (HFO) is the main fuel used in the bauxite/alumina industry, it is also the main fuel for electricity generation as well as for domestic industrial production, including the sugar factories.
- Acquisition of foreign owned sugar production by government, coupled with the failed bagasse board initiative, resulted in a decrease of efficiency in factory operations requiring the use of HFO to sustain out of crop operations of distilleries.
- However despite this use, consumption of this fuel dropped.
- On the other hand, consumption of transportation fuels increased.

TRANSPORT SECTOR

- Like electricity, transportation is essential to a nations development
- In this sector, there have been some significant milestones.

➢ 1984: When the importation of motor vehicles were restricted and a special license from the Trade Board was required for their import

➢ 1989: When the motor vehicle import restrictions were lifted and the importation of used cars form Japan (Deportees}were allowed.

➢ 1992 : When the Jamaica Railway Corporation was closed for public passenger and freight services and used only for transport in the bauxite/alumina sector

Although the vehicle importation policy of 1989 averted problems such as shown in the next two slides, it did create some more, especially for our environment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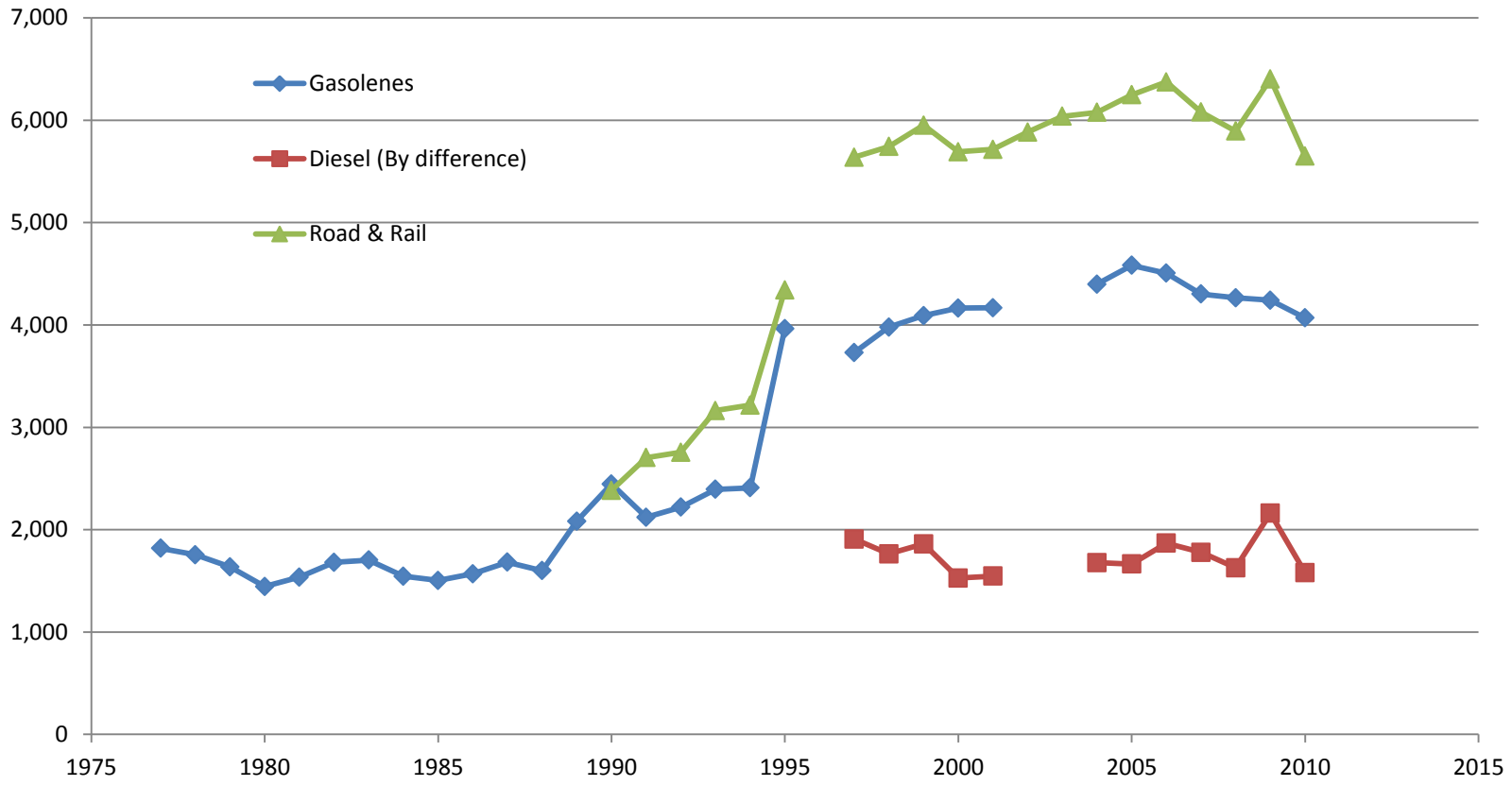
TRANSPORT

