



SAUDI ELECTRICITY COMPANY (SEC)

SAUDI ARABIA

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Power Gen 2012

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INTRODUCTION

INTRODUCTION

- ❑ Saudi Electricity Company (SEC) was established in 2000 as a Saudi Joint Stock Company with paid-up capital of SR (33.7) billion.
- ❑ SEC is (74%) owned by the Government and (7%) owned by Saudi Aramco, amounting to (81%) Government owned
- ❑ SEC provides power generation, transmission, distribution & customers services, either by itself or by its subsidiaries in the Kingdom of Saudi Arabia.

SEC MAJOR ROLES AND RESPONSIBILITIES

- Provide stable and reliable power supply for all customers in the kingdom.
- Committed to infrastructure investment in Generation, Transmission & Distribution networks.
- Establish an interconnected grid throughout the Kingdom, to enable the optimum means of stability, reliability and economical operation.
- Develop a competition in the field of Independent Power Producers (SEC-IPPs).
- Import and export power across the borders and invest in power projects outside the Kingdom.
- Perform and support Research & Development in the fields of Performance Improvement, Economical Operation, Environment Protection, Power Conservation, Renewable Power, Services Enhancement,...etc.

SEC ORGANIZATION RESTRUCTURE

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- ❑ SEC is in the process of unbundling into SEC & Six Fully Owned Subsidiaries, to comply with the objective to reach energy open market in stages, (**single buyer, principle buyer** and eventually **open market**).

The Subsidiaries will be as follows:

- **Four Generation Companies (GENCO's),**
 - **One Transmission Company (National Grid),**
 - **One Distribution Company (DISTCO),**
- ❑ The preparation of the unbundling program started in 2007, and the final set up was approved in 2010.
 - ❑ In order to ensure maximum success, the program implemented in stages as follows:
 - **Restructured SEC go live: Jan, 1, 2012**
 - **National Grid go live: Jan, 1, 2012**
 - **Four GENCO's go live: Jan, 1, 2014**
 - **DISTCO go live: Jan, 1, 2014**

SEC GENERATION RESTRUCTURE

SEC Power plants were allocated to each GENCO to create a **Balanced Grouping** taking into consideration Technology, Type Of Fuel, Operational Costs, Average Age, Retirement etc:

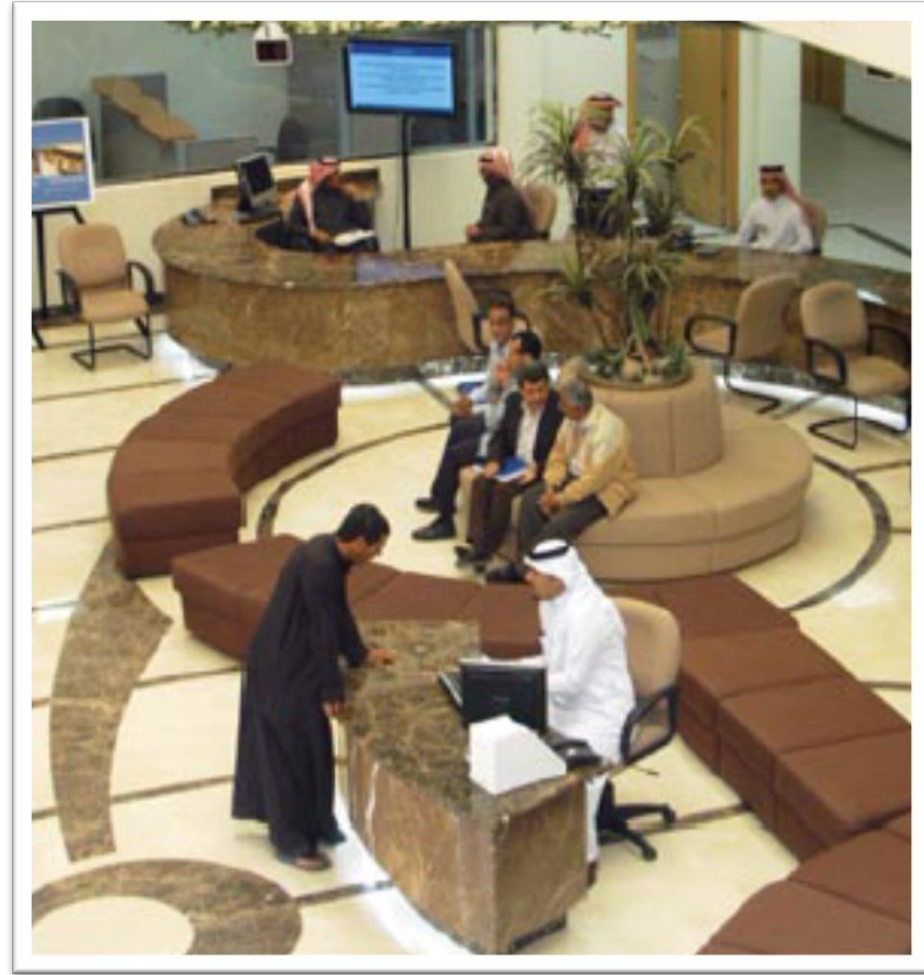
GENCO's at 2014:

