Saudi Arabia

Energy efficiency report

Objectives:

- Reducing the electricity intensity by 30% between 2005 and 2030
- Halving the peak demand growth rate by 2015 compared with the period 2000-2005

Overview	**2010**		**2000-2010 (%/year)**	
Primary intensity (EU=100)[1]	243	--	2.0%	--
CO_2 intensity (EU=100)	291	--	2.0%	--
CO_2 emissions per capita (in tCO_2/cap)	17	--	3.2%	--
Power generation	2010		2000-2010 (%/year)	
Efficiency of thermal power plants (in %)	31	--	0.7%	+
Rate of electricity T&D losses (in %)	9	-	2.1%	--
CO_2 emissions per kWh generated (in gCO_2/kWh)	757	--	-0.6%	-

++ Among best countries + Better than the EU average[1] - Below the EU average[1] --Among countries with the lowest performances

Latest update: April 2012

[1] The European Union, as the best performing region, is used as the benchmark.

1. Overview

1.1. Policies: creation of the Saudi Energy Efficiency Center

The Saudi Energy Efficiency Center (SEEC) was created in October 2010 and held its first meeting in April 2011. It is responsible for the development of energy efficient technologies and conservation policies. The SEEC targets households, whose energy consumption has soared in recent years, through future awareness campaigns, strengthened minimum energy efficiency ratios for windows and air conditioners, and labels for electrical appliances. The proposed programs under the demand-side management program being considered include the replacement of low-efficiency air conditioning (AC) units and insulation of new buildings for residential customers (through a 100 percent rebate of additional cost during the first 5 years). For commercial and industrial customers, measures include remote control of AC units during peak times and curtailable load contracts and load tariffs. These cumulated measures could save up to 10.2 TWh by 2016 (3.5 percent) and 29.2 TWh by 2021 (7.6 percent).

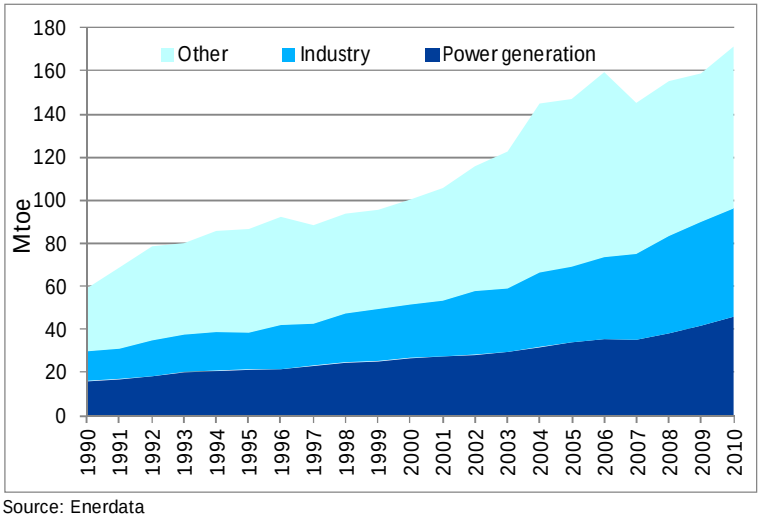
In 2008, the National Energy Efficiency Program (NEEP) defined eight objectives, including energy audit services and industry support, efficient use of oil and gas, energy efficiency labels and standards for appliances, construction codes and technical management and training. The NEEP currently focuses on four outcomes: regulation (design of the first Energy Conservation Law and national and regional regulations), information (new national database on energy supply and demand), capacity development of energy efficiency managers and public awareness.

The plan aims to cut the electricity intensity by 30 percent between 2005 and 2030 and the growth in peak demand by 50 percent compared with the average 2000-2005 increase. Subsidized electricity prices may be removed to limit the demand growth.

1.2. Energy consumption trends: buoyant growth for 20 years

Saudi Arabia's primary energy consumption per capita is 3.6 times higher than the world average, at 6.7 toe in 2010 compared with the world average of 1.9 toe.

