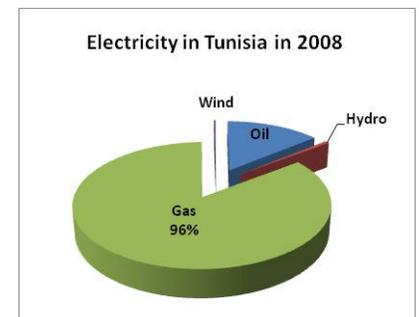


## Tunisia Sustainability Backgrounder

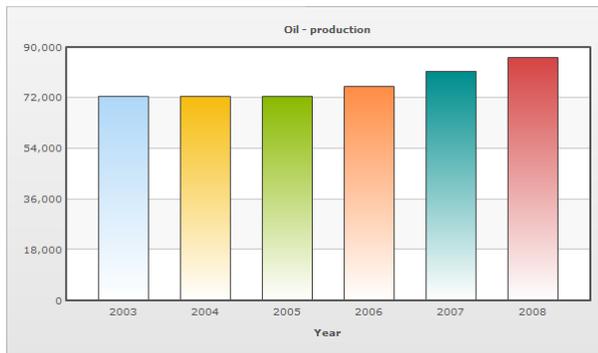
### Overview:

- In 2006, Tunisia's energy import dependency was 11%. The country's primary energy demand is nearly entirely based on oil and gas. Tunisia's dependency on energy imports is increasing and the energy trade deficit in monetary terms is growing rapidly. The country relies on fossil fuels for 99% of its energy supplies. The high level of dependency on hydrocarbons makes the country vulnerable to disruption in the international oil and gas markets and to price volatility.
- Oil production has been declining for years. Currently, the country's domestic oil production capacity cannot meet the country's consumption demand, which makes Tunisia a net importer of oil and oil products.
- Tunisia is increasingly turning to natural gas to meet domestic energy demand. The state-owned natural gas and electricity company, Société Tunisienne de l'Electricité et du Gaz (STEG) has promoted the use of natural gas through an incentive system that began in 2005. According to STEG, natural gas represented 44 percent of the total initial energy consumption in Tunisia in 2005, compared to just 14 percent in 2003.
- In order to limit energy dependency and promote a lower carbon growth, Tunisia has adopted measures to scale-up investments in energy efficiency and renewable energy in its 11<sup>th</sup> development plan (2007-2011).
- Tunisia and The World Bank have recently signed a \$55 million Energy Efficiency Project, to be implemented over 4 years. The objective of the Energy Efficiency Project is to scale up industrial energy efficiency and cogeneration investments, and thereby contribute to the government's new four-year energy conservation program.

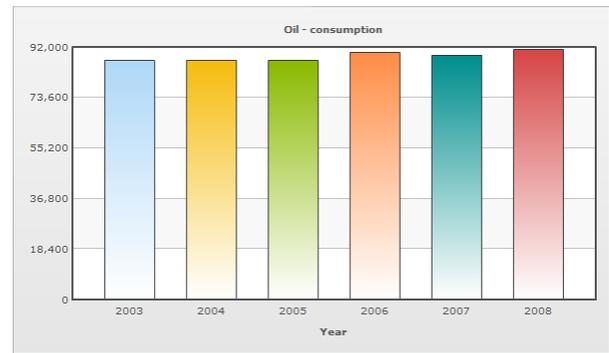
- **Energy intensity:** The energy intensity in Tunisia stopped increasing in the 1990s and has since then declined to the lowest level in the MENA region. However, the intensity remains high compared to some other Mediterranean countries such as Greece and Portugal. Moreover, energy expenditures - energy consumption valued at international energy prices - accounted for 12% of GDP in 2006, which is a high level compared to industrialized countries (they amount to 4% of GDP in Japan and 7% in Greece).
- **Electricity supply:** In 2008, 99% of electricity was thermally generated, 96% of it from gas (both domestic and from Algeria), with the remainder accounted for by hydroelectric and wind plants.
- **Electricity market:** Electricity generation rose 4.2% to 14bn KWh in 2007. 72% of the total is generated by the state-owned Société tunisienne de l'électricité et du gaz (STEG), 22% came from the privately owned 471-mw combined-cycle Radès II plant, and 6% from self-production. 59% of the 12.1bn KWh of electricity consumed in 2007 was high- and medium-voltage, two-thirds of which was used by industry (most importantly the cement industry). There were 2.9m subscribers to STEG's network at end-2007, giving an electrification rate of 99.5%. The total length of the national electricity grid has doubled since 1994 to over 136,000 km. Electricity is expensive by European standards. The national grid is connected to Algeria's and work is continuing on a link to Libya in order to complete the North African grid from Morocco to Egypt.
- **Natural Gas:** Tunisia is increasingly turning to natural gas to meet domestic energy demand. Natural gas production rose sharply in 1996 after BG, a British energy firm, brought the Miskar field in the Gulf of Gabès on stream. The field still produces over three-quarters of Tunisia's gas output. BG is investing US\$500m to extend the life of Miskar and US\$800m of the US\$1.2bn cost of developing the Hasdrubal field (ETAP will contribute the remainder), where production is due to start in 2009. Local gas production covered about 53% of consumption in 2007. Power plants used 77% of the gas, industry 18% and households 7%. Industrial and domestic use of piped gas is growing fast.
- **Oil production:** In 2006 Tunisia had proven reserves of oil of 308 million barrels. According to the 2008 BP Statistical Energy Survey, Tunisia produced an average of 97.6 thousand barrels of crude oil per day in 2007, 0.11% of the world total. Oil production from the two oldest fields - El Borma in the south and Ashtart in the Gulf of Gabès - has been declining for years. This has been partly offset by output from newer, smaller fields such as Adam, Didon and Oudna, which now account for most output. With Oudna coming on stream in late 2006 at a rate of 700,000 t/y and output at Didon tripling to 700,000 t/y, production in 2007 rose by 40% to 4.6m tonnes. However, Tunisia remains a net importer of oil and oil products. Exploration is at record levels; at the end of 2007 some 45 foreign and local firms were exploring for oil and gas on 50 licenses, 17 of which were offshore. Eight new foreign operators entered Tunisia in 2007.



