

Country Assessment Report

Country/Region Name:

Kingdom of Saudi Arabia (“KSA”)

Electricity generation and demand:

Saudi Arabia, with 16% of the total proved oil reserves of the world, remains one of the top countries for the production and export of petroleum liquids in the world. Kingdom’s fuel mix (for electricity) strikes a resemblance to its image of being the largest oil exporter, with more than 50% of the Kingdom’s electricity needs are being met by liquid fuels, while gas provides the rest. By the end of 2015, the installed electricity capacity was around in KSA is around 81,000 MW.

Despite having the world’s largest energy reserves, Saudi Arabia is facing major feedstock issues in its power sector. Due to the lack of sufficient new gas investment in the kingdom, the country is already burning an estimated 750,000 barrels a day (b/d) of liquid fuels in its power and desalination plants, which otherwise could be sold on the international market.

Installed capacity MW by fuel type, 2015 (Electricity & Cogeneration Regulatory Authority “ECRA”):

Primary fuel Type	Installed Capacity (MW)
Heavy Fuel Oil	17 MW
Diesel	9 MW
Crude	20 MW
Natural Gas	35 MW

Source: ECRA Statistical Report 2015

With the power demand forecast to be more than double by 2030, this growing domestic needs would lead to a reduction of the fossil fuel exports, which constitute the main revenues of the country.

This increase in domestic fossil-fuel demand is not sustainable over the long-term and this is why several programs are being launched in the country to reduce the fossil-fuel consumption for both the power and water sector. Several initiatives have been launched and can be categorized into three focus areas:

- Gas will be the primary fuel for the new conventional greenfield projects which will be utilizing the most efficient technologies such as combined cycle project;
- Fuel mix diversification by exploring new sources of energy. The kingdom has already announced the renewable energy program to install 9.5GW of renewables by 2023.
- Removing fuel/electricity subsidies which is expected to enhance the operational efficiency in the generation side as well as improving the consumption behaviour of the consumers.

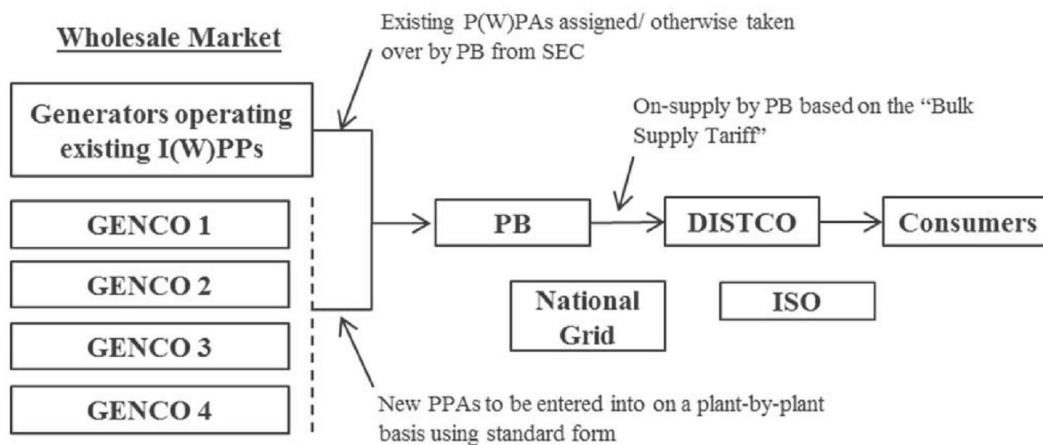
Market Structure:

- The majority (70%) of installed electricity capacity is produced by the Saudi Electricity Company (“SEC”), while the rest is produced by the Saline Water Conversion Corporation (“SWCC”), Saudi Aramco, and by Independent Power Producers (“IPPs”).

