

Iran – Power Sector Strategy Note Draft Concept Note

Background

1. Iran is OPEC’s second largest oil producer and holds close to 10% (12.3 billion tons) of estimated world oil reserves and 17% of gas reserves (27 trillion cubic meters). Current oil production is about 3.8 million barrels/day. This has been fairly stable over the last 10 years. Natural gas is mostly associated gas and of a total production of about 287 million cubic meters per day (MMCMD), more than half is being supplied to domestic consumers, through an extensive network of pipelines, about 10% is being flared and the rest is being re-injected in the oil fields.
2. In 2003, Iran had an installed power generation capacity of about 34 GW, of which about 83% was gas-fired, 7% hydro, with the remainder being oil-fired and some wind/geothermal. Total annual generation of electricity reached 149 billion KWh. Transmission and distribution losses were about 13%. Access to power is relatively high, at 98%, including 94% in rural areas. Consumption is roughly equally split among residential, industrial and other users (see Table 1 below).

Table 1: Consumption of electricity in Iran

	<i>share (%)</i>
Household	35
Industrial	32
Public	13
Commercial	7
Agriculture	10
Other	3

3. Iran trades electricity with Afghanistan (exports), Armenia, Azerbaijan, Pakistan, Turkey and Turkmenistan, with Iran importing around 1.5 billion kWh per year. A new transmission line is under construction from Turkmenistan, expected to bring total imports from Turkmenistan alone to 2.4 billion kWh per year. Iran is currently a net importer of electricity, i.e. it imports more than its exports.
4. Power demand is growing rapidly at about 8% annually. This high growth-rate, requires significant investment in generation capacity (estimated at 3,000 MW in 2005 alone). To date, the investment needs have primarily been met by public resources mainly in hydro and thermal power plants.
5. In the last few years, the power sector has undergone significant change: (i) policy and operation have been separated and the sector has been unbundled into 16 regional electricity companies, 32 generation management companies, 42 distribution companies and one high voltage transmission system operator (IGMC) organized under a

holding company structure (Tavanir) and many functions have been outsourced; (ii) in 2003, an electricity market was introduced whereby generation management companies, through the regional electricity companies, submit their quantities and prices on a daily basis to the IGMC which instructs the national dispatching center on optimum generation by the various power plants. The buyers are the regional electricity companies; and (iii) as a result of a government policy decision, a significant share of new generation capacity is expected to be added through private sector financed and managed power plants.

Sector Challenges

6. The need for reforms in the sector has been identified by the Government of Iran (GoI) in its Fourth Five Year Development Plan (FYDP; 2005-2010) and also in recent Bank activities, such as the Country Economic Memorandum (CEM) prepared in 2003 and the Environmental Energy Review (EER) prepared in 2004.

7. In the Fourth FYDP, the GoI proposes to focus on (i) energy efficiency improvements and demand side management; (ii) rationalization of energy prices and elimination of subsidies; (iii) productive use of energy export revenues; (iv) increased role of the private sector; (v) development of a regulatory framework and agency; and (vi) diversification through increased use of renewable energy. The Government has already started addressing some of the priorities identified in the FYDB, including increased use of gas over oil in power production (the share of natural gas in thermal power plants increased from 70% to 83% in the last 6 years) and by industry and increased fuel prices (although below the inflation level and in January 2005, the Parliament froze domestic prices for gasoline and other fuels at 2003 levels). Nevertheless, major challenges still remain and the Government has expressed its keen interest in continuing with improving the sector in line with the focus areas in the Fourth FYDP. However, following the presidential election of June 2005, it is not clear which direction the new Government will take on energy prices and subsidy rationalization. Across-the-board reductions in subsidies and upwards tariff adjustments may now be more gradual than would otherwise have been the case. Alternatively, there may be greater emphasis on targeting subsidies.

