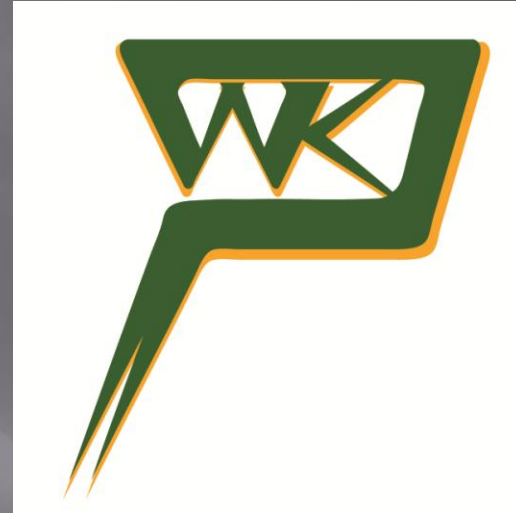


Jamaica Energy
Partners



West Kingston Power
Partners

Contributing to the National
Grid

Jamaican Electricity Market Highlights

- ▣ Jamaica has a total nameplate generation capacity of approx. 884 MW
- ▣ No indigenous sources of fuel - small (62 MW)
 - wind farm and very limited hydro resources
- ▣ Expansion in small increments, usually implemented under pressure from looming shortages
- ▣ The size of the power system doesn't allow for large generation units due to reliability and security of the grid
- ▣ Significant shortfall of base load generation in major load region (Kingston)

Jamaican Electricity Market Highlights

- ▣ Over 200 MW of JPS units are very old and inefficient – these are in need of replacement – won bid for 360MW (Due in 2014)
- ▣ 60 MW capacity was needed by the end of 2010 to replace old and inefficient units as well as to cater for load growth – WKPP (65MW) adds this capacity
- ▣ High level of system distribution losses (over 18%)
- ▣ High power prices due to the reliance on imported fuel and inefficient units.
- ▣ Medium-term plans are made for an additional 360 MW - Proposed fuel is now natural gas (transported as LNG)
- ▣ Demand growth expected to continue at a level of 4-5% p.a. over next 5 years

Regulatory Overview

▣ Legislation

- ▣ The Electric Lighting Act of 1890 provides the basic legal foundation for the electricity sector – it empowers the Minister to issue licenses to any local entity to participate in the sector
- ▣ Utility Regulations Act of 1995, amended in 2000, established a Regulator (OUR) to oversee the market players, including JPS
- ▣ The main players in Jamaica's power sector are the Ministry, JPS, the IPPs and OUR
- ▣ The Energy Division of the Ministry is involved with policy-making within the sector

Regulatory Overview

- ▣ The OUR is the independent regulatory agency responsible for regulation of the electricity, water and telecommunication sectors and is responsible for the regulation of the tariffs and maintaining industry service standards
- ▣ The OUR's responsibilities include
 - Recently:
 - ▣ Least Cost Expansion Plan
 - ▣ RFPs for New Capacity
 - ▣ Commercial Terms for new Capacity
 - ▣ Commission to review billing by JPS due to customer complaints
 - In progress/Future
 - ▣ Revised Generation Code
 - ▣ Greater control over Economic Generation Dispatch

Overview of JEP Existing Facilities

	Dr. Bird I	Dr. Bird II
Commissioned Year	1995	2006
Number of Engines	8	3
Type of Engines	Wärtsilä 12 cylinder V46 Medium Speed Diesel	Wärtsilä 18 cylinder V46 Medium Speed Diesel
Onboard Fuel Storage	60,000 barrels HFO	27,000 barrels HFO
Heat Recovery	Steam System	Thermal Oil System
Other Auxiliary Systems	Lubricating Oil, Compressed Air Cooling Water, Charge Air, Oily Water Treatment, Control Panels & Operator Stations, Fire Fighting Systems, Electrical Systems	Lubricating Oil, Compressed Air Cooling Water, Charge Air, Oily Water Treatment, Control Panels & Operator Stations, Fire Fighting Systems, Electrical Systems
Capacity/Heat rate	74 MW	50 MW

- Located adjacent to JPS's Old Harbour Bay power station (40km from Kingston)
- Highly reliable and well maintained plants
- The facilities at the Power Station include:
 - Metering/Interconnection Substation
 - Fuel Oil Handling Facilities:
 - 5 mooring buoys, Pipeline End Manifold, Fuel Hoses, 1.6 km of undersea pipeline
 - Office, warehouses and parking area



West Kingston Site

- ❑ Located along Marcus Garvey Drive and Industrial Terrace
- ❑ Industrial Zone
- ❑ Site of the old NWC sewage treatment plant