Technology	GENCO "A" (MW)	GENCO "B" (MW)	GENCO "C" (MW)	GENCO "D" (MW)
Gas Turbine	6,612	7,262	5,517	4,090
Combined Cycle	2,606	1,200	1,200	3,867
Steam Turbine	4,376	5,056	5,538	4,192
Total	13,594	13,518	12,255	12,149

GENCO's By 2021:

Technology	GENCO "A" (MW)	GENCO "B" (MW)	GENCO "C" (MW)	GENCO "D" (MW)
Gas Turbine	3,804	6,528	2,667	3,282
Combined Cycle	3,371	1,200	3,800	3,867
Steam Turbine	10,376	8,656	10,338	10,636
Total	17,551	16,384	16,805	17785

DISTRIBUTION OVERVIEW



DISTRIBUTION NETWORKS:

SEC Distribution networks cover the whole country with the voltages below 100 KV.

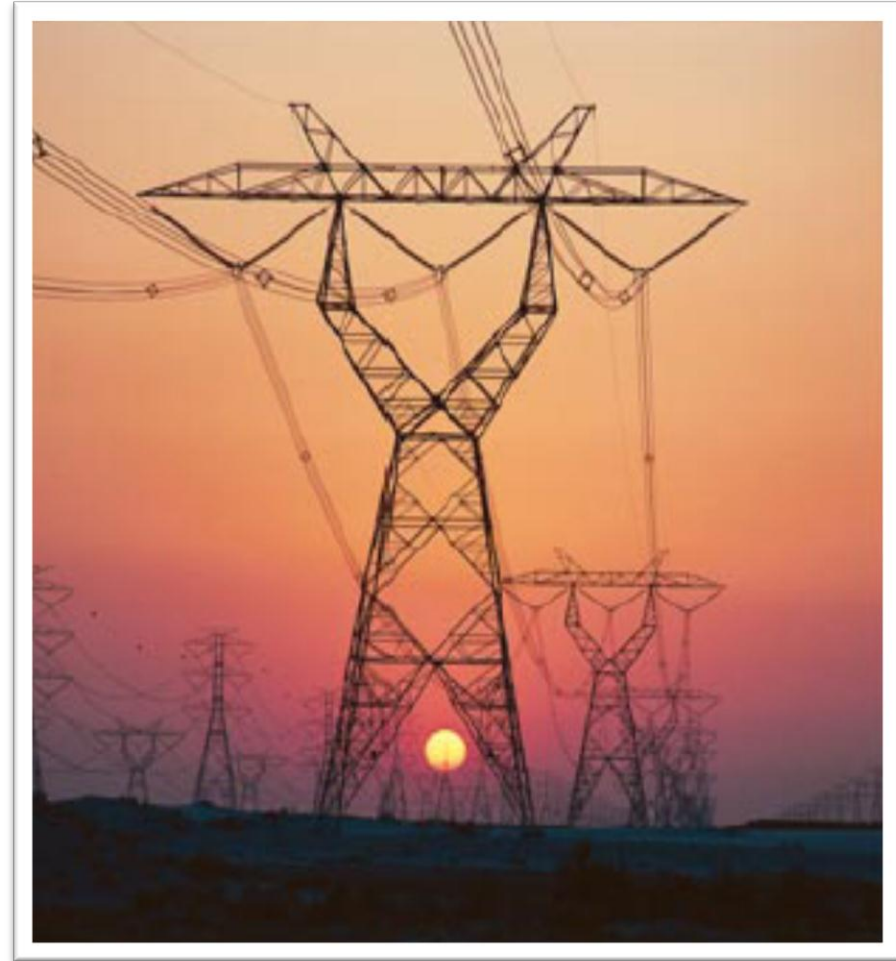
❑ Distribution Networks Growth during 2011:

- Length of Distribution Networks ≈ **26,000 CKM.**
- Distribution Transformers ≈ **24,000 Transformers**
- Transformers Capacity ≈ **11,000 MVA**
- New Customers ≈ **360,000 Customers**
- Newly Electrified Towns and Villages ≈ **266**
- Energy soled ≈ **220,000 GWH**

❑ Distribution Networks (By the end of 2011):

- Total Circuit Lengths ≈ **410,000 CKM.**
- Total Distribution Transformers ≈ **345,000 Transformers**
- Total Transformers Capacity ≈ **160,000 MVA**
- Total No. of customers ≈ **6.3 millions**
- Total No. of Electrified Towns and Villages , ≈ **12,300**

TRANSMISSION OVERVIEW



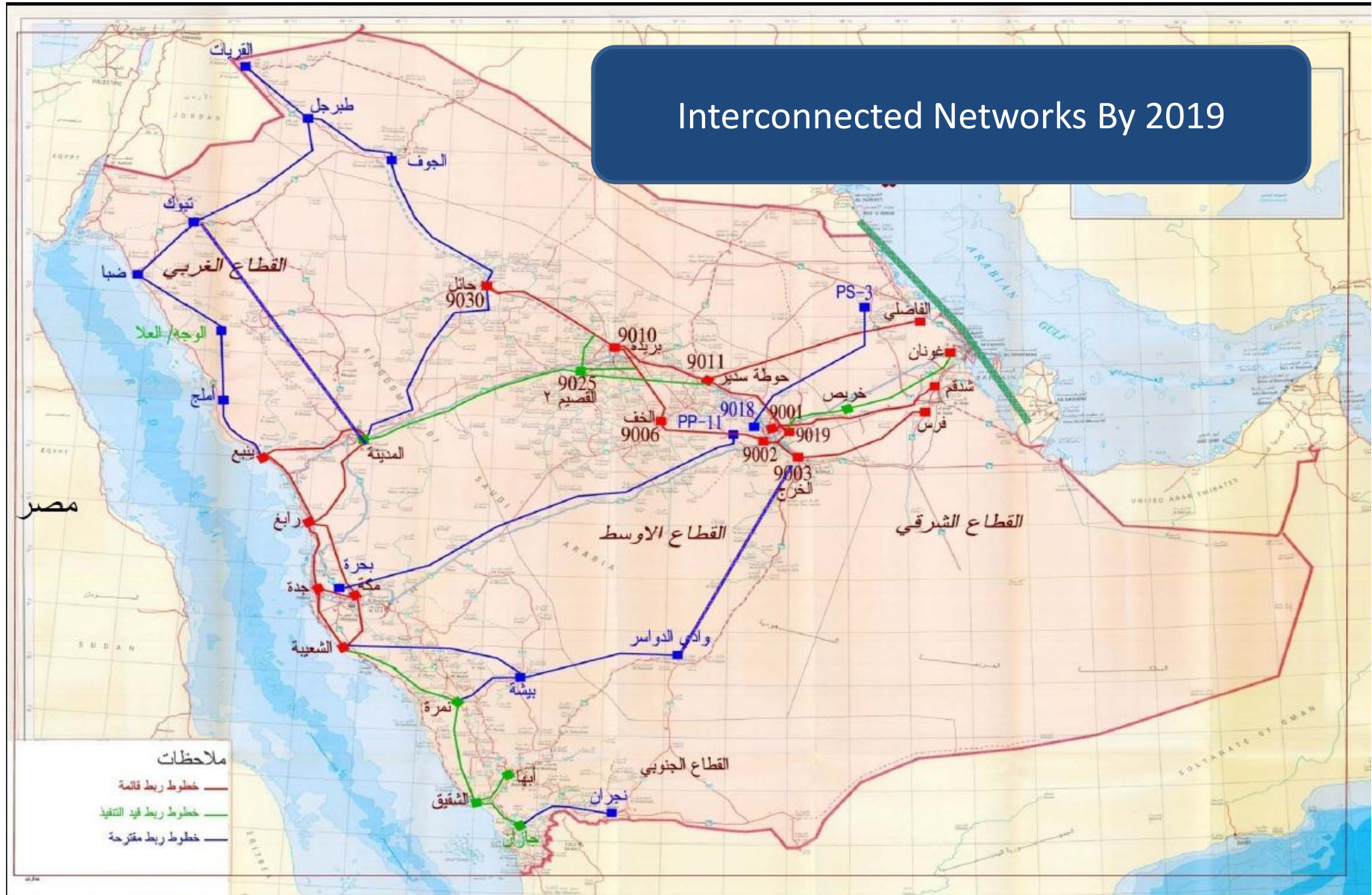
EXTRA & HIGH VOLTAGE TRANSMISSION NETWORKS (above 100 KV)