Figure 1: Energy consumption trends by sector



Source: Enerdata

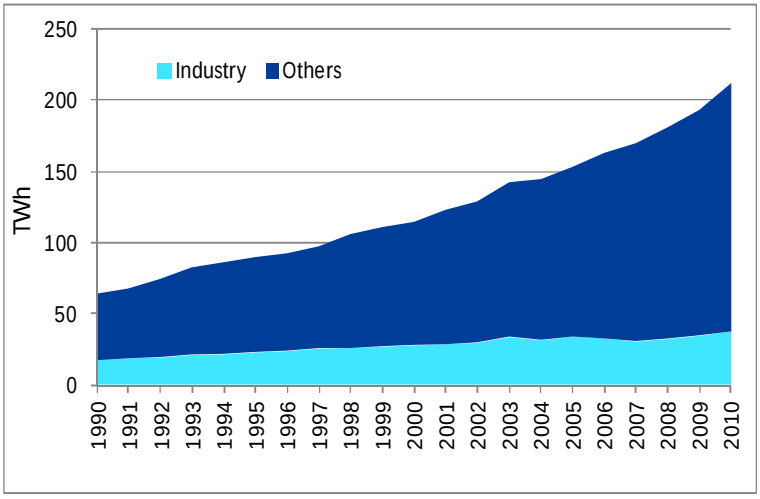
Total energy consumption is growing steadily and very rapidly, at an average rate of 5.5 percent/year since 1990, and tripled between 1990 and 2009.

Industry is the largest consuming sector, with 29 percent of the total energy consumption in 2010, compared with 24 percent in 1990. This share is mainly explained by the high energy consumption of non-energy uses: the petrochemical sector alone accounts for about 19 percent of energy consumption (2010). The energy consumption of the power sector is also high, accounting for 27 percent of the total in 2010 (stable since 1990).

Electricity consumption per capita has been growing very rapidly. It stands at about 8,300 kWh/cap (2010), compared with the world average of 2,700 kWh/cap. The share of electricity in energy consumption increased from 13 percent in 1990 to about 17 percent in 2010.

The country's electricity consumption has been growing rapidly since 1990 (+6.2 percent/year). That surge was propelled by demand in the residential and tertiary sector, which reached 82 percent of total electricity consumption, from 73 percent in 1990. The sharp increase in the residential sector (+6.7 percent/year) led to a relative erosion of the share of industry in electricity consumption (18 percent in 2010 compared with 27 percent in 1990).

Figure 2: Electricity consumption trends by sector

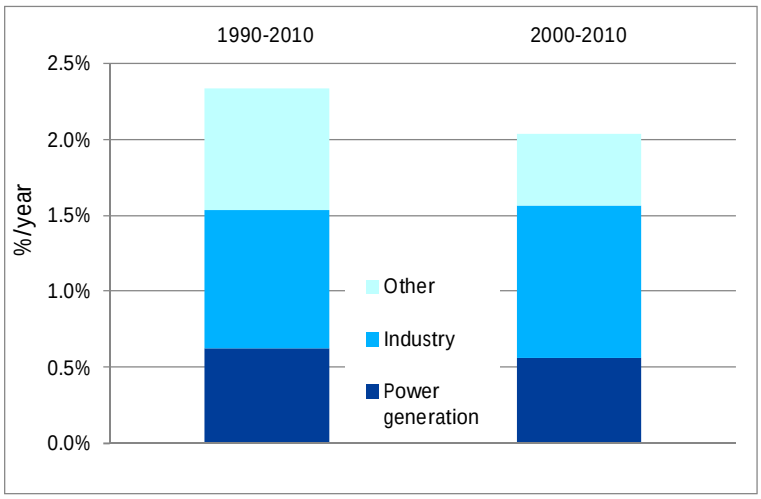


Source: Enerdata

1.3. Energy efficiency trends: degradation of energy intensities

Energy consumption is growing faster than GDP, resulting in increasing energy intensities, which is contrary to the general trend observed in most countries: total energy intensity rose by 2.3 percent/year, on average, between 2000 and 2010. This increasing trend is due to the fact that the country's development is based on energy-intensive industries, as well as on energy-intensive lifestyles in buildings and transport, encouraged by low energy prices.