- SWCC is generating around 6 GW of electricity and 4.6 Mm³/day of desalinated water from 28 plants distributed along the east and west coasts of the Kingdom
- At the end of 2015, the installed electricity generation capacity owned by the private producers, connected to national grid, constituted about 15% of the total installed electricity capacity of the country.
- The IPPs in KSA have been procured by several entities namely:
 - Water and Electricity Company (government off-taker for desalinated water and cogeneration plants IWPPs and IWPs)
 - Saudi Electricity Company (off-taker for IPPs)
 - Marafiq (off-taker for power and water in Jubail and Yanbu industrial cities)
 - Saudi Aramco (off-taker for power, steam, and water supplies to its facilities)
 - Other industrial entities such Petro-Rabigh Refinery
- Currently, the KSA electricity market is under extensive reform. The Initial phase is to break down the power plant legacies into four generation companies (“GenCos”) and put them on the market for the private sector to own and operate. The second phase is to develop the distribution sector. Finally, leading to the third phase to a well-developed competitive electricity market.
- The primary objective of the restructure of the power sector is to increase the efficiency of power generation in the Kingdom and, ultimately, this should mean that the Kingdom will establish a fully-functioning open power market, where the following entities will be established:

Phase 1

- Four (4) GenCos
- A principal power buyer (the “PB”)
- A transmission company (“National Grid”)
- A distribution company (“DISTCOS”) and
- An independent system operator (“ISO”)



Source: PA Consulting – Roadmap for Market Implementation – February 2015

Phase 2

- The establishment of multiple distribution companies;
- The exposure of industrial consumers a real time pricing; and
- The establishment by National Grid of a “shadow” competitive wholesale market followed by full implementation

Phase 3

- The establishment of a fully competitive wholesale and retail market

** It should be noted that it is possible that the reform structure described above will change given that the process is not finalized yet.*

Responsible Government Departments:

Entity	Role
Ministry of Energy, Industry, and Mineral Resources	It is responsible for setting policy for the electricity sector and long-term energy plans including fuel allocation for power generation.
Ministry of Environment, Water, and Agriculture	It is responsible for the regulation and implementation of all aspects of the country's policies for the environmental, water and agricultural sectors.
Electricity & Cogeneration Regulatory Authority ("ECRA")	It regulates the electricity and water desalination industry and issues licenses to producers. It also monitors performance of the licensees, sets rules and tariff regulations.
Water and Electricity Company ("WEC")	It was established to buy water and electricity (off-taker) from the Independent water desalination (IWPs) and cogeneration plants (IWPPs).
Saudi Company for Energy Purchase Ltd	It is the newly formed principal buyer. It is wholly owned by Saudi Electricity Company (SEC) with a capital of SR2m (\$530,000). The primary role of the principal buyer will be 1) to purchase and sell electricity, 2) the purchase of fuel to supply to electricity producers who have signed agreements with the buyer, and 3) import and export electricity to markets outside Saudi Arabia.
Saudi Aramco	National Fuel supplier.
Saudi Electricity Company	National electricity utility company.
Saline Water Conversion Corporation ("SWCC")	It is responsible for the desalination of seawater and cogeneration plants by supplying various regions in the Kingdom with desalinated water and electricity.
King Abdullah City for Atomic and Renewable Energy ("KACARE")	It used to plan the integration of clean energy sources in Saudi Arabia including nuclear. Its current role is focusing on nuclear power and supporting with renewable resource monitoring and reporting.
General Authority of Meteorology and Environmental Protection ("PME")	PME is the national authority that is responsible for the regulation and the protection of the environment in the Kingdom including providing and enforcing air emission permits to power plants.