- ❑ The interconnection of the four SEC Area Networks (Central - Eastern - Western - Southern), was completed in 2010.
- ❑ The small (9) isolated networks: (Tabouk - Al Qurayyat - Aljouf & Arar - Rafha - Tabarjal - Deba - Alwajh & Al Oula -Wadi Dawassir– Sharorah), will be linked to the interconnected networks before 2016, (except Rafha and Sharorah which will remain isolated networks for at least the Plan period 2021).
- ❑ **Transmission Networks Growth during 2011:**
 - Length of transmission networks ≈ **2,200** CKM.
 - Transmission transformers ≈ **100** Transformers
 - Transformers capacity ≈ **13,000** MVA
- ❑ **Transmission Networks (*by end of 2011*):**
 - Total length of transmission networks ≈ **50,000** CKM.
 - Total no. of substations ≈ **642** substations
 - Total no. of transformers ≈ **1,900** Transformers
 - Total transformers capacity ≈ **175,000** MVA

PLANNED TRANSMISSION INTERCONNECTION PROJECTS (380 KV)

Networks Interconnection Projects	Commissioning Year
Hail – Al Jouf	2013
Qassim – Madinah Stage 2	2013
Interconnection of Qaisumah	2013
Tabouk – Dhibah	2014
Tabarjal – Qurayyat	2013
Jizan – Najran	2013
Eastern – Central 5 th Interconnection	2017
Southern region - Wadi Aldawasir	2015
Madinah – Hail	2017
Central - Western regions HVDC Link	2018
Tabouk – Madinah HVDC Link	2018
Western – Southern 2 nd interconnection	2016
Debha – Wajh / Ula	2015
Yanboa - Umlaj	2014
Boosting Connection of the western- Southern Region	2016
Tabouk – Eygpt HVDC Link	2016
Tabouk – Tabarjal	2016
Al Jouf – Tabarjal	2016
Boosting Interconnection of Madinah - Hail	2019
Al Kharj – Al Aflaj - Wadi Aldawasir	2019

PLANNED & EXISTING (380 KV) TRANSMISSION INTERCONNECTION



SEC NETWORKS PEAK LOADS FORECAST (2012 - 2021)

Networks	PEAK LOADS FORECAST (MW)									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Central & Eastern	29,925	32,790	35,065	37,675	39,990	42,755	44,805	46,815	48,950	51,155
<i>Isolated Networks</i>	1,230	679	730	459	121	128	135	144	152	160
Western	14,315	15,770	17,230	18,430	19,780	21,935	23,275	24,595	25,805	27,040
<i>Isolated Networks</i>	898	972	1,047	1,132						
Southern	4,058	4,450	5,180	5,665	6,140	6,520	6,900	7,255	7,610	7,940
<i>Isolated Networks</i>	104	112	119	126	132	139	146	154	164	175
Total	50,530	54,773	59,371	63,487	66,163	71,477	75,261	78,963	82,681	86,470

GENERATION



TOTAL EXISTING GENERATION CAPACITY

Units Type	East	Central	West	South	Total
Steam	6,876	-	7,110	-	13,986
Combined Cycle	3,323	3,595	965	-	7,883
Gas Turbine	4,187	9,752	5,400	3,410	22,749
Diesel	30	-	18	193	211
SEC Total	14,349	13,349	13,494	3,603	44,832
SEC (SEC-IPP)	-	614	602	-	1,216
WEC (IWPP)	-	-	900	850	1,750
Non-SEC	6,470	-	700	60	7,230
Total (SEC-IPP, WEC& Non-SEC)	6,470	614	2,202	910	10,196
Grand Total	20,886	13,963	15,696	4,513	55,028

Up To the end of Summer 2012

Generation Projects Up To 2021

SEC GENERATION PROJECTS (*UNDER CONSTRUCTION*)

