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(Ref.- Nr.: GT435EPCWEB)

900 MW Combined Cycle Power Plant (2 units a 450 MW) for sale:



Main Power Station Data

Power Output (net)	2 x 450 MW
Lay-out	2 Modules x (2 GT + 1 ST)
Grid connection	400 kV
Net make up water flow (river quality, current location)	200 kg/s
OEM	Siemens
Combined Cycle Mode Efficiency	49,5 %
Open Cycle Mode Efficiency	33,0 %
Total Surface (gross)	10 Ha

Milestone	Date
Signing of EPC Contract	1991
COD	1992
Mothballing	2002
Recommissioning	2003
Latest Major Overhaul (Module 1 / Module 2)	2005 / 2006
Latest Medium Overhaul (Module 1 / Module 2)	2010 / 2011
Official Closure Date	June 2015

	Design (@15°C, 1013 mbar)	Actual
CCGT (Module)	450 MW	456 MW
Net Efficiency	50,5 %	49,5%

Operational range: 80 MW – 912 MW

Start-up gradient OCGT operational mode: 22 MW/min

Start-up gradient CCGT operational mode at hot start:	4,0 MW/min
Start-up gradient CCGT operational mode at warm start:	1,5 MW/min
Start-up gradient CCGT operational mode at cold start :	0,7 MW/min

Emission levels:	Permit	Actual	Legislation
NOx	50 mg/Nm ³	25 - 35 mg/Nm ³	IED Compliant
CO	50 mg/Nm ³	0 - 10 mg/Nm ³	IED Compliant

Generator OEM – GT	Siemens
Generator Model Type – GT	TLRI 108/36
Date installed – GT	1991 (re-commissioned 2003)
Generator cooling type – GT	Air
Generator MVA - GT	173
Generator Voltage – GT	11,00
Generator Power Factor – GT	0,85
Generator breaker – GT	ABB (180 MVA)
Generator OEM – ST	Siemens
Generator Model Type – ST	THRI 93/40
Date installed – ST	1991 (re-commissioned 2003)
Generator cooling type – ST	Hydrogen
Generator MVA - ST	200
Generator Voltage – ST	11,00
Generator Power Factor – ST	0,85
Generator breaker – ST	ABB

- The plant was built by Siemens under an EPC contract
- The whole plant was constructed using a modular approach with high level of prefabrication by Siemens at their workshop in Germany
- Robust and reliable Siemens V.94.2 generation family
- Equipped with by-pass stack (CCGT and OCGT operational modes possible). Very high flexibility and rapidness in the respond



Steam turbine OEM	Siemens, D Class HP Turbine N Class LP Turbine (dual flow)
Cylinder arrangement	2 casings (HP turbine + LP turbine)
Steam Turbine Power (MW) (Rated Power to Generator terminals)	168.4
Shaft speed	3000
Anti-icing Type	Warm air extraction from compressor discharge
Air inlet OEM	AAF
Number of filtration stages	2 static filter stages (pre-filter (AMERKLEEN M80) / fine filter (DURACEL XL 90M))
Number of cells	Pre-filter: 420 Fine filter: 420
Number of Coalescers	None
Pre-Filter equipment	Weather hood Anti-bird screen Vertical vane weather louver
Any Inlet fogging / chilling installed?	No
Condenser type	Water cooled condenser
Condenser manufacturer	Siemens, Aluminium Bronze tubes
Direct or indirect cooling system	Semi Dry Cooling Tower
Cooling water	Treated river water
Boiler feed pump manufacturer	KSB, Germany
Boiler feed pump	3x50%
Condensate extraction water pump manufacturer	KSB, Germany
Condensate extraction water pump	2x100%
Cooling water pump manufacturer	Weirs, UK
Cooling water pump	2x50%
CW pump type	vertical suspended pump
Bypass Capacity	100
Balance of Plant	Cooling Tower make-up water from river, 2x100% water extraction pumps