<p>The National Committee for the Clean Development Mechanism</p>	<p>It is the Designated National Authority (DNA) for CDM in KSA. The National Committee is presided over by a representative of the Ministry of Energy, Industry, and Mineral resources and the membership of a number of relevant Ministries and entities. The National Committee carries out a number of tasks including:</p> <ul style="list-style-type: none"> • Facilitating the CDM and specifying the conditions, terms, priorities and requirements for CDM in the Kingdom • Drawing up necessary standards for evaluation and approval of CDM projects, including the issuance of LoAs in case of positive decision • Following up the operations of the CDM Executive Board and maintain the necessary communications with it and with the concerned agencies • Providing information on the CDM in the Kingdom • Promoting the CDM potential of the Kingdom nationally and internationally 			
<p>Existing/Planned Energy Legislation:</p>				
<p>1. The Electricity Law:</p>				
<p>It was issued in 2005 by a Royal Decree No. M/56, and a minor amendment to it was made in 2010. It sets the regulation and development of the electricity sector in KSA, including the mandate to the restructuring of the electricity industry, encouraging the private sector participation, and the deregulation of the electricity market.</p>				
<p>2. Resolution 5/23 of Supreme Economic Council</p>				
<p>It was issued in 2002 to establish a frame work for participation of the private sector in IWPP projects. Pursuant to this resolution, WEC was formed to be the off-taker under the PWPA.</p>				
<p>3. Decision 2/29 of Supreme Economic Council</p>				
<p>It was issued in 2008 to approve the privatization of SWCC to a holding company owning a number of production business units where private sector can own a maximum of 50% of these production business units.</p>				
<p>4. Objectives and KPIs of KSA Vision 2030 and National Transformation Program 2020</p>				
<p>Strategic Objective: Institutional and privatization of the electricity sector to optimize financial efficiency.</p>				
<p>KPI</p>	<p>Baseline</p>	<p>Target 2020</p>	<p>Regional Benchmark</p>	<p>Global Benchmark</p>

Percentage of power plant electricity generation through strategic partners	27%	100%	74%	100%
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Strategic Objective: Increase the efficiency of fuel utilization in the electricity sector.

KPI	Baseline	Target 2020	Regional Benchmark	Global Benchmark
Efficient utilization of fuel in electricity power generation	33%	40%	34%	44%

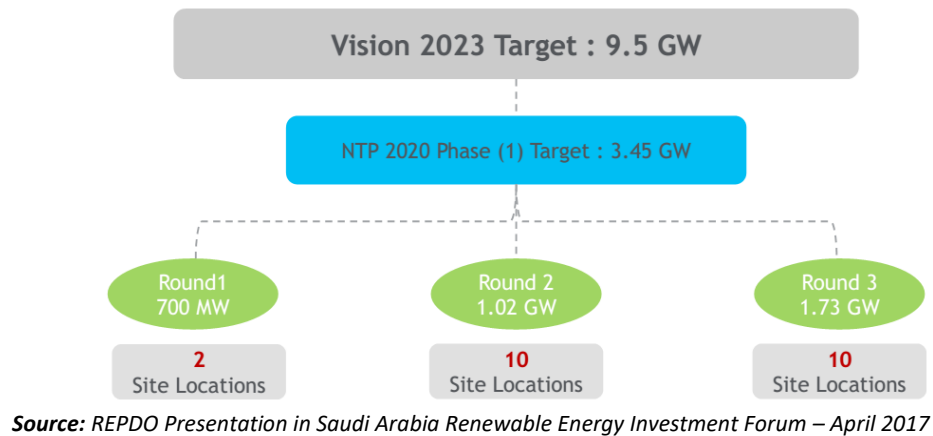
Strategic Objective: Enable renewable energy to actively contribute in the national energy mix.