Figure 3: Energy efficiency trends



Source: Enerdata

2. Power generation

2.1. Policies: energy audits and load management in the power sector

The National Energy Efficiency Program targets energy conservation in the power sector, including load management for utilities. It includes energy audits and the promotion of energy-efficient boilers to improve the efficiency of the steam system.

2.2. Efficiency of the power sector: improving efficiency thanks to new technologies

The efficiency of the power sector (thermal power plants) regularly increased over the period 1990-2010, rising from 27 percent to 31 percent. This improvement is due to the rising share of gas-fired capacity (+6.6 percent/year), notably since 2000 (+2.3 GW in CCGT capacity). The rate of T&D losses is about 9 percent, in line with the world average.

Figure 4: Efficiency of power generation and thermal power plants

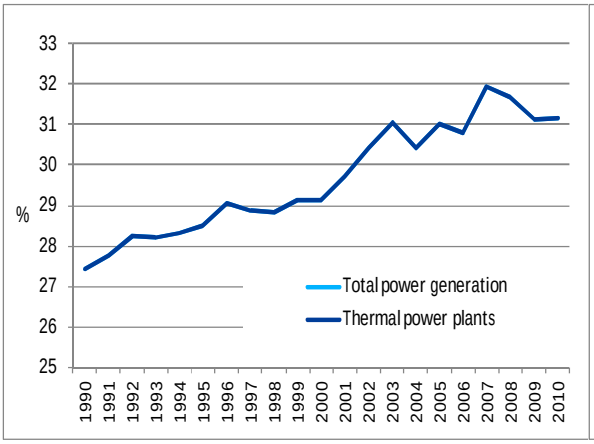
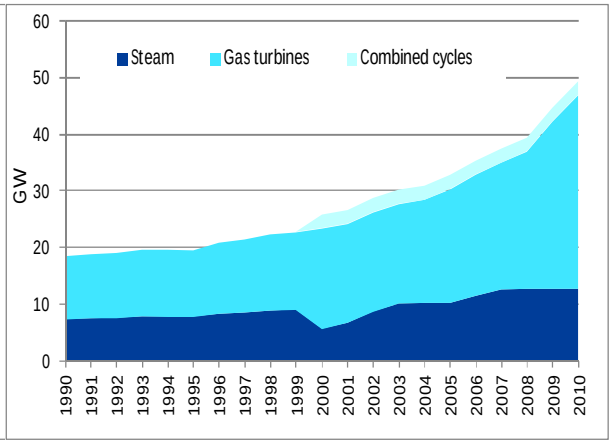
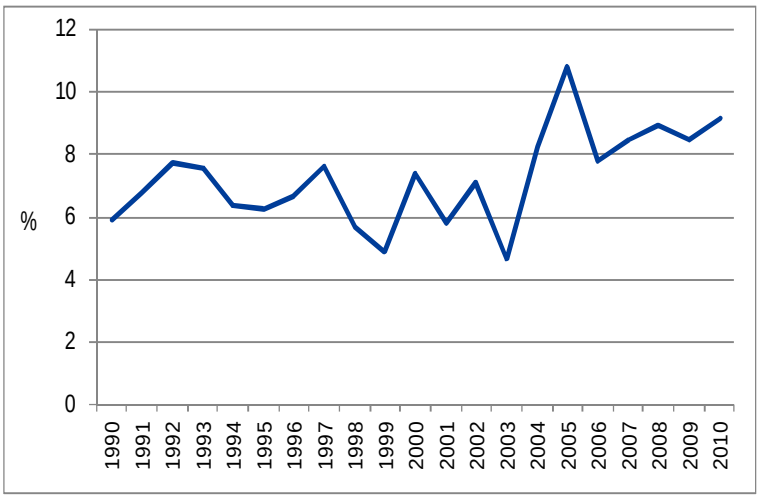


