

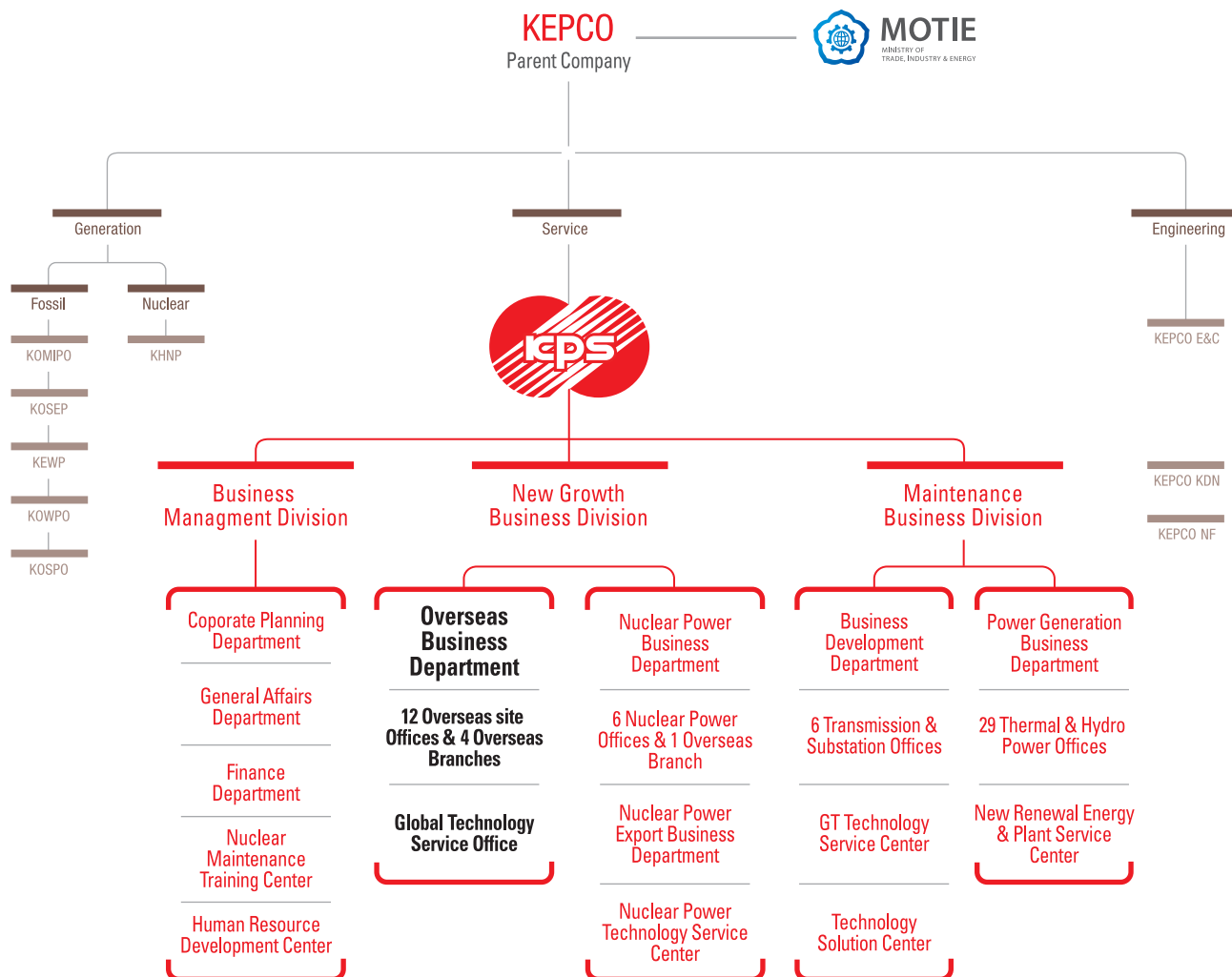
KEPCO KPS

Company Profile 14/15

KEPCO KPS has taken the initiative in maintain electric power and industrial facilities in and outside Korea effectively and efficiently and grown to be one of the best comprehensive plant service company in the world.