KPI	Baseline	Target 2020	Regional Benchmark	Global Benchmark
Capacity introduced from renewable energy	0	3,450 MW	2,665 MW	7,017 MW
Percentage of renewable energy to total energy used	0	4%	7%	26.4%

KSA National Renewable Energy Program (“NREP”)

- NREP is a strategic initiative under Vision 2030 and the National Transformation Program (NTP) that aims to substantially increase the share of renewable energy capacity in the total energy mix, targeting the generation of 3.45 GW of renewable energy by 2020 and 9.5 GW by 2023.
- NREP sets out a systematic and targeted road map to rapidly diversify the domestic power supply, catalyze economic development and support long-term prosperity in line with Vision 2030’s goals which include creating a new renewable industry and support the buildup of this promising sector.
- The office responsible for the delivery on NREP is the Renewable Energy Project Development Office (REPDO), an office within the Ministry of Energy, Industry and Mineral Resources. REPDO serves to deliver renewable energy across the Kingdom in line with Vision 2030. REPDO reports to a committee, chaired by H.E. the Minister that is tasked with overseeing the delivery of the NREP. The committee brings together heads of the various Kingdom stakeholders involved in energy research, measurement, data acquisition, regulation and

predevelopment including, King Abdullah City for Atomic and Renewable Energy (KACARE), Electricity and Cogeneration Regulatory Authority (ECRA), Saudi Aramco and the Saudi Electricity Company (SEC).



Existing Planned Certificate System:

The National Committee for the Clean Development Mechanism is the Designated National Authority (DNA) for CDM in KSA. The National Committee is presided over by a representative of the Ministry of Energy, Industry, and Mineral resources and the membership of a number of relevant Ministries and entities. The National Committee carries out a number of tasks including:

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- Drawing up necessary standards for evaluation and approval of CDM projects, including the issuance of LoAs in case of positive decision
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Extent of Engagement with Government:

No engagement with the government has been conducted yet regarding I-REC.

Expected Response from Government:

Saudi Arabia is moving towards becoming a global leader in the renewable energy sector and has already set the targets for 2020 and 2023. Additionally, Saudi Arabia already submitted its Intended Nationally Determined Contribution (INDC) to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat.

According to the KSA INDC, the Kingdom will engage in actions and plans in pursuit of economic diversification that have co-benefits in the form of greenhouse gas (GHG) emission avoidance and

adaption to the impacts of climate change, as well as reducing the impacts of response measures. The following actions and plans will generate mitigation co-benefits:

- Energy efficiency enhancement
- Renewable energy implementation
- Promotion and encouraging carbon capture and utilization/storage actions
- Utilization of natural gas in electricity production and displacing the utilization of liquid fuels
- Methane recovery and flare minimization

Therefore, implementation of I-REC mechanism in Saudi Arabia is expected to draw no objections as the mechanism can support promoting the above actions and plans by allowing to sell the environmental benefits of such projects, thus making them more economically viable.

It should be noted that no engagement with the government has been made so far.

Current Environmental Reporting in Energy

Conventional power plants are obligated to comply with the environmental regulations and emission limits and obtain permits from and periodically report to the General Authority of Meteorology and Environmental Protection. The framework under the following national environmental standards covers a variety of environmental and operational parameters:

- General Environmental Regulations 2001 issued by the Presidency of Meteorology and Environment (PME), (specifically EIA, environmental standards and hazardous wastes);
- PME Environmental Standards 2014, originally issued 2012 (Issued by the PME and superseded Appendix 1 of the General Environmental Regulations 2001) including the following:
 - Control of Emissions to Air from Stationary Sources
 - Mobile Source Emissions
 - Industrial and Municipal Wastewater Discharges
 - Environmental Noise (Construction and Operation)
 - Ambient Water Quality (including Surface & Groundwater)
 - Ambient Air Quality

Any other Relevant Information:

Grid Emission Factor (GEF) – The National Committee for the Clean Development Mechanism describes to the tool GEF. This is to determine the CO₂ emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the “combined margin” emission factor for the electricity system. The combined margin is the result of the weighted average of two emission factors of the electricity system: the “operating margin” and the “build margin”.

- The operating margin is the emission factor of the thermal power plants and all plants serving the grid that cannot be characterized as “must run”.
- The build margin is the emission factor of a group of recently built power plants.

This tool is particularly relevant for grid-connected electricity generation methodologies, be it for projects related to electricity generation or reducing electricity consumption.