GT Auxiliaries	Condition monitoring system	Vibrometer VM600, connection to WIN_TS
	Lubrication oil product	Castrol AWT46
	Lubrication oil filtration	Duplex cartridge filters + bypass oil filtering system and Jensen filter
Emissions Control	NOx control method	dry low NOx combustion system
Control Systems	Plant level DCS system	Module 1: Siemens SPPA-T2000/TP ME Module 2: Siemens SPPA-T3000 Unit 0: Siemens SPPA-T2000/TP ME
	Plant level DCS system age (latest refurbishment)	Module 1: 1992 - 2004 Module 2: 2011 Unit 0: 1992 - 2004
	GT control system	Module 1: Siemens SPPA-T2000/TP ME Module 2: Siemens SPPA-T3000
	GT control system age (latest refurbishment)	Module 1: 1992 - 2004 Module 2: 2011 Unit 0: 1992 - 2004

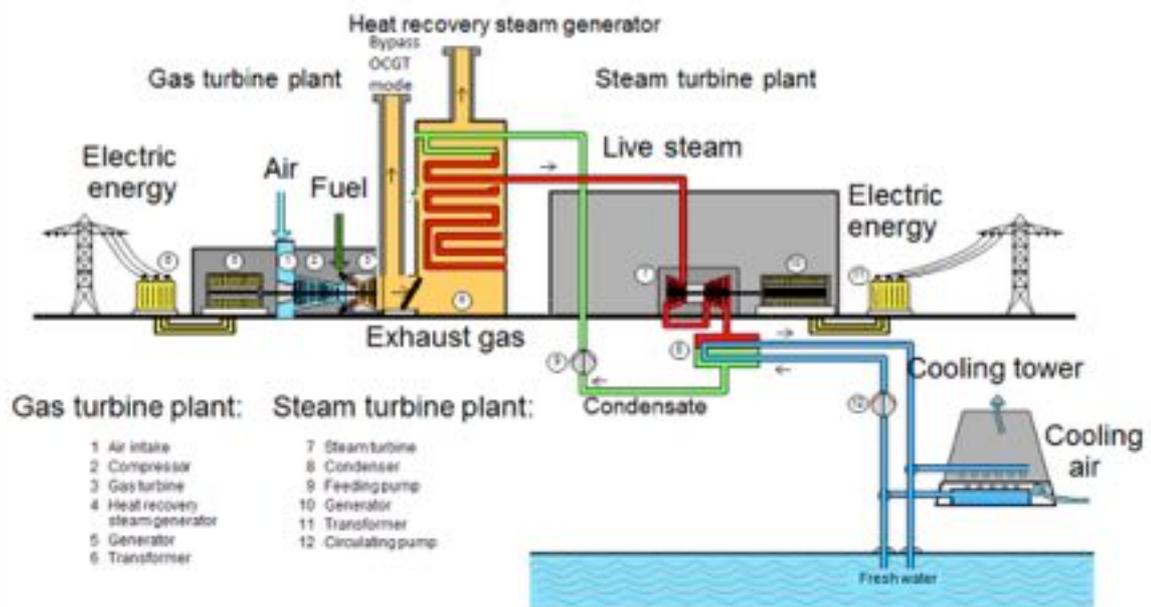
Year	EOH (Cumulative)	Starts (Cumulative)
2011	129428	1595
2012	132137	1758
2013	133581	1885
2014	135371	1980
2015	135914	2006
From June 2015	Plant officially closed. Preservation measures in place to ensure potential reutilization.	

Generator Transformer OEM – GT	Trafo Union, type TRSM256
Generator Transformer MVA – GT	180 MVA
Generator Transformer Spares – GT	1 Full trafo
Generator Transformer OEM – ST	Trafo Union, type TRSM256
Generator Transformer MVA – ST	180 MVA
Generator Transformer Spares – ST	1 Full trafo
Generator Transformers Voltage Ratio (all)	410/11
Grid Connection voltages	400
Black Start and Emergency Diesel	1 Diesel engine in container assembly, 400 KVA
MV switchgear OEM	Siemens
LV switchgear OEM	Siemens