Budget Year	Project	Capacity (MW)	Fuel Type	Commissioning	
				Year	MW
2008	Al Jouf PP (GT)	56	Diesel	2012	56
2009	Al-Qurayah 2 PP (Steam Phase) (CC)	260	-	2013	260
2010	Al Qurayyat PP Ext. (GT)	136	Crude	2012	136
	PP 10 (ST Phase) (CC)	1,151	-	2014	345
				2015	806
	Rafha PP # 2 (GT)	140	Diesel	2012	140
	Najran (GT)	112	Crude	2013	112
	Tabouk PP Ext. # 7 (GT)	122	Diesel	2012	122
	Rabigh PP2 (ST)	2,555	HFO	2014	2,555
2011	Al-Qurayah 2 PP Ext. (CC)	260	Gas	2013	260
Total		4,792			4,792

SEC GENERATION PROJECTS (*UNDER CONSTRUCTION*)

Budget Year	Project	Capacity (MW)	Fuel Type	Commissioning	
				Year	MW
2011	PP 12 (CC)	1,992	Gas	2014	1,310
				2015	682
	Tabuk PP Ext. #8 (GT)	129	Diesel	2013	129
	Al-Wajh /Al- Ola PP # 2 (GT)	211	Diesel	2013	211
	Al-Jubah PP Ext. # 4 (GT)	124	Crude	2013	124
	Al Qurayyat PP Ext # 2 (GT)	125	Crude	2013	125
	Sharorah PP Ext. # 3 (GT)	128	Diesel	2013	128
	South Jeddah PP Phase #1 (ST)	2,400	HFO	2016	1,800
				2017	600
2012	Shuebah (CC)	1,238	Crude	2013	790
				2014	448
Total		6,347			6,347

SEC GENERATION PROJECTS (UNDER CONTRATUAL PROCESS)

Budget Year	Project	Capacity (MW)	Fuel Type	Commissioning	
				Year	MW
2012	Rafha PP2 Ext (GT)	60	Crude	2014	60
	Shuqaiq (ST)	2,400	HFO	2016	2,400
2013	Al Qurayyat PP Ext # 2 (GT)	120	Crude	2014	60
				2015	60
	Rabigh Ext. 5&7 ST Phase (CC)	1000	Crude	2016	1,000
	Khufgi Phase # 1 (ST)	2,400	HFO	2017	2,400
Total		5,980			5,980

SEC GENERATION PLANNED PROJECTS (*STEAM UP TO 2021*)

Budget Year	Project	Capacity (MW)	Fuel Type	Commissioning	
				Year	MW
2014	Ras Abo Gumais PP Phase # 1	2,400	HFO	2019	2,400
	Khufgi - Phase # 2	1,200		2018	1,200
	Ras Abo Gumais PP Phase # 2	1,200		2020	1,200
2016	Al Rais PP Phase # 1	2,400		2020	1,200
				2021	1,200
2015	South Jeddah PP Phase #2	2,400		2019	2,400
Total		9,600		9,600	

SEC PLANNED PROJECTS (*SIMPLE & COMBINED CYCLE UP TO 2021*)

Budget Year	Project	Capacity (MW)	Fuel Type	Commissioning	
				Year	MW
2014	PP 13 (CC)	1,800	Gas	2018	1,800
2015	Sharorah PP Ext. # 4 (GT)	60	Crude	2018	60
2016	PP 14 (CC)	1,800	Gas	2018	1,800
Total		3,660			3,660

SEC-IPP PROJECTS (*UNDER CONSTRUCTION*):

Owner	Budget Year	Project	Capacity (MW)	Fuel Type	Commissioning	
					Year	MW
SEC-IPP	2008	Rabigh PP # 1 (ST)	1,204	HFO	2012	602
					2013	602
		PP 11 (CC)	1,729	Gas	2012	614
					2013	1,115
	2011	Qurayah PP (CC)	3,927	Gas	2014	3,927
Total			6,860			6,860

SEC-IPP PROJECTS (*UNDER CONTRACTUAL PROCESS*):

Owner	Budget Year	Project	Capacity (MW)	Fuel Type	Commissioning	
					Year	MW
SEC-IPP	2011	Deba PP Phase # 1 (CC)	1,800	Gas	2018	1,800
		Rabigh PP # 2 (ST)	1,800	HFO	2016	600
	2017				1,200	
	2012	Deba PP Phase # 2 (ST)	1,800		2017	1,200
					2018	600
Total			5,400	5,400		

NON-SEC PROJECTS (UP TO 2021)

Under Construction:

Project	Capacity (MW)	Fuel Type	Commissioning	
			Year	(MW)
SWCC Ras Alkhair PP (CC)	1,050	Gas	2014	500
			2015	550
				1,050

Under Contractual Process:

Project	Capacity (MW)	Fuel Type	Commissioning	
			Year	(MW)
SWCC Yanbu PP (ST)	1,850	HFO	2018	900
			2019	950
Jazan (ST)	2,200		2017	1,100
			2018	1,100
	4,050			4,050

Planned:

Project	Capacity (MW)	Fuel Type	Commissioning	
			Year	(MW)
ARAMCO (Mnefa , Kharasaniyah & wasite) (GT)	2,484	Gas	2013	143
			2014	387
			2016	1,954
	2,484			2,484

GENERATION PROJECTS COMMISSIONING SUMMARY (BY YEAR UP TO 2021)

	2012*	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total MW
SEC	454	2,139	4,778	1,548	5,200	3,000	4,860	4,800	2,400	1,200	30,379
SEC- IPP	1216	1717	3,927	-	600	2,400	2,400	-	-	-	12,260
WEC	-	-	-	-	-	-	-	-	-	-	-
Non SEC	-	143	887	550	1,954	1100	2,000	950	-	-	7,584
Total	1,670	3,999	9,592	2,098	7,754	6,500	9,260	5,750	2,400	1,200	50,223

Remaining projects 2012

GENERATION PROJECTS SUMMARY (UP TO 2021)

Owner	Under Construction	Under Contractual process	Planned				Total (MW)	Total %
			ST	CC	GT	CC & GT		
SEC	11,139	5,980	9,600	3,600	60	3,660	30,379	61%
SEC-IPP	6,860	5,400	-	-	-	-	12,260	24%
WEC	-	-	-	-	-	-	-	0%
Non-SEC	1,050	4,050	-	-	2,484	2,484	7,584	15%
Total	19,049	15,430	9,600	3,600	2,544	6,144	50,223	100%

Generation Projects Conclusions

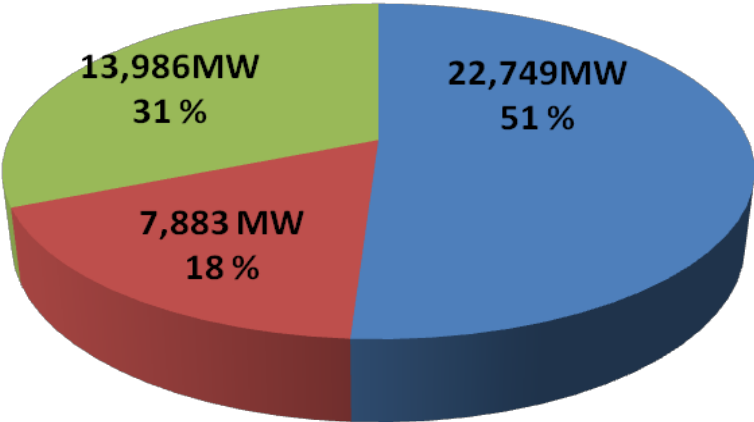
EXPECTED GENERATION CAPACITIES (BY 2021)

Owner	Installed Capacities		Under Construction, Contractual and Planned Projects		Total Expected Installed Capacities	
	2012		Up to 2021			
	MW	%	MW	%	MW	%
SEC	44,832	81%	30,379	61%	75,211	71%
SEC-IPP	1,216	2%	12,260	24%	13,476	13%
WEC	1,750	3%	-	0%	1,750	2%
SEC-IPP + WEC	2,966	5%	12,260	24%	15,226	14%
Non-SEC	7,230	13%	7,584	15%	14,814	14%
Total	55,028	100%	50,223	100%	105,251	100%

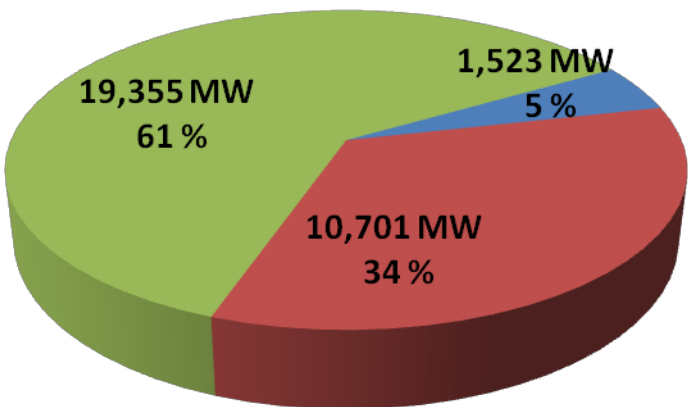
Degradation, Retirement and Forced Outage are not included