Organization Structure

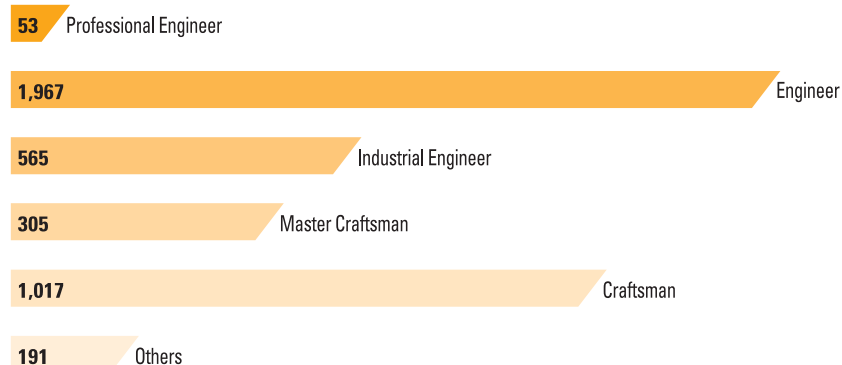


KEPCO Group

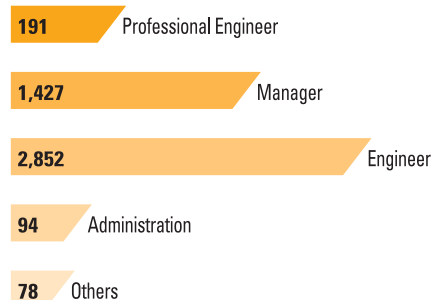
- | | |
|---|--|
|  KEPCO KPS KEPCO Plant Service & Engineering Co., Ltd. |  KOMIPO Korea Midland Power Co., Ltd. |
|  KEPCO E&C KEPCO Engineering & Construction Company, Inc. |  KOSEEP Korea South-East Power Co., Ltd. |
|  KEPCO KDN KEPCO Knowledge, Data & Network Co., Ltd. |  KEWP Korea East-West Power Co., Ltd. |
|  KEPCO NF KEPCO Nuclear Fuel Company, Ltd. |  KOWPO Korea Western Power Co., Ltd. |
|  KHNP Korea Hydro & Nuclear Power Company |  KOSPO Korea Southern Power Co., Ltd. |