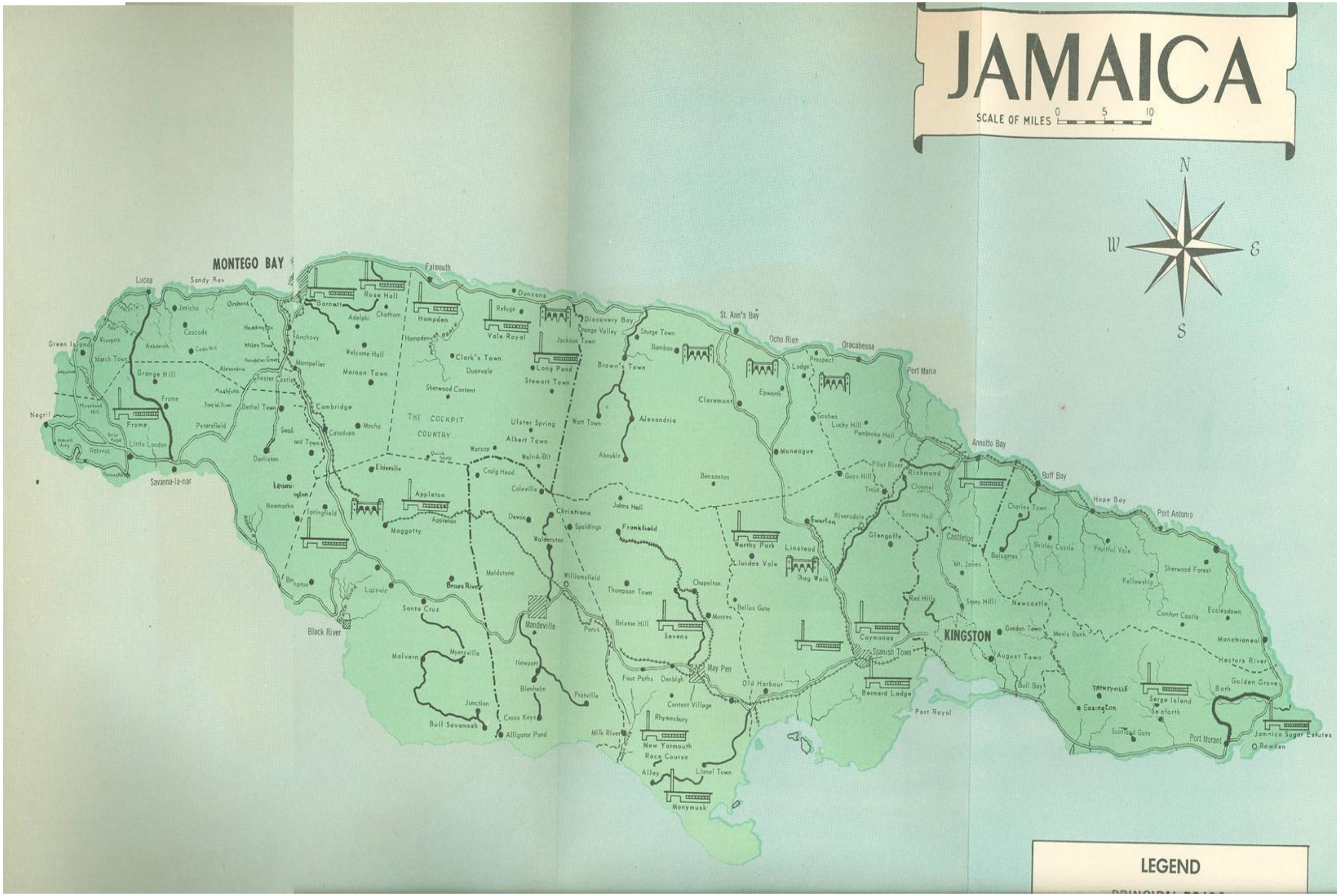
- The demand for motor gasolines rose from 790,000 barrels in 1962 to 4,068,000 barrels in 2010
- Carbon Dioxide emissions from gasoline rose from 0.283 million tons per year to 1.55 million tons in 2010, an increase of 5.5 times the 1962 levels.
- It should be noted that the steep rise in consumption started shortly after the motor vehicle import policy of 1989 was introduced and vehicles started to arrive in 1990
- This increase was further exacerbated by closure of the railway in 1992 .
- What is even more disconcerting is that there appears to be no effort on the part of successive governments to revive the railway