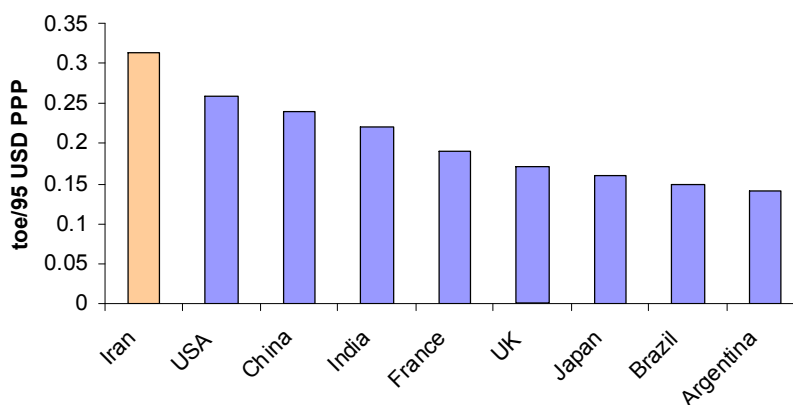
Key Sector Challenges:

8. Like many other countries with abundant natural gas reserves, the power sector in Iran is characterized by: high demand growth and inefficient use of energy; substantial investment needs; lack of experience in engaging with the private sector and poor cost recovery.

9. High demand growth has triggered an increase in electricity consumption from 59,102 GWh/year in 1990 to 150,360 GWh/year in 2001 with per capita consumption equal to about 2,200 KWh/year. Energy intensity is high in Iran. As evidenced in the graph below, it is higher than that characterizing most industrial countries.¹

¹ Iran, EER, April 2004

Table 2: International Comparison of Energy Intensity



10. The most effective signal to improve energy efficiency is price reform. Today, little incentive exists for managing consumption levels given the low cost of service. Furthermore, the availability of huge natural gas reserves (Iran has 17% of known world reserves, which continue to be subsidized) is a major reason behind the low electricity tariffs. Addressing pricing issues (level and structure of the tariffs and design of tariffs that will encourage a reduction of consumption at peak load, i.e., time-of-use tariffs) will assist in addressing the high demand and high-energy consumption pattern. However, there are also other energy efficiency measures that need to be considered, such as energy-saving appliances as well as uses outside of the power sector.

11. To keep up with an 8% increase in demand per annum, sector investments in the order of US\$3 billion have been estimated to be required.² Most of the investment needed is in generation capacity. Although the sector is reported to be carrying very low levels of debt, it is possible that a significant portion of future investments will need to be met by the private sector (although under the current high oil prices the fiscal pressure for private financing may be less).³ There is a need to review the investment program based on various scenarios, including adjustments in tariffs. An increase in prices would eventually lead to reduced per capita consumption levels, which in turn would reduce or at least defer investments.

12. The investment climate for the private sector in Iran is perceived as high risk by international investors. In May 2002, the “Law on the Attraction and Protection of Foreign Investment” was passed which deals with issues related to streamlined procedures, guaranteeing profit repatriation, among other things. This law represents the first foreign investment act since the 1979 revolution.

13. While there are several international firms active in the upstream hydrocarbon sector, there are none in the power sector to date. However, Iran is potentially attractive to private sector since it offers a large market and has availability of natural gas

² Draft Energy Sector Strategy Concept Note (prepared but never reviewed)

³ The *Iran Power Sector Restructuring “White Paper”* (July 1999), recognizes the limited availability of public resources and the need for private sector investment to implement the country’s future investment program.

resources. It is also worth noting that MIGA recently extended a guarantee for equity and debt participation by firms from Thailand and Japan to establish a JV in Iran in the petrochemical industry. The project involves the construction and operation of a high-density polyethylene (HDPE) plant with a capacity of up to 320,000 metric tons/year in Assaluyeh, Iran, and using natural gas as the feedstock.