Employees Status

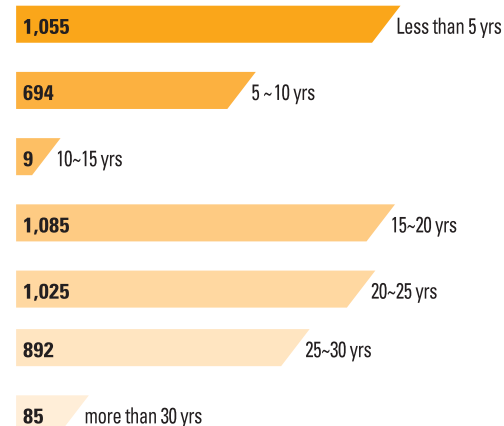
Certification



Work Field



Work Experience



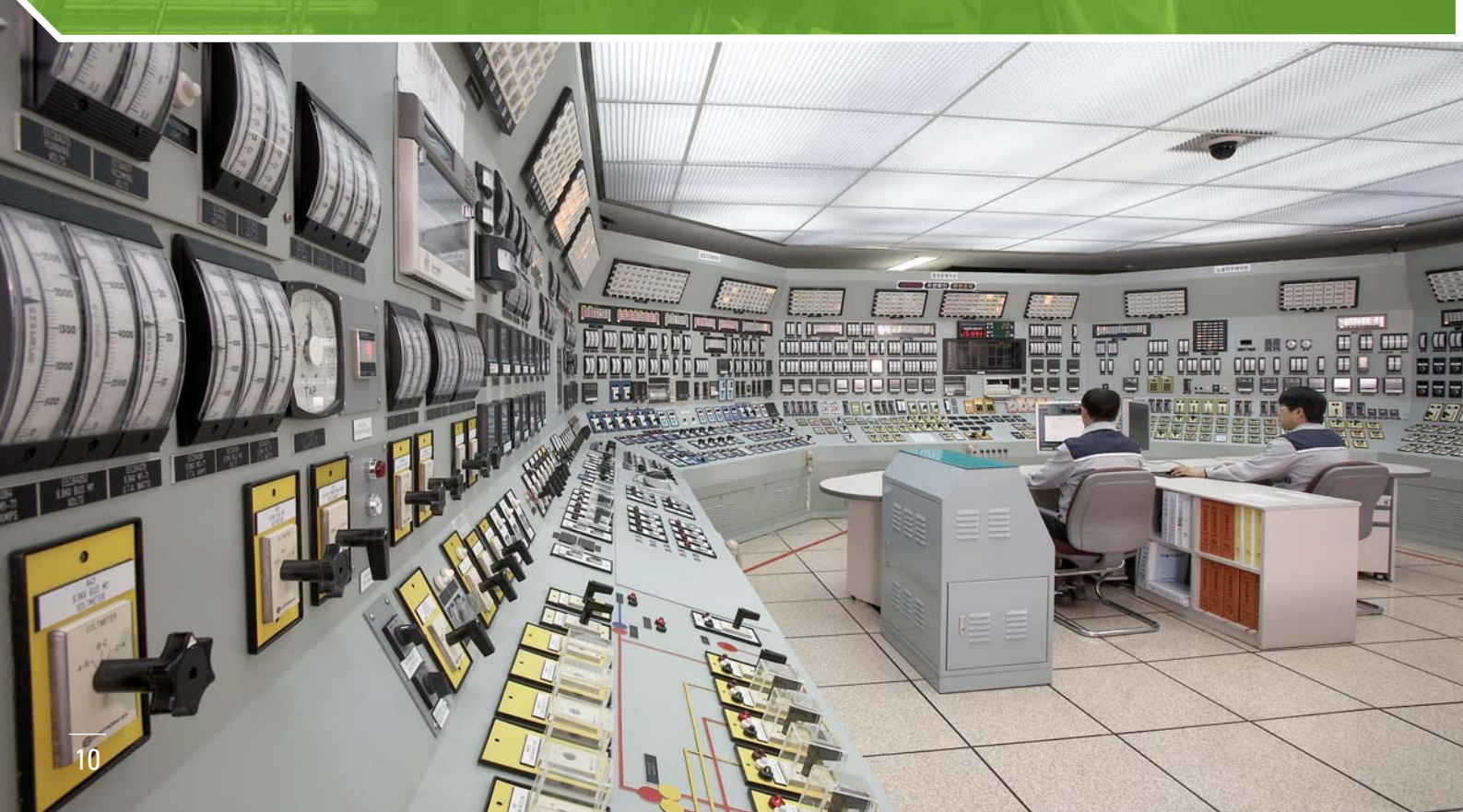
Financial Status

Million USD		2013	2012	2011
Total Assets	Current	415.3	406.5	350.4
	Non-Current	379.8	349.7	322
	Total	795.1	756.2	672.4
Total Liabilities	Current	173.3	173.6	151
	Non-Current	32.7	51.1	27.3
	Total	206	224.7	178.3
Total Equity	Current	8.5	9	9
	Non-Current	580.5	522.5	485.1
	Total	589	531.5	494.1



Operation & Maintenance

Our Vision is to establish KEPCO KPS as a "Global Leading Business Partner for Green Energy Management." With this in mind, we see the world as our playing field where we proudly provide the following services: O&M, Retrofit and Maintenance of power facility equipments and training of workers.



Covered Capacity (Overseas)

	Thermal	CCPP	Diesel	Total
Unit	32	12	79	123
Capacity(MW)	3,533	1,682	845	6,060

- Daily Operations and Routine Maintenance
- Spare Parts and Inventory Management
- Staffing, Site Personnel Training
- Environmental Compliance Management
- Performance Monitoring and Diagnostics
- Management Information Report

Corporate Social Responsibility

India

- Jalsuguda** Support orphanage
Support cyclone damage recovery
- Chanderiya** Support flood damage recovery
Provide necessities to school for handicapped people
- Wardha** Support local development
Support unfortunate children
Held a local athletics competition
- Vemagiri** Food donation
Provide necessities to local village near power plant
- Balco** Provide necessities to social welfare facility (Divya-Jyoti Hostel)
Invite outstanding local employees to Korea for benchmark training
- GMR** Provide necessities to local school (Vellachemy)
Invite outstanding local employees' family to power plant