Power Plant Layout

- ❑ Based on six 12V46 Wärtsilä Medium Speed Diesel Engine Generating Sets
- ❑ Net Contracted Capacity - 65.5 MW
- ❑ Located in Western Kingston
- ❑ Primary Fuel No. 6 Heavy Fuel Oil



Efficiency of Facilities

- ▣ Design of the facilities
- ▣ JEP has been an efficient operation based on its adherence to heat rate, close to contract/design value
- ▣ WKPP location chosen to ensure it was close to the load centre, KMTR to reduce transmission losses

Fuel Choice

- ▣ No. 6 Heavy Fuel Oil is the fuel of choice
- ▣ All facilities are able to be converted to used natural gas

Reasons for Expansion

- ▣ Replacing Old and Inefficient Units
- ▣ Demand Growth
- ▣ System Balance/Security

Jamaican Generation Plants

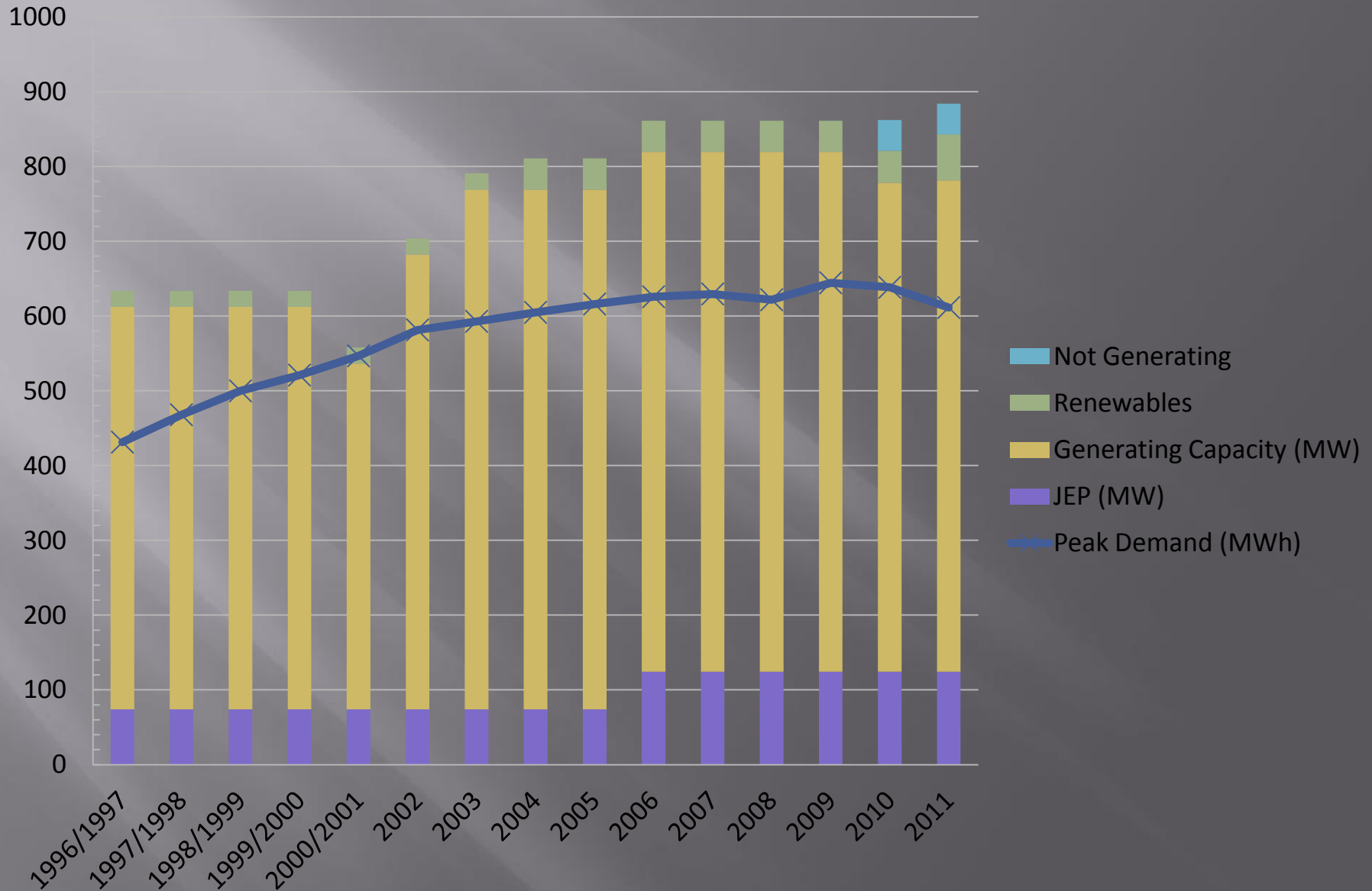
Unit No.	Year In Service	Installed Capacity (MW)	Fuel Type	Heat Rate (Btu/kWh)
IPPs				
JEP-I ⁽¹⁾	1995	74.2	No. 6 (HFO)	8,166
JEP-II ⁽¹⁾	2006	50.2	No. 6 (HFO)	8,166
JPPC	1996	61.3	No. 6 (HFO)	7,937
Wigton	n/a	20.0	Wind	n/a
Total IPP		205.7		
Additional Capacity				
Jamaica Broilers	n/a	11.0	No. 6 (HFO)	n/a
Jamalco (co-generator)	1995	11.0	Steam	n/a