SEC GENERATION CAPACITIES PROFILE

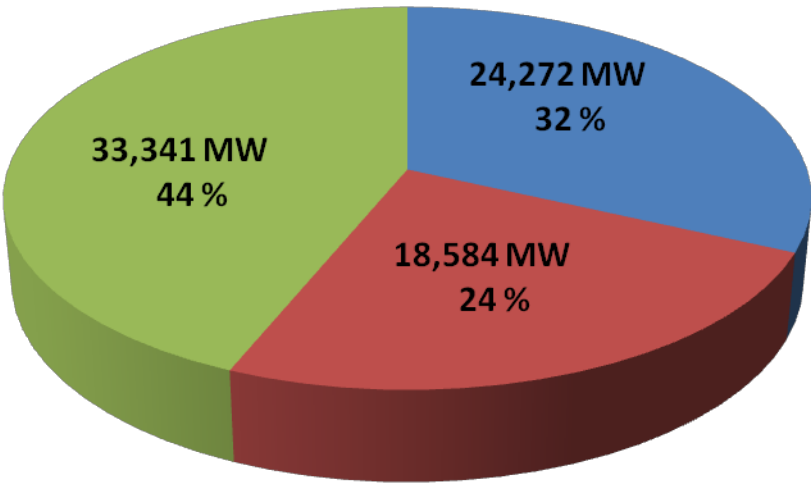
EXISTING IN 2012



PROJECTS UP TO 2021



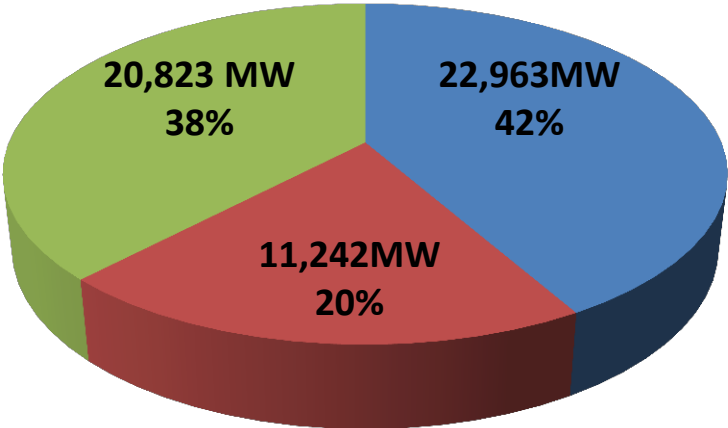
CAPACITY AT 2021



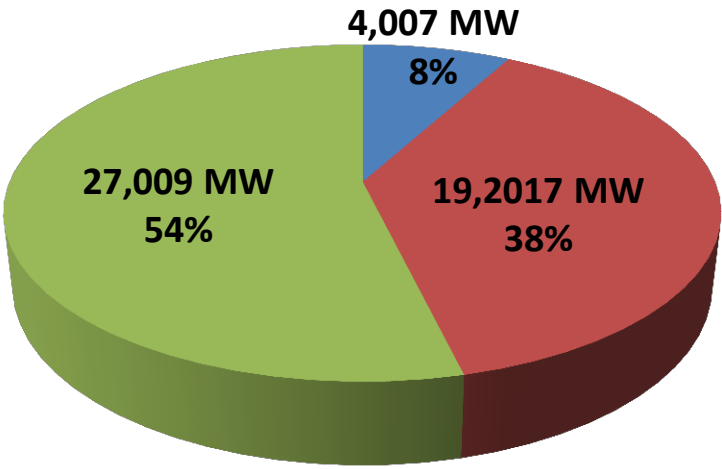
■ Gas Turbine ■ Combined Cycle ■ Steam Turbin