TRANSPORTATION FUELS



RAILWAY

- Initially, the railway served four ocean ports, Montego Bay and Port Antonio (concentrating on banana exports), Port Esquivel (in alumina trade) and the Port of Kingston, which received the bulk of importations to the island.
- It was believed that the railway would lead to an improvement in transportation resulting in further developments such as factories. This expectation became a reality as in the early years, the railway led to the establishment of central factories within the Sugar Industry.
- There were also rapid developments in the banana and citrus industries in the early 1880's. Coconut Groves and banana cultivations were also greatly aided by the railway. In addition, the bauxite industry gained significant benefits as the railway was used for alumina haulage from Bauxite Plants as well as the carriage of imported supplies of fuel oil, liquid, caustic soda and other materials crucial to the alumina process.
- According to statistics from the Jamaica Railway Corporation (JRC), the railway in 1978 transported a record of 2,689,821 passengers.
- Jamaica's transportation needs have increased tremendously since 1978 and if the rail at that time was within a one-year period able to transport almost 2.7 million passengers, the potential impact of the revival of he railway today is unparalleled.



JAMAICA
SCALE OF MILES
0
5
10
N
S
W
E
MONTEGO BAY
KINGSTON
Lucea
Sandy Bay
Falmouth
Duncans
Rose Hall
Barnett
Adelphi
Chatham
Hampden
Refuge
Vale Royal
Discovery Bay
Orange Valley
Jackson Town
St. Ann's Bay
Ocho Rios
Oracabessa
Port Maria
Sturge Town
Bamboo
Brown's Town
Long Pond
Stewart Town
Clark's Town
Duanvale
Sherwood Content
Welcome Hall
Maroon Town
Anchovy
Montpelier
Cambridge
Catadupa
Mocho
THE COCKPIT
COUNTRY
Ulster Spring
Albert Town
Warsop
Wait-A-Bit
Watt Town
Alexandria
Aboukir
Claremont
Epworth
Lodge
Prospect
Goshen
Lucky Hill
Pembroke Hall
Moneague
Bensonton
Green Island
Cascade
Jericho
Grange Hill
March Town
Frome
Petersfield
Little London
Savanna-la-mar
Negril
Bethel Town
Darliston
Newmarket
Springfield
Elderslie
Appleton
Maggotty
Craig Head
Coleville
Christiana
Devon
Spaldings
Johns Hall
Frankfield
Walderston
Williamsfield
Maidstone
Mandeville
Porus
Thompson Town
Chapelton
Brixton Hill
Sevens
Moores
Bellas Gate
Lluidas Vale
Worthy Park
Linstead
Bog Walk
Ewarton
Riversdale
Glengoffe
Guys Hill
Troja
Flint River
Richmond
Clonmel
Scotts Hall
Annotto Bay
Buff Bay
Charles Town
Hope Bay
Port Antonio
Castleton
Balcarres
Shirley Castle
Fruitful Vale
Sherwood Forest
Mt. Jones
Fellowship
Red Hills
Stony Hill
Newcastle
Comfort Castle
Ecclesdown
Gordon Town
Mavis Bank
Manchioneal
Hectors River
Golden Grove
August Town
Bull Bay
Bath
Easington
Serge Island
Seaforth
Scotland Gate
Port Morant
Jamaica Sugar Estates
Bowden
Caymanas
Spanish Town
Bernard Lodge
Port Royal
Old Harbour
May Pen
Four Paths
Denbigh
Content Village
Rhymesbury
New Yarmouth
Race Course
Alley
Lionel Town
Monymusk
Milk River
Alligator Pond
Cross Keys
Blenheim
Newport
Pratville
Junction
Bull Savannah
Malvern
Myersville
Santa Cruz
Lacovia
Braes River
Black River
LEGEND