Madagascar

- Ambatovy** Support Local School
Support Local Youth Football Team



O&M Experiences

In progress

Fuel	Power Station	Capacity	Contract	Country			
Thermal	Chanderiya (HZL)	234 MW	77 MW x 2	BHEL	Since 2004	India	
			80 MW x 1				
	Jharsuguda (VAL)	1,215 MW	135 MW x 9	SEPCO - II	Since 2008		
	ATPS (GMDC)	250 MW	125 MW x 2	Ansaldo	Since 2013		
	Bhavnagar (BECL)	500 MW	250 MW x 2	BHEL	Since 2014		
	Wardha (Wardha Power Co.Pvt.,Ltd)	540 MW	135 MW x 4	Dongfang	Since 2009		
CCPP	Ambatovy (DMSA)	185 MW	ST : 45 MW x 3	SIEMENS	Since 2009	Madagascar	
			DG : 1.5 MW x 37				
	San Jose (UTE)	532 MW	GT : 173 MW x 2	SIEMENS	Since 2015		Uruguay
		ST : 186 MW x 1					
Putting Bato (SLTEC)	270 MW	135 MW x 2	Harbin Dongfang	Since 2014	Philippines		
Meghnaghat (SMPCL)	335 MW	GT : 110 MW x 2	GE	Since 2013	Bangladesh		
		ST : 115 MW x 1					
Daharki (FPCDL)	175 MW	GT : 115 MW x 1	GE	Since 2009	Pakistan		
		ST : 60 MW x 1					
Diesel	IPP3 (Al Manakher)	589 MW	15.5 MW x 38	Wärtsilä	Since 2013	Jordan	





Routine Maintenance

KEPCO KPS inspects operating facilities on a daily basis by following services: Preventive, Predictive and Corrective maintenance. Any defects found are fixed immediately during operation, hence enhancing operational reliability.



Covered Capacity (Domestic)

	Thermal	CCPP	Nuclear	Hydro	Diesel	Total
Unit	72	94	20	14	6	206
Capacity(MW)	18,031	12,101	16,815	3,900	120	50,967

Covered Capacity (Overseas)

	CCPP	Diesel	Total
Unit	9	2	11
Capacity(MW)	1,633	80	1,713

Experiences (Overseas)

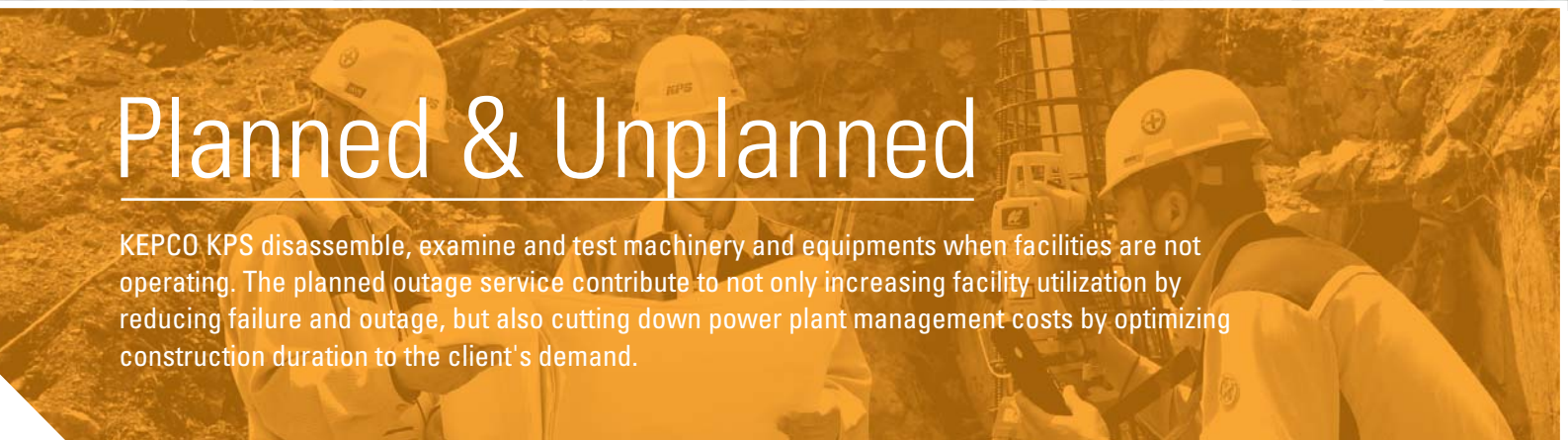
Fuel	Power Station	Capacity	Country	Contract	Remarks	
CCPP	Ilijan (KEILCO)	1,200 MW GT : 200 MW x 4 ST : 200 MW x 2	MHI	Philippines	Since 2002	Routine Maintenance & O/H In progress
	Norte II (KESC)	433 MW GT : 150 MW x 2 ST : 133 MW x 1	GE	Mexico	6 Years from Oct. 2012	Routine Maintenance & O/H In progress
Diesel	Carbras Diesel (German Power Authority)	80 MW 40 MW x 2	MAN	Guam	5 Years from Jun. 2010	Maintenance TA Complete





Planned & Unplanned

KEPCO KPS disassemble, examine and test machinery and equipments when facilities are not operating. The planned outage service contribute to not only increasing facility utilization by reducing failure and outage, but also cutting down power plant management costs by optimizing construction duration to the client's demand.