TOTAL GENERATION CAPACITIES PROFILE

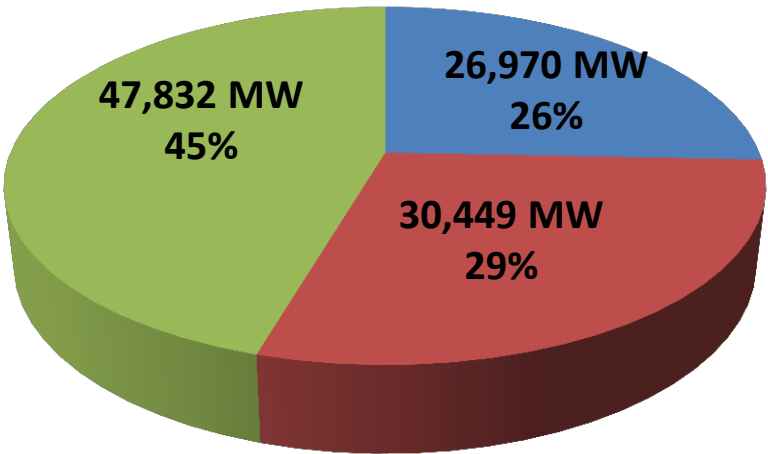
EXISTING IN 2012



PROJECT UP TO 2021



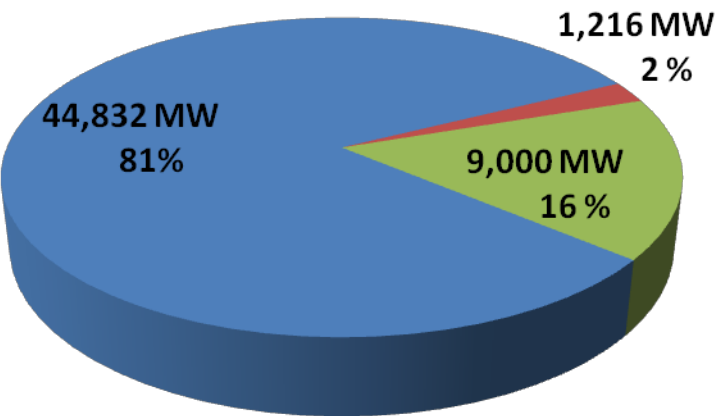
CAPACITY AT 2021



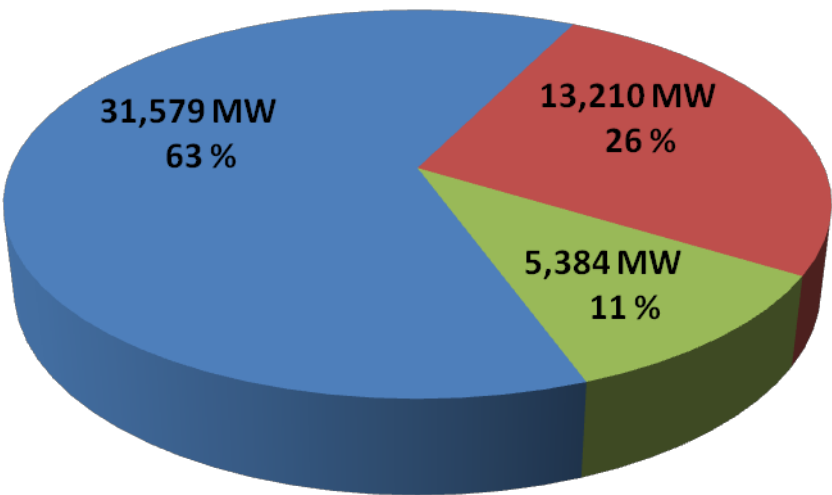
■ Gas Turbine ■ Combined Cycle ■ Steam Turbine

SEC SHARE OF GENERATION CAPACITIES

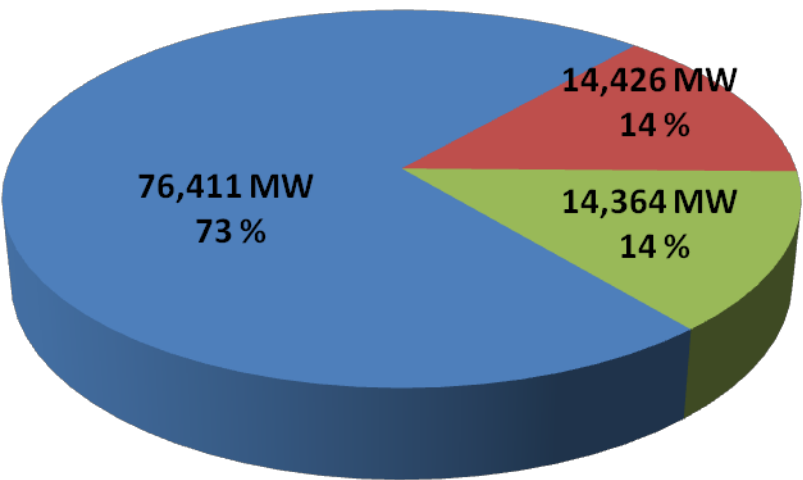
EXISTING IN 2012



PROJECTS UP TO 2021



CAPACITY AT 2021



■ SEC ■ IPP ■ IWPP,WEC

THANK YOU