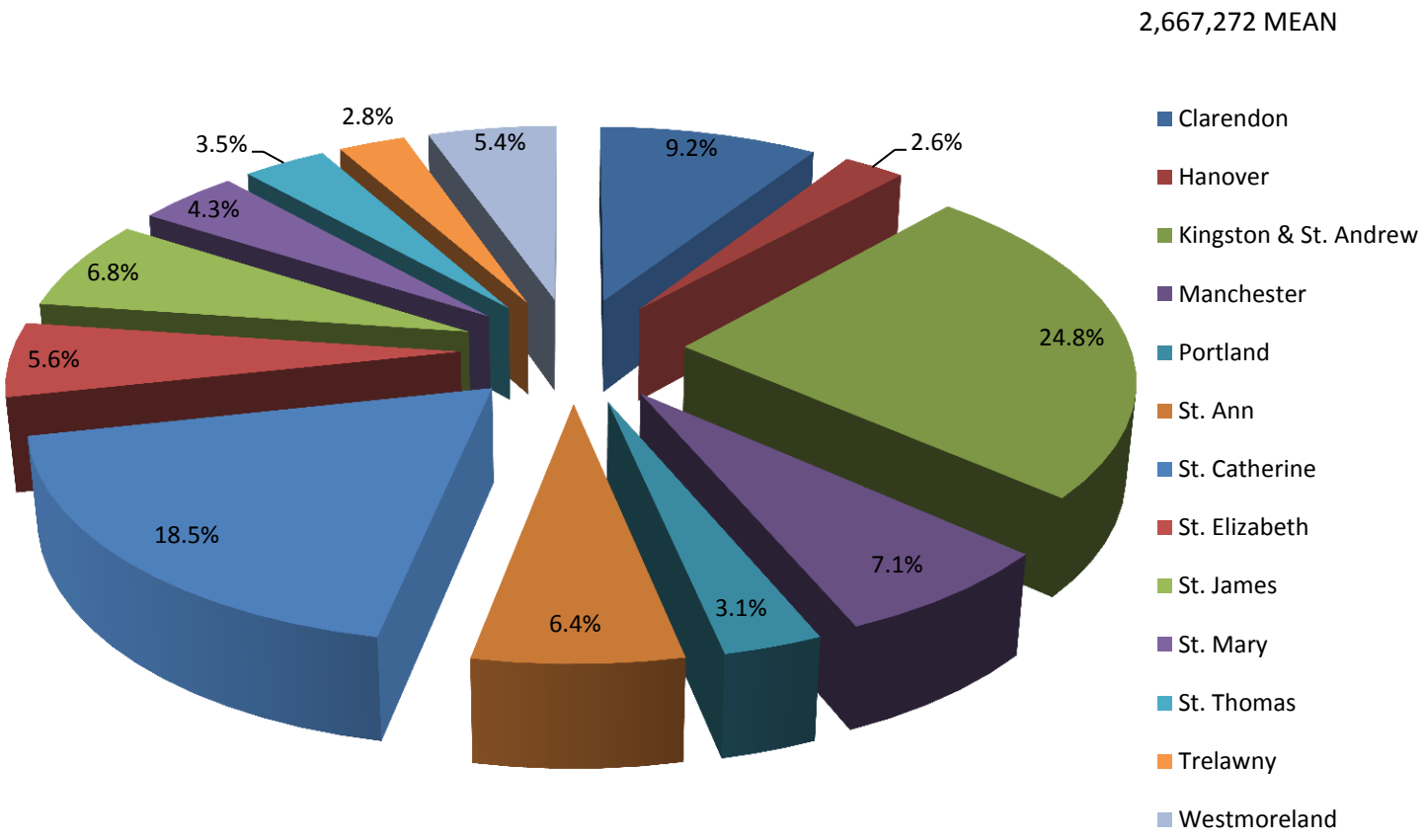
RAILWAY

- Rail is the most efficient mode of transport for freight, carrying on average in the USA 1 ton for 436 miles on 1 gallon fuel.
- Jamaica's most abundant mineral is limestone – approx 50 - 60 billion tonnes.
- Limestone deposits in Jamaica account for 65% of the island by weight, and 85% of its surface coverage.
- A significant percentage of the active quarries are close to the rail lines producing approximately 6-8 million tons per year for domestic consumption
- Quantity of Limestone exported – approx 250,000mt per year.
- Employment – 1,500 (direct) and 7,500 (indirect)
- Potential Limestone exports to the Caribbean region – 2.0 million mt/yr
- Growing export market for value-added products in the USA – GCC & PCC – 1.0 million mt/yr