Planned & Unplanned Maintenance

Field Overhauls

- | | | |
|---------------------------|--|------------------------|
| ST : Grade A, B, C | • Alignment with Gauge/Laser | • Rotor Balancing |
| | • Repair BOP Equipments : Compressor, Pump, Valve and etc | |
| | • Vibration Trouble Shooting | • Non-Destructive Test |
| GT : MI, HGPI, CI | • Check and Repair Components : Bucket, Nozzle, Transition Piece and etc | |
| GEN | • Generator Rewinding | • Electrical Test |

Life Cycle Extension

Emergency Maintenance

Rehabilitations

Experiences
(Domestic)

KEPCO KPS is taking responsibility of Planned and Unplanned maintenance for almost power plants in South Korea

Power Plant Type	Thermal	Diesel	Nuclear	Other	Total
Covered Capacity	13,795	4,176	11,787	40	29,838

01 Jun 2013~31 May 2014 (Unit : MW)

Experiences
(Overseas)

Fuel	Power Station	Capacity		Country	Contract	Remarks	
Thermal	Malaya (KEPPHICO)	650 MW	300 MW x 4	SIEMENS	Philippines	Since 1996	Major OH TA TBN Vibration 20 Projects
			350 MW x 2	HITACHI			
	Quezon (QPL)	440 MW	440 MW x 4	GE	Philippines	Since 2003	Major OH TA Tube Repair 5 Projects
	Baywater (Macquarie Generation)	2,640 MW	660 MW x 4	TOSHIBA	Australia	Since 1999	Major OH TA 10 Projects
	Eraring (Eraring Energy)	2,880 MW	720 MW x 4	TOSHIBA	Australia	Since 2000	Major OH TA 12 Projects
	Tarjun (Eraring Energy)	55 MW	55 MW x 1	ABB	Indonesia	1 Month from Mar. 2011	GEN Rotor Repair
	Lal Pir Power (AES)	350 MW	350 MW x 1	MHI	Pakistan	2 Month from Oct. 2010	Major OH TA
	PAKGEN (Pakgen Ltd.)	730 MW	365 MW x 2	MHI	Pakistan	2 Month from Jan. 2012	Major OH TA
Matimba/Grootvlei (ESKOM)	1,010 MW	350 MW x 1	Man	South Africa	2 Years from Feb. 2008	Major OH TA	
		660 MW x 1					

Planned & Unplanned



Planned & Unplanned Maintenance

Experiences (Overseas)

Fuel	Power Station	Capacity	Country	Contract	Remarks		
Thermal	Hendrina (Rotek Engineering)	200 MW	200 MW x 1	Kraftwerk Union	South Africa	2 Months from Feb. 2012	TA Service (Overhaul)
	Majuba U3 (Rotek Engineering)	600 MW	600 MW x 1	GEC	South Africa	3 Months from Mar. 2012	TA Service (Overhaul)
	Batanggas(#2) (Emerald Energy Co)	300 MW	300 MW x 1	GEC Alstom	Philippines	3 Months from Dec. 2008	TBN/GEN (Overhaul)
	Rabigh IPP (KEPCO)	1,320 MW	660 MW x 2	Dongfang	Saudi Arabia	1 Month from Sep. 2012	TA Service
	Calaca (NPC)	600 MW	600 MW x 1	GEC Alstom	Philippines	2 Months from Mar. 2005	GEN/TBN (Repair)
	Marafiq (Hanhwa)	500 MW	250 MW x 2	Doosan	Saudi Arabia	26 Months from Jun. 2012	TA Service
	Tutuka U3 (Rotek Industries SOC Limited)	600 MW	600 MW x 1	GEC	South Africa	88 Days from Dec. 2012	TA Service
	Tutuka U4 (Rotek Industries SOC Limited)	600 MW	600 MW x 1	GEC	South Africa	90 Days from Sep. 2013	TA Service
	Tanjungjati B (PT. TJB Power Service)	1,320 MW	660 MW x 2	TOSHIBA	Indonesia	47 Days from Dec. 2012	TBN OH
	Egbin (Korea Electric Power Nigeria Ltd.)	1,320 MW	220 MW x 6	HITACHI	Nigeria	14 Days from Apr. 2014	TBN Boiler BOP