**Oil - production: 86,210 bbl/day (2007 est.)**



**Oil - consumption: 91,110 bbl/day (2006 est.)**



- **Clean Development Mechanism:** Although Tunisia can be considered a model for other African countries in terms of its environmental and energy policy, the CDM sector is still in its infancy. To date there are only two landfill gas projects that have been successfully registered with the CDM Executive Board; these are being implemented with Italy as the partner country.
- **Renewable policy:** In order to limit energy dependency and promote a lower carbon growth, Tunisia has adopted measures to scale-up investments in energy efficiency and renewable energy in its 11<sup>th</sup> Development Plan (2007-2011). The 11th Development Plan (2007-2011) calls for a scaling-up of investments in energy efficiency and renewable energy. More specifically, the four-year energy conservation program for the period 2008-2011 aims at increasing the contribution of renewables to 4% of primary energy demand over the same period. As part of the 11<sup>th</sup> Plan the government set an objective of 200 MW installed capacity of wind power by 2011.
- **Status of renewable energy sources:** Renewable energy, hydro and wind power, only account for 1% of the country's electricity generation.
  - **Hydropower:** 145 GWh of electricity was generated from hydropower in 2005, or 1.6% of the total produced by the state owned energy supplier STEG. At 62 MW, hydropower accounts for about 2% of the country's installed capacity. The Sidi Salem dam is the most important hydroelectric power installation in Tunisia, and has been in operation since 1982. With an installed capacity of 36 MW, it produces 40 GWh of electricity per year. In future, with the planned expansion of renewable energy, particular emphasis is to be placed on the use of small-scale hydropower schemes. Nine sites for such plants have been identified in the course of a development programme. The total capacity of the programme is supposed to be 10 MW (60 GWh/a).
  - **Wind energy:** The national energy agency ANME has conducted a series of pilot measurements with international support. The total on-shore potential is estimated at approximately 1,000 MW. Until now only one wind farm has been built, in Sidi Daoud (Gouvernement Nabeul) near Cap Bon. It has been in operation since 2000. Average annual wind velocity at this location is 8.4 m/s at a height of 30 m. The farm has gone through 2 expansions since beginning of its operation and in 2005 generated 42.4 GWh of electricity (12.4 GWh more than in 2002), which was almost 0.5% of Tunisia's total production.
  - **Solar energy:** Solar irradiation in Tunisia ranges between 1,500 and 1,900 kWh/m<sup>2</sup> annually. The length of sunshine is 2,800 to 3,200 hours/year or 255 days/year. The conditions for utilizing solar energy are therefore good.

Wind power	2010	2020	2030
Installed capacity [MW]	310	1130	1840
Production [TWh/a]		2.8	4.6
Primary energy saved [TWh/a]		8.1	14.0
Resultant saving of CO <sub>2</sub> [mill. t CO <sub>2</sub> e]		1.5	2.8
Primary energy saved (aggregated) [TWh]	10.5	64.0	186.0
Resultant saving of CO <sub>2</sub> (aggregated) [mill. t CO <sub>2</sub> e]	2	13	37

Tab. 4: Estimation of wind energy potential; Tunisia<sup>20</sup>

- **World Bank's energy efficiency financing:** On June 30, 2009 The World Bank's Board of Executive Directors approved Energy Efficiency and Renewable Investment Project for Tunisia. The objective of the project is to scale up industrial energy efficiency and cogeneration investments, and thereby contribute to the government's new four-year energy conservation program. The project concept was designed to provide an integrated technical and financial analysis of end-use projects to be financed by Participating Financial Intermediaries (PFIs). To avoid lengthy and cumbersome application processes for projects that commercial banks will not be interested in financing, the National Agency for Energy Control (ANME) will work closely with PFIs to prescreen projects for financing. This set-up will also allow the integration of Energy Efficiency and Renewable Energy Fund (FNME) subsidies and other grants and loans from different sources in the financing plan of each project.
- **Water:** Water is in short supply. Over one-quarter of the land (5m ha) is cultivated, and just under one-quarter (4.2m ha) is pasture or forest. Some 405,000 ha (8%) of cultivated land is fully irrigated and another 60,000 ha is part-irrigated. The output of rain-fed

agriculture fluctuates sharply from year to year according to rainfall. Around 20,000 ha of farmland are lost each year through erosion, desertification, salination or urbanization. In the medium- to long-term, water shortages will become serious and the competing demands of farmers, industry, tourism and domestic consumers will generate tensions.

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