14. The Government has put significant consideration into the sector reforms that have been initiated. In particular, measures on how to introduce competition and how to attract the private sector in financing and managing new generation capacity have been identified and considered and there is significant interest in all sector concerned institutions of how to develop the regulatory and legal frameworks necessary and the framework for private sector participation in the longer term. Specifically, the GoI is keen to draw lessons learned from the process and is putting in place several incentives to attract the private sector to invest (currently mostly aimed at the domestic market). Issues that need to be further considered include: (i) the different modalities for private sector participation; (ii) risk mitigation and government guarantees; (iii) good practice in contract formulation and negotiation; (iv) harmony between encouragement of private sector and development of a competitive market; and (v) expected efficiency gains and fiscal implications.

15. Finally, the average retail tariff in Iran is US cents 1.2/kWh.⁴ This is the lowest in the region, after Iraq (see Table 3 below). Key reasons behind the low tariff are that gas is plentiful but also highly subsidized, which accounts for the majority of the fuel used in power production. The low pricing is resulting in high and inefficient use of energy, large investment needs and increasingly difficult financial performance in the sector.

Table 3: Average Electricity Tariffs in Selected Countries of the MNA Region (US cents/kWh)

	<i>US cents/kWh</i>
Algeria	2.78
Egypt	2.30
Iran	1.2
Iraq	0.2
Morocco	8.23
Saudi Arabia	2.20

Objectives of the Sector Strategy Note

16. The objective of the Sector Strategy Note will be to provide recommendations to the Government of Iran how power can be supplied in the most cost-efficient and sustainable manner under a dynamic market structure with competition and participation by the private sector. The recommendations will cover important aspects, including legal and regulatory framework, pricing (gas and power), opportunity for stepping up energy

⁴ Iran Infrastructure Sector Note, June 2005

efficiency activities, regional trading opportunities and the role of the Government in supplying electricity, financing and governing. A proposed outline is attached as Annex 1.

Intended Audience and Stakeholders:

17. The intended audience is the Ministry of Energy and Tavanir; in that the Strategy Note will aim to assist in future sector policy direction and decision-making. However, the stakeholders expand outside the sector and include the Ministry of Finance in that it will be interested in managing the fiscal and quasi-fiscal exposure in the sector and the Management and Planning Organization in its involvement in key policy decisions, including market reform, regulation and private sector participation.

Team and Budget Requirements:

18. The core team will comprise the following:

Anna Bjerde, Task Team Leader and Senior Infrastructure Specialist
Pierre Audinet, Senior Energy Economist
Sophie Jablonski, Energy Efficiency Expert
Khalid Boukantar, Team Assistant

19. In addition, contributions will be made by the following: Mark Moseley (Senior Legal Counsel) on framework for private sector participation and contracts; Scott Sinclair (Lead Financial Officer) on investment climate and private sector potential; Amarquaye Armar (Lead Energy Specialist) on market structure and energy efficiency and Franz Gerner (on gas market and prices).

Peer Reviewers:

Vladislav Vucetic, Lead Energy Specialist
Eric Groom, Senior Regulatory Specialist

Outputs and Timetable:

21. The output will be a Policy Note. A draft will be completed by mid-February, 2005 for internal review. A final draft will be discussed with the Government in March, 2006. Final deliverable will be May 15, 2006. Missions will take place in December, 2005 and March, 2006.

Proposed Strategy Outline

1. Executive Summary
2. Power Demand
 - a. Historic patterns and trends
 - b. Future projections
 - c. Description of characteristics of demand
 - d. Energy intensity and need for energy efficiency
3. Power Supply
 - a. Current supply situation
 - b. Options to meet future demand
 - i. Conventional, domestic supply
 - ii. Imports/regional dimension
 - iii. Renewables
 - iv. DSM
 - c. Public vs private
 - d. Security of supply issues
4. Market structure
 - a. Current structure
 - b. Plans for the future
 - c. Issues for the future
5. Legal and regulatory framework
 - a. Current frameworks
 - b. Plans/issues to consider for the future
6. Pricing
 - a. Electricity
 - b. Gas
7. Conclusions and Recommendations

Annexes