Fuel	Power Station	Capacity		Country	Contract	Remarks	
CCPP	Ilijan (KEILCO)	1,200 MW	GT : 200 MW x 4	MHI	Philippines	Since 2002	Major Inspection Major OH TA Service
			ST : 200 MW x 2				
	Habibullah (Habibullah CPP)	126 MW	GT : 33.5 MW x 3	GE	Pakistan	Since 2011	TA Service (GT, ST, GEN O/H) 2 Projects
			ST : 35.8 MW x 1	MHI			
	Bataan (Panasia Energy)	600 MW	GT : 70 MW x 6	Alstom	Philippines	Since 2012	Major OH GEN Lfe Extention 4 Projects
			ST : 90 MW x 2				
	Zahrani (KELECO)	435 MW	GT : 145 MW x 2	SIEMENS	Lebanon	Since 2010	Major OH GEN Rotor Repair 4 Projects
			ST : 145 MW x 1				
	Deir-Amar	435 MW	GT : 145 MW x 2	SIEMENS	Lebanon	3 Months from Mar. 2006	HRSG
			ST : 145 MW x 1				
	Lan Krabu Plant (EGAT)	-	-	GE	Thailand	2 Months from Feb. 2004	Component Repair 1st bucket
	Cantho	-	-	GE	Vietnam	7 Months from May. 2003	Component Repair
	SEC (SAECO)	-	-	GE	Saudi Arabia	5 Years from Jan. 2009	TA Service (GT, Overhaul)
	Merak (Posco Engineering)	120 MW	GT : 60 MW x 2	Fuji	Indonesia	7 Months from Jul. 2012	TA Service
	Jizan (SAECO)	20 MW	GT : 20 MW x 1	GE	Saudi Arabia	1 Months from Aug. 2008	TA Service (GEN, Overhaul)
Kabiwala (FKPCL)	157 MW	GT : 48.4 MW x 2	Westing House	Pakistan	1 Months from Sep. 2011	GEN, Overhaul	
		ST : 59.4 MW x 1					
Hub Power (IPGDL)	1,292 MW	324 MW x 4	Ansaldo	Pakistan	8 Days from Nov. 2012	HIP & LP Operation	
Qurayyah (SAECO)	625 MW	STG : 625MW x 1	MHI	Saudi Arabia	10 Days from Nov. 2012	TA Service	
Engro (Engro Powergen Qadirpur Ltd.)	217 MW	-	-	Pakistan	8 Days from Oct. 2013	TA Service (GT, GEN)	
Arzew Refinery (Hyundai Eng.)	35 MW	GT : 35MW x 1	GE	Algeria	7 Days from Oct. 2013	TA Service	



Commissioning & Performance Test

KEPCO KPS participates in the startup phase of a power plant, which is the last phase of the construction process that takes place 12 months prior to completion, to ensure integrity of facilities for commercial operation.



Commissioning

Technical Support

- No Load Test / Load test
- Cold / Hot Commissioning
- Steam Blowing
- Synchronize, Back Energize
- Developing Maintenance Manual
- Vibration Measurements

Turn-over to Owner

Reliability Tests



Performance Test

Overall Plant Performance Test

- Gross Power Output (Generator Terminal)
- Net Power Output (Step up Tr, HV Side)
- Net Power Output (@LHV)
- Additive (Sorbent) Consumption
- Unit Internal Electrical Consumption
- Common Auxiliary Consumption

Steam Turbine Acceptance Test

- Maximum Capacity Test
- Turbine Cycle Power Output (@Rated Condition)
- Turbine Cycle Heat Rate (@Rated Condition)

Natural Gas Combustion Test

- Maximum Capacity Test
- Gross Heat Rate (HHV)
- Net Capacity
- Net Heat Rate (HHV)
- Exhaust Gas Temp.
- Exhaust Gas Mass Flow Rate

Test Standards

- ASME PTC 46 Combined Cycle
- ASME PTC 22 Gas Turbine
- ASME PTC 6.2 Steam Turbine
- ASME PTC 4.4 HRSG
- ASME PTC 19.1 Uncertainty
- Heating Valve ISO 6976