RAILWAY

- 52.5% of our population, 1.4 million people live in Kingston, St. Andrew, St. Catherine and Clarendon. A great portion require transportation to Kingston.
- Imagine the potential for savings in emissions had this mode of transport been used
- Note that one gallon of gasoline can produce 20 pounds of CO_2

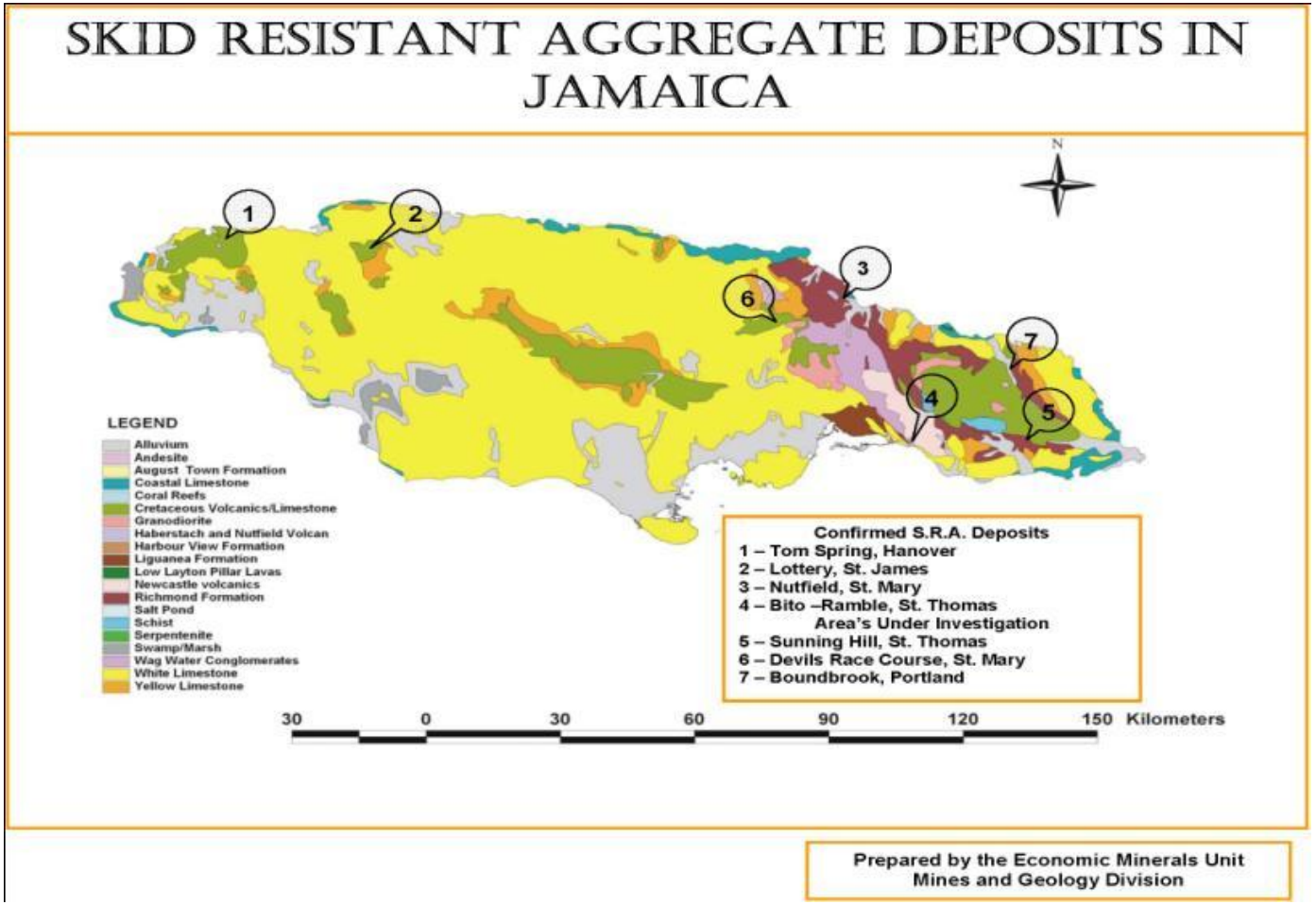
POPULATION DISTRIBUTION BY PARISH



MINERALS TRANSPORT BY BARGE

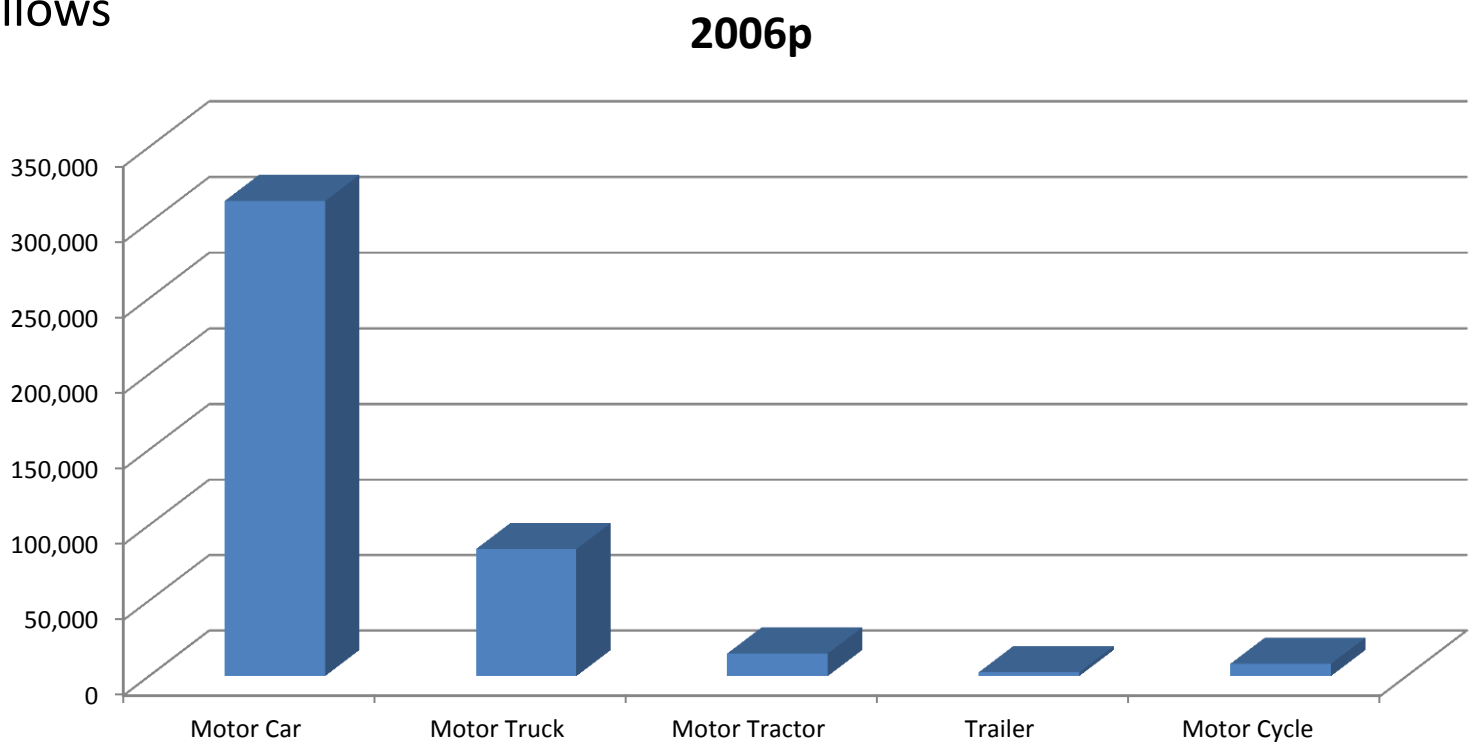
- The Draft Minerals Policy shows the following aggregates available for domestic use and exports: -
- Aggregate (skid-resistant) 270.7 million metric tonnes and
- Alluvial sand and gravel about 600 million metric tonnes
- These deposits, much of which are in the St Thomas area, as the next slide shows, are transported to Kingston via public roadways causing road failure due to excessive axel weight
- There is no reason why much of this material cannot be transported to Kingston via ocean barges
- Rather than the massive investment in developing the Port Antonio yacht facility, would this investment not have been better made in developing a minerals port in St. Thomas?
- I am advised that almost 80% of the aggregates used in the Kingston metropolitan area are sourced from St. Thomas.