Unit No.	Year In Service	Installed Capacity (MW)	Fuel Type	Heat Rate (Btu/kWh)	
JPS Oil-Fired Steam					
Old Harbour	1	1968	30.0	No. 6 (HFO)	14,705
Old Harbour	2	1970	60.0	No. 6 (HFO)	13,909
Old Harbour	3	1972	65.0	No. 6 (HFO)	12,091
Old Harbour	4	1973	68.5	No. 6 (HFO)	12,050
Hunts Bay	6	1976	68.5	No. 6 (HFO)	12,092
		292.0			
JPS Diesel					
Rockfort	1	1985	18.0	No. 6 (HFO)	9,122
Rockfort	2	1985	18.0	No. 6 (HFO)	9,122
		36.0			
JPS Gas Turbines					
Hunts Bay	5	1974	21.5	No. 2 (LFO)	14,773
Hunts Bay	10	1993	32.5	No. 2 (LFO)	12,479
Bogue	3	1973	21.5	No. 2 (LFO)	13,649
Bogue	6	1990	14.0	No. 2 (LFO)	16,233
Bogue	7	1990	14.0	No. 2 (LFO)	15,621
Bogue	8	1992	14.0	No. 2 (LFO)	15,843
Bogue	9	1992	20.0	No. 2 (LFO)	13,694
Bogue	11	2001	20.0	No. 2 (LFO)	12,107
Bogue	12	2002	38.0	No. 2 (LFO)	8,390
Bogue	13	2003	38.0	No. 2 (LFO)	8,390
		233.5			
Bogue (12/13 –2 nd cycle)		2003	38.0	Steam	8,390
Total Mini Hydroelectrics	1945-1988		21.7		
Total JPS		621.2			

JEP is the largest IPP contributing approximately 20% of the Island's electricity

(1) 8,166 Btu/ Kwh is the contracted heat rates; Dr. Bird I and II operate at 8,325 and 7,930, respectively

Installed Capacity vs Peak Demand



Generation Order of Merit

(sorted by marginal cost)

MERIT ORDER	UNITNAME	CAPACITY (MW)
1	Jamalcoa	11
2	ROCKFOR1	20
3	JPPC	60
4	ROCKFOR2	18
5	JEP	124.36
6	HUNTBAY6	68.5
7	OLHARB#4	68.5
8	OLHARB#3	65
9	Ccycle 03	114
10	OLHARB#2	60
11	OLHARB#1	30
12	GT 11	20
13	GT 12	40
14	GT 13	40
15	GT 10	32.5

Note: Merit Order based on June 2010 – JPS Data

Natural Gas in Jamaica

Not currently used in Jamaica

Could be used by:

- Residential (cooking and heating)
- Light and Medium Commercial Enterprises (various uses)
- Large Industry: Utilities and Bauxite companies

Government of Jamaica initiative since the late 1990s

- Unable then to find supplier and financing
- Change in focus of GoJ
- Ease in oil prices reduced the urgency

Reasons for Change

- High cost of heavy and light fuel oil
- Need to reduce the cost of electricity
- Need to lead off business renewal
- Natural gas is a cleaner fuel
 - Increased time between maintenance
 - Reduced NO_x emissions
- Opportune time to need for upgrading of several base load power plants

Natural Gas Adaptability

Power Sector

- Fuel 100% imported: a major impact on Balance of Payments
- High electricity costs, key impediment to economic growth

Demand Growth

- Demand growth outpacing supply increases

Ageing Existing Facilities

- Old and inefficient facilities in need for replacement

Additional Capacity Needs

- 200-300MW needed in next 3-5 years (estimated by the WB)
- Introduction of NG considered in the future

Sector Constraints

- A vertically-integrated privatized utility, partly monopolistic

Grid Constraints

- Large-unit size infeasible due to small grid size

➤ The introduction of NG is challenging as it requires significant upfront capital investment.

➤ The country's comparably small energy needs may not be sufficient to amortize such large upfront investment economically.

➤ Nonetheless, GoJ is contemplating the introduction of NG to reduce its dependency on imported oil and improve energy cost competitiveness.

➤ The Project could be adapted to NG at relatively modest capital costs

➤ The Project would be equally or more cost-competitive than small-scale CCGTs (large scale CCGTs would not be feasible due to the limited grid size).