Commissioning & Performance Test

Experiences

Fuel	Power Station	Capacity	Country	Contract	Remarks		
Thermal (Coal)	Jorf Lasfar	700 MW	350 MW × 2	MHI	Morroco	23 Months from Aug. 2012	Turn-key Commissioning
	Ambatovy (DMSA)	135 MW	45 MW × 3	SIEMENS	Madagascar	Ongoing from Aug. 2009	Commissioning
	Chanderiya (HZL)	234 MW	77 MW × 2	BHEL	India	1 Year from Oct. 2004	
			80 MW × 1				
	Jharsuguda (VAL)	1,215 MW	135 MW × 9	SEPCO-III	India	1 Year from Feb. 2008	
Wardha (Wardha Power Co. Pvt Ltd)	540 MW	135 MW × 4	Dongfang	India	8 Months from Feb. 2002		
Combined Cycle (Gas)	TBP (HDEC)	220 MW	GT : 45 MW x 4	GE	India	1 Year from Nov. 2000	Commissioning & Maintenance
			ST : 40 MW x 1				
	Termonorte (HDEC)	340 MW	GT : 75 MW x 3	GE	Brazil	Since Dec. 2000	Consulting
			ST : 115 MW x 1				
	SHINTAO (DOOSAN)	750 MW	-	HRSG (DOOSAN)	Taiwan	2 Months from Sep. 2001	Consulting
	IRONWOOD (DOOSAN)	700 MW	GT : 240 MW x 2	HRSG (DOOSAN)	U.S.A	1 Month from Sep. 2001	Consulting
			ST : 220 MW x 1				
	Fujaira (DOOSAN)	660 MW	GT : 105 MW x 4	GE	UAE	18 Months from Oct. 2001	Consulting
			ST : 120 MW x 2				
	DEB (DOOSAN)	80 MW	80 MW × 1	Rolls-Roys	Indonesia	6 Months from Nov. 2009	TA Service
	SIPCO (Hyundai Eng.)	167 MW	GT : 110 MW x 1	FUJI	Thailand	14 Months from Sep. 2009	Consulting
			ST : 57 MW x 1				
	PTT (HEC)	114 MW	GT : 38 MW x 3	GE	Thailand	6 Months from Jun. 2011	Commissioning & Supervising
	Sabiya (HHI)	2,004 MW	GT : 224 MW x 6	GE	Kuwait	17 Months from Dec. 2010	TA Service
ST : 218 MW x 3							
Riyadh	1,803 MW	GT : 157 MW x 7	GE	Saudi Arabia	3 Months from Nov. 2011	TA Service	
		ST : 352 MW x 2					
Qudus	500 MW	GT : 125 MW x 4	GE	Iraq	23 Months from May. 2012	Commissioning	
TAZA (Hyundai Eng.)	292 MW	GT : 292 MW x 1	SIEMENS	Iraq	12 Months from Mar. 2013	Commissioning	
UCH - II (Hyundai Eng.)	375 MW	2GT ST 2HRSG	GE FKH	Pakistan	11 Months from Mar. 2013	Commissioning	
Rumaila (Hyundai Eng.)	1,415 MW	GT : 283 MW x 5	SIEMENS	Iraq	11 Months from May. 2013	Commissioning	
MEB Add-On (Hyundai Eng.)	22 MW	1ST 2HRSG	Kawasaki SC Engineering	Indonesia	6 Months from Apr. 2014	TA Service	

Retrofit

Fuel	Power Station	Capacity		Country	Contract	Remarks
Thermal (LNG)	Egbin Power (PHCN)	440 MW	220 MW × 2	HITACHI	Nigeria	1 Year from Nov. 2007 Boiler (2Units)
Thermal (Coal)	Eraring (Eraring Energy)	3,000 MW	750 MW × 4	TOSHIBA	Australia	26 Months from Aug. 2009 Upgrade(#1~ #4) 660 → 750MW
	NAGA (Salcon Power)	110 MW	55 MW × 2	ABB	Philippines	Since 2004 Restoration 3 Projects
Thermal (Oil)	Khratoum North Power (NEC)(#3, #4)	120 MW	60 MW × 2	SIEMENS	Sudan	7 Months from Oct. 2009 CTCS
	Khratoum North Power (NEC)(#1, #2)	60 MW	30 MW × 2	SIEMENS	Sudan	2 Months from Aug. 2007 Condenser Tube
Combined Cycle (Gas)	Jizan (SAECO)	20 MW	20 MW × 9	GE	Saudi Arabia	1 Month from Dec. 2007 GEN Rehabilitation
Diesel Generator (Diesel)	P.T SAI (P.T SAI)	31 MW	6 MW × 6	NIGATA (NIGATA)	Indonesia	3 Months from Jun. 2006 -
Hydro	Bendela Hyd P/P (Eraring Energy)	40 MW	40 MW × 1	-	Australia	1 Year from Jun. 2007 -