AGGREGATES

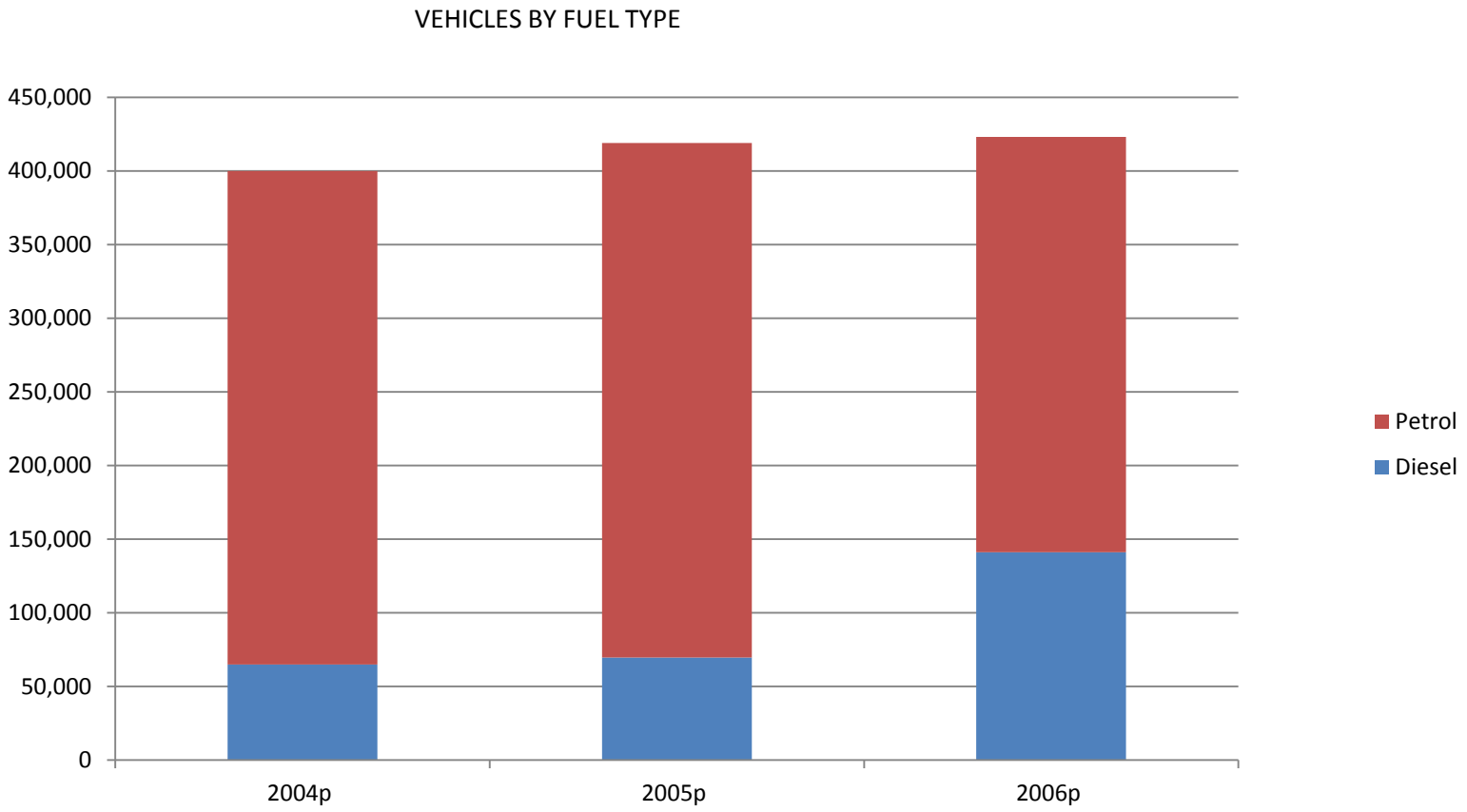

SKID RESISTANT AGGREGATE DEPOSITS IN JAMAICA
N
1
2
3
6
7
4
5
LEGEND
Alluvium
Andesite
August Town Formation
Coastal Limestone
Coral Reefs
Cretaceous Volcanics/Limestone
Granodiorite
Haberstach and Nutfield Volcan
Harbour View Formation
Liguanea Formation
Low Layton Pillar Lavas
Newcastle volcanics
Richmond Formation
Salt Pond
Schist
Serpentenite
Swamp/Marsh
Wag Water Conglomerates
White Limestone
Yellow Limestone
Confirmed S.R.A. Deposits
1 – Tom Spring, Hanover
2 – Lottery, St. James
3 – Nutfield, St. Mary
4 – Bito –Ramble, St. Thomas
Area's Under Investigation
5 – Sunning Hill, St. Thomas
6 – Devils Race Course, St. Mary
7 – Boundbrook, Portland
30 0 30 60 90 120 150 Kilometers
Prepared by the Economic Minerals Unit
Mines and Geology Division

VEHICLES

- The Transport authority in their Annual Transport Statistics 2006-2007 report a vehicle population of 419,239 registered vehicles categorized as follows



VEHICLE TYPE BY FUEL



Gallons per vehicle

- In 2006 there were 282,067 gasoline powered vehicles registered.
- In that year we consumed 186.2 million gallons of gasoline, or an average 55 gallons per month per vehicle
- Doesn't sound right does it?
- Lets say the vehicle count is out by 20%. This reduces the average monthly consumption to 44 gallons. Sounds better?

