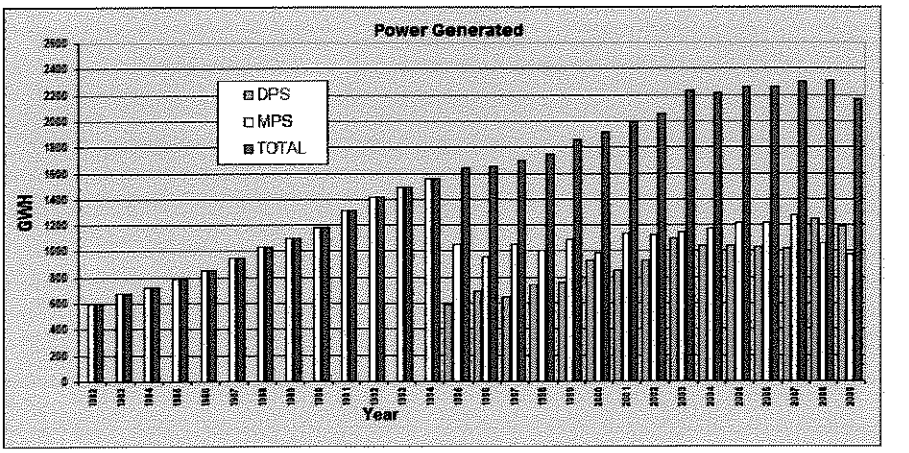
APPENDIX B

ELECTRICITY GENERATION

The Corporation continued to cater for the electricity needs in the Maltese islands, through its two power stations, the one at Marsa and the other at Delimara with an installed capacity of 267MW and 304MW respectively.

In 2009 there had been a drop of 6.2% in the amount of units generated. This was also reflected in the maximum peak demands, where in certain months it was lower by up to 10%. The reason for this drop was mainly attributed to the rise in electricity tariffs. This rise in tariffs reduced a large amount of wastage that the Maltese families were accustomed to. The weather conditions though, still played a dominant factor in the use of electricity, and the demand for electricity fluctuated irregularly during the past months. The peak demand registered in August 2009, was 403MW as compared with the 424MW maximum demand in the previous year.

All efforts were made to keep the plant at Marsa in optimum operating condition, by means of regular inspections, overhauls and maintenance. The statutory inspections of pressure vessels, boilers and safety equipment were carried out as in previous years. Similar procedures were adopted to the turbines and auxiliaries to prevent forced shut downs particularly during the peak summer months.



Other major works carried out at the Marsa Power Station included:

- **turbine No. 4 trust bearing inspections and repair;**
- **turbine No. 4 replacement of most sea-water pipe work;**
- **change-over of Turbine No.6 to new Siemens switchgear;**
- **fuel Tank No. 2 inspection was completed;**
- **re-circulation lines on feed-pumps Nos. 5 to 7 were completed;**
- **turbine No. 8 inspection: replacement of H2 seal, HPH tube leak; rehabilitated seawater discharge line 'B' and repaired throttle valve.**

The long-serving plant at the Marsa Power Station, continues to prove a great burden to the maintenance section, since the number of faults and breakdowns being registered are on the increase. The replacement of seawater lines, boiler tube leaks, feed pump failures, damaged bellows and burnt motors all reflect this situation.

A new automatic emission monitoring system was commissioned and the QAL 2 were conducted. The system was thus calibrated in July and with the new system now in service, emissions from the station are being adequately monitored online and all readings duly recorded.

APPENDIX B1/2.

SYSTEM GENERATION FIGURES		
	Actual	**Actual**
	2008	**2009**
TOTAL GENERATING CAPACITY		
MWh Generated Marsa B Stn (Steam)	1,058,949	966,151
MWh Generated Marsa B Stn (Gas)	5,739	5,900
MWh Generated Delimara Stn (Steam)	859,904	836,970
MWh Generated Delimara Stn (Gas)	4,975	15,756
MWh Generated Delimara Stn (CCGT)	382,504	342,863
Total MWh Generated	**2,312,071**	**2,167,400**
Units consumed in Stations (MWh)	127,142	121,705
Units sent out from Station busbars (MWh)	2,184,929	2,045,935
System maximum demand (MW)	424	403
System maximum demand (MVar)	210	165
FUEL CONSUMPTION (MTONS)		
Heavy Fuel Oil (Marsa)	329,102	303,029
Gas Oil (Marsa)	2,339	2,338
Heavy Fuel Oil (Delimara)	228,169	220,457
Gas Oil (Delimara)	2,020	5,541
Gas Oil (Delimara CCGT)	77,803	69,609
FUEL RATES (KG/KWH)		
Steam Units Marsa	0.311	0.314
Steam Units Delimara	0.265	0.263
Gas Turbine Unit Marsa	0.408	0.396
Gas Turbine Unit Delimara	0.406	0.352
CCGT	0.203	0.203
PLANT CAPACITY FACTOR %		
Steam Units Marsa	82.23	78.49
Steam Units Delimara	95.10	92.40
Gas Turbine Unit Marsa	38.76	39.65
Gas Turbine Units Delimara	42.10	46.90
CCGT	70.40	70.00
STATION THERMAL EFFICIENCY %		
Steam Units Marsa*	26.67	26.27
Steam Units Delimara*	31.78	31.86
Gas Turbine Unit Marsa	20.43	21.09
Gas Turbine Units Delimara	22.09	23.77
CCGT	39.48	39.28