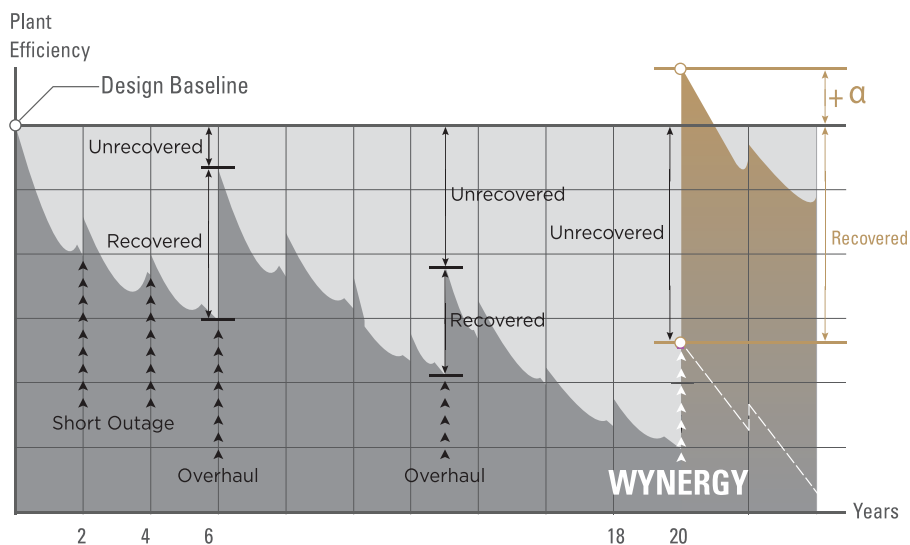
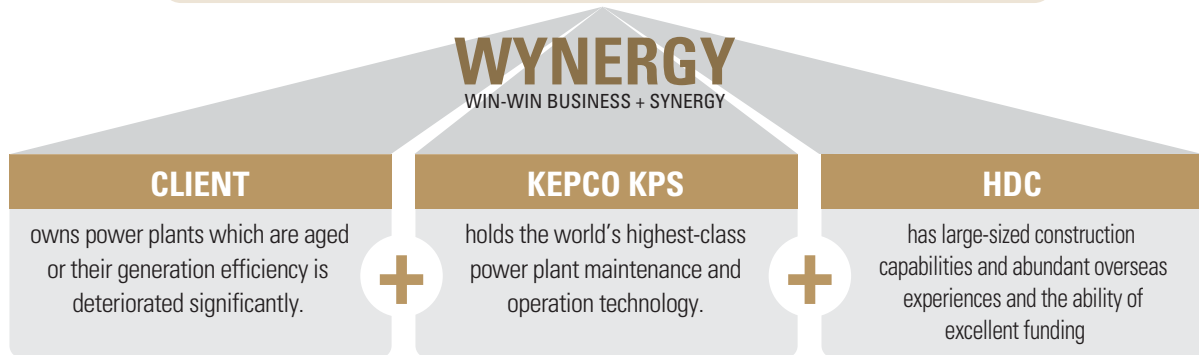
ROMM (Rehabilitation+O&M+Management)

KEPCO KPS Company Profile Leading into the Future World-Class Services!



Low Cost and High Performance! You can Realize Through WYNERGY!

The clients can create the profits by improvement of operation efficiency through the performance improvement of power plants without financial and technical burdens.



Other Services

GT/ST/DG Part Repair

GT Technology Service Center provides following services:

GT Technology Service Center

Non-destructive Test	Metallurgical Analysis	Wrap TIG welding
Thermal Barrier Coating by APS and LVPS	Heat Treatment	FEM Analysis
Dry & Wet Blasting	Renovation	Balancing
Rotor Stack & Unstack skill	Rewedging and Tightness Test	

Repair Services

Bucket tip shroud	Buckets	Inlet guide vane angle
Modification fuel nozzle	Nozzle Modification	Nozzle segments
Shroud blocks	Stator Coil End	Seal Strip, Diaphragm
Combustor transition form and cooling halls		

Model Lists

GE	MS5001	MS6001B	MS7001B
	MS7001F	MS7001FA	MS7001FA+
	MS7001FA+e		
Siemens	W251B4	W501D5	V84.3A
Alstom	GT24	GT11 N	GT11 N2
MHI	M501D	M501F	M501G
	M501J		

Certification

HSE & Quality	ISO 9001	ISO 14001	KOSHA 18001	K-OHSMS 18001
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