QUICK REVIEW

- Low cost and what was perceived to be abundant supplies of liquid petroleum supplies resulted in investments that did not prioritize efficiencies
- GOJ's response to the 1974 "oil price shock" was establishment of an Energy Division in the then Ministry of Mining and Natural Resources in 1978
- In 1978 the first Energy Plan was published as part of a 10 year development plan.
- Energy for the first time was to become an integral part of economic planning.
- This never happened

RESULTS

- The unfettered importation of motor vehicles in 1989, without regard to size or efficiency resulted in a enormous spike in consumption.
- Many entrepreneurs emerged to operate both legal an illegal taxis. The age of “robots was born
- This was exacerbated by closure of the JRC in 1992 and its replacement for haulage with trucks
- Lacking the financial resources to maintain roads. The age of the “pot hole’ was born
- Competition from “robots” and “route taxis” resulted in massive financial losses by the JOS, losses that today are increasing and will soon reach the level that cannot be sustained.

RESULTS

- Governments refusals to allow expansion of JPS with the use of coal as the least cost route for expansion, has resulted in a number of “stop gap” measures and the current high electricity prices that are constraining industrial development
- Promises for the last 10 years that LNG would be available for expansion at lower prices than the other liquid petroleum alternatives have still not been realized.
- We continue to delude ourselves into the belief that Government will somehow waive a wand to make the looming energy crisis disappear, and yet GOJ has so far done nothing meaningful to encourage alternatives.

RESULTS

- Government remains the single largest consumer of energy. And yet despite extremely difficult budgetary constraints, we see no massive effort to conserve
- The 2010 import cost of non bauxite petroleum was US$1.4 billion. Results for 2011 are likely to be 15% higher
- 2012 is anyone's guess due to the uncertainties in the Middle East.
- But still we do little about conservation, diversification, and the use of alternatives.

ONE SOLUTION

- A Jamaican investor faces bank borrowing rates of 6% (PetroCaribe Fund) to up to 14% depending on the bank
- On the other hand international investors can source funds at 1.5% and sometimes lower.
- How then do we expect Jamaicans to participate in energy investments with this level of disadvantage?
- One solution is the development of a Jamaican Energy Fund exclusively for investments in energy projects.
- This fund can be easily financed by imposing a 2% cess on all petroleum imports
- Using the 2010 import figure, had it existed, the fund would have collected US$28 million.
- Impossible? Impractical?

ONE SOLUTION

- The PCJ has for the last 20 years at least, has been collecting a cess of 1% from all of Petrojam's imports of crude and petroleum products.
- This is not what PCJ was established to do, as they can earn a more suitable income from dividends declared by their profitable subsidiaries such a Petrojam, Petcom and Wigton.
- The Energy Fund would collect not only from Petrojam but also from all Marketing Companies who import petroleum products.
- This fund would add only an infinitesimal fraction to your energy bill and would be used to finance such alternative energy projects as are economically viable and un-loaned at 2%
- In addition, every effort must be made to restore the JRC, Installation of a minerals export wharf in St. Thomas should also be a priority.

END

- But my friends tell me this is all a pipe dream and will never become a reality. For example the Energy Fund was proposed as far back as 1978 in the first Energy plan. Energy has never been a critical part of economic planning.
- They also tell me that the trucking “Lobby” is too powerful to allow displacement of road haulage with train or barge.
- They remind me of the stolen rail lines between Kingston and Spanish Town, with the objective of stopping passenger rail that competed with the “Robots”
- That may well be but before I depart this life I hope and pray for the day when our politicians can agree on what to do about Energy and Education in Jamaica, so that at least these two critical areas to our economy will no longer are regarded as political footballs.

- THANK YOU

LAST WORD

- HOW APPLICABLE IS DR. SAMPSON'S REMARK TO THE ENERGY SITUATION IN JAMAICA?
- YOU BE THE JUDGE!