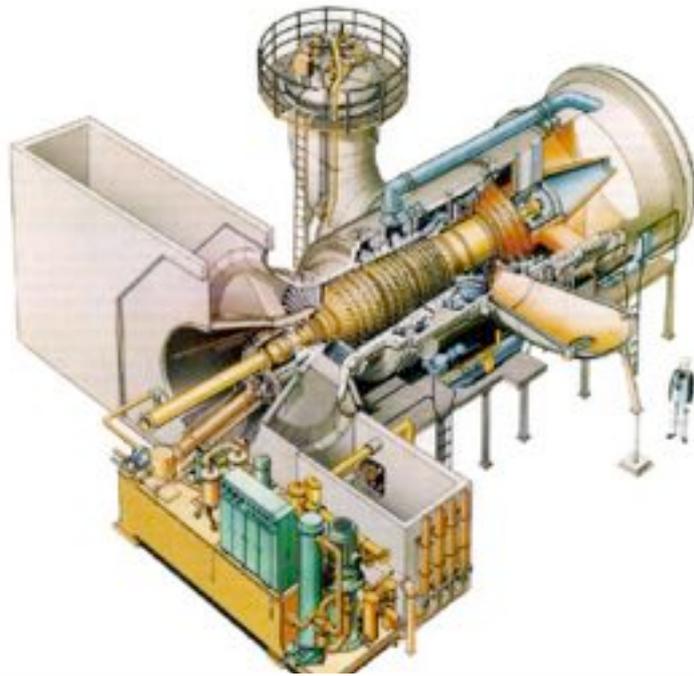
- Unit start-up (notice time to synchronization)
 - CCGT mode (hot start up): 60 mins
 - CCGT mode (warm start up): 85 mins
 - CCGT mode (cold start up): 240 mins
 - CCGT mode (very cold start up): 960 mins
 - OCGT mode: 15 mins
 - In CCGT mode, both modules can start up with a 30 min intervals
- OCGT start and transfer into online transfer into CCGT mode possible
 - Total time since start transfer to full load: 360 mins
- Reactive Power: Up to 434 MVAR at full load available (grid services market)
- Frequency response capabilities at all load range between 0 and 450 MW in frequency range +/- 0.5 Hz

HSRG OEM	Babcock
Construction (horizontal/vertical gas path)	Horizontal
Pressure regime	Double-Pressure
Circulation (e.g. natural, assisted, etc.)	HP & LP: Forced
Type of design	Drum type HP and LP
Boiler Circulation Pump manufacturer	KSB, Germany
Boiler Circulation Pump (HP / LP)	HP - 2x100% / LP - 2x100%
HP Steam Pressure (bar(a))	86
HP Steam Temperature (Celsius)	522
HP Steam Flow (kg/s)	66
LP Steam Pressure (bar(a))	9,5
LP Steam Temperature (Celsius)	250
LP Steam Flow (kg/s)	11
Any bypass stack?	YES
GT Manufacturer	Siemens
GT Type	V 94.2
GT serial number	GT 11 – 800187, GT 12 – 800183, GT 21 – 800189 & GT 22 – 800179 (4 Units)
GT unit power	147 MW at 15 °C and 1.013 bar
GT Pressure Ratio	10.7
Fuel	Natural Gas (18 barg)
Typical NOx Emissions (stable load)	Guaranteed max 35 mg/Nm ³ (IED Compliant) Guaranteed 50 mg/Nm ³ above 60% GT Load (66% CC Load)
Typical CO Emissions (stable load)	(IED Compliant)
Standard Outage Cycle	Minor Outage: 8.000 EOH B – Outage: 20.000 EOH C – Outage: 40.000 EOH
Other relevant info	All GT equipped with on-line and off-line blade wash system

GT Compressor	Variant	axial compressor
	Number of stages	16
	Number of blow off valve stages	3 in total: 2x stage 5 / 1x stage 10
	Off/On line washing products	Detergent
GT Combustion System	Variant	Two silo type combustion chambers with a total of 16 dry low NOx burners
	Combustion tuning performed by	Siemens
GT Turbine	Variant	axial turbine
	Number of stages	4



GT: Siemens V94.2



Pricing for full EPC on a preliminary base: 232 Mio. EUR, including zero hour overhauled (condition like new, including 1 year manufacturer warranty).

Pricing full O&M on a preliminary base: 11,98 Mio. EUR per year.

In case you have any questions, please do not hesitate to contact our office

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