Figure 5: Thermal electricity capacity, by technology



Source: Enerdata

Figure 6: Electric T&D losses



Source: Enerdata

3. Industry

3.1. Policies: energy audits and high-efficiency motors

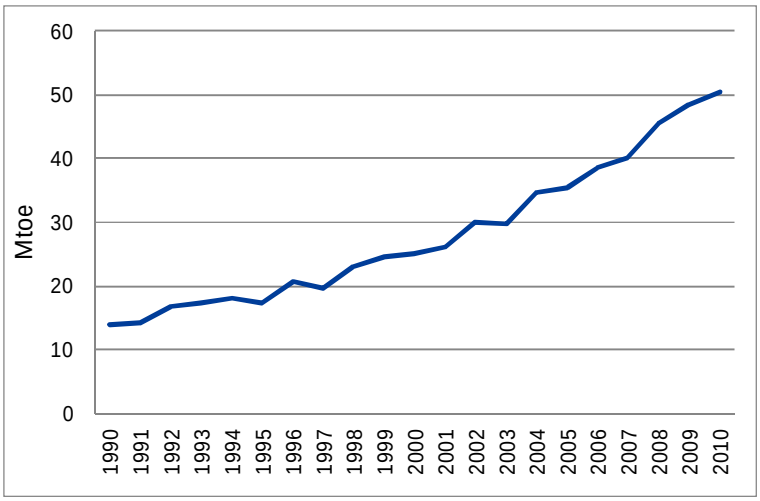
The National Energy Efficiency Program includes energy audits in the industrial sector and the promotion of high-efficiency motors: according to studies, matching motor size to actual load could lead to energy savings of between 5 percent and 25 percent. Audits are led by Energy Service Companies (ESCOs).

The Saudi Basic Industries Corporation (SABIC) aims to reduce its energy intensity by 10 percent between 2010 and 2015. The SEEC is also studying how to convert wasted heat to air conditioning in the cement sector.

3.2. Energy consumption trends: surging consumption since 1990

The energy consumption of the industrial sector (including non-energy uses) soared by 6.6 percent/year between 1990 and 2010. Its electricity consumption rose by 6.1 percent/year over that same period.

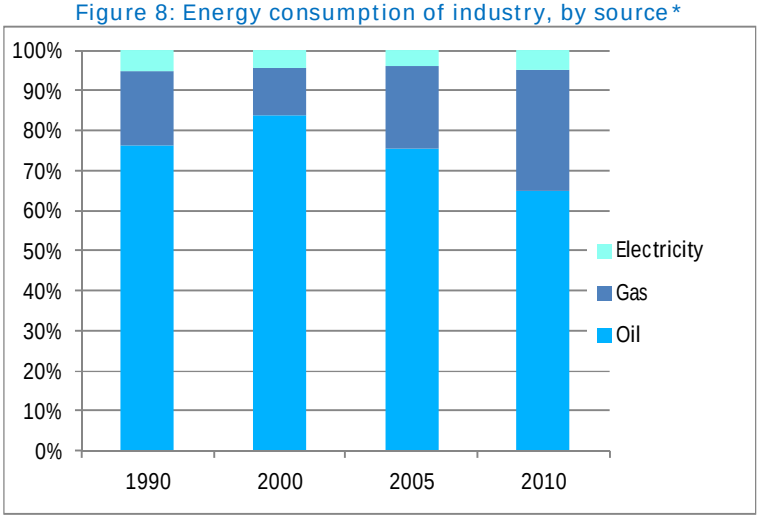
Figure 7: Trends in industrial energy consumption*



* including non-energy uses
Source: Enerdata

Energy consumption in the Saudi industry (including non-energy uses) is mainly covered by oil products (65 percent in 2010 and 84 percent in 2000). Gas is used in non-energy uses (petrochemical sector) and covered about 30 percent of the industrial energy consumption in 2010 (around 10 percent in 2000). Electricity consumption remains marginal, at around 5 percent of industrial energy consumption. This energy structure is largely influenced by the overwhelming weight of the petrochemical industry in Saudi Arabia.

Figure 8: Energy consumption of industry, by source*



* including non-energy uses
Source: Enerdata