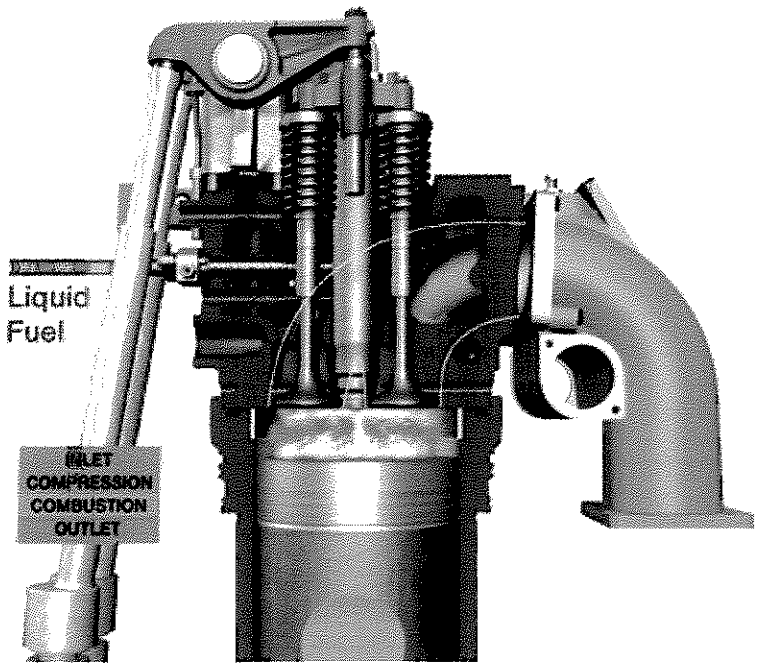
** Efficiency calculated on Net CV*

WÄRTSILÄ

Wärtsilä oil-fired engines

In the diesel process, liquid fuel is injected into the cylinder at high pressure by camshaft-operated pumps. The fuel is ignited instantly due to the high temperature resulting from the compression.

Combustion takes place under constant pressure with fuel injected into the cylinder during combustion. After the working phase, the exhaust gas valves open and the cylinder is emptied of exhaust gases. With the piston in its upper position, the inlet valves open just before the exhaust gas valves close, and the cylinder is filled with air. In Wärtsilä engines the inlet valves close just before the piston reaches the bottom dead centre. This method, called "Miller timing", reduces the work of compression and the combustion temperature, which results in higher engine efficiency and lower emissions.



Wärtsilä 20 main technical data

Wärtsilä 32 main technical data

Wärtsilä 46 main technical data

The Wärtsilä 46 is a medium-speed engine for which reliability and total economy have been the guiding principles. Extensive testing in our modern diesel laboratory backed up by several thousand running hours have made the Wärtsilä 46 a really reliable diesel engine. Laboratory testing is full-scale engine testing: it covers various types of endurance testing, and also combustion measurements and system optimizations. All these confirm theoretical calculations,

simulations as well as performance mapping of such factors as heat balance, fuel and lube oil consumption, exhaust emission, noise and vibration level.

Wärtsilä engine designs are based on generations of know-how combined with innovations in response to customer needs.The Wärtsilä 46 engine offers customers the following **benefits**:

- Real reliability
- Low operating costs
- Low exhaust gas emissions
- Easy and cost-effective installation
- Proven flexible mounting technology
- Easy maintenance

Technical data 50 Hz/500 rpm		**12V46***	**18V46***
Power, electrical	kW	11384	17076
Heat rate →	kJ/kWh	7732	7732
Electrical efficiency	%	46,6	46,6
Technical data 60 Hz/514 rpm			
Power, electrical	kW	11384	17076
Heat rate	kJ/kWh	7732	7732
Electrical efficiency	%	46,6	46,6
Dimensions and dry weight of generating sets			
Length	mm	15400	18780
Width	mm	5090	5320
Height	mm	5700	6020
Weight	tonne	265	358

Heat rate and electrical efficiency at generator terminals, including engine-driven pumps. ISO 3046 conditions and LHV. Tolerance 5%. Power factor 0.8.
* Gas-diesel version available.

Read more from our Wärtsilä 46 technology review brochure.

Wärtsilä 46F main technical data

Contact us ›