

Public Policy to Attract Private Sector Investments; Case study on Development of Small-Scale Generators in Power Industry

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Abstract

The energy sector, especially the power industry is one of the most important and strategic industries in every country. Therefore, the public policy in the power industry is of great importance. By adopting privatization policies in this industry, while attracting private sector investments, governments will be able to reduce public expenses by increasing the influential role of people in this area. Construction or even management of large power plants is not desirable for the private sector due to the large volume of investment required and the operational and technical complexities. Public policy in support of widely distributed production of electricity and the development of small-scale generators has a lot of utility for the private sector due to its various advantages and quick return of investment. It may play an effective role in attracting private sector investments to the power industry.

Keywords: public policy, power industry, private sector, small-scale generators

Introduction

The use of energy for economic and social development and improving the quality of life is essential in all countries; as such, electricity has become a critical input to supply a wide range of activities related to the production, transmission and consumption. By 1980, most countries used to rely on state monopolies for electricity production, but in the mid-1990s, more than 30 countries and different regions in different countries adopted policies to reform their power industry. One of the issues before the power industry decision-makers and policy-makers in many countries is the idea of restructuring this industry by improving efficiency and competitiveness in other industries. According to this view's proponents, the need to move in this direction is undeniable for avoiding wasting capital, economic inefficiency and traditional monopoly. The strategic objective of restructuring is to replace old governmental monopolies with privatized companies (Mosleh Shiraz, Talebnezhad and Zamani, 2013: 130). The power industry began its life with private and small-scale power plants. Once its importance was understood, the power industry gradually began its nationalization process (and the subsequent monopolization).

Thus, the power industry became a unified and exclusive industry in the public mind that no one could enter or become active within it. With the same mentality, governments (in general) took control of the power industry. However, since early 1990s, the power industry around the world experienced fundamental changes. The traditional structure of the power industry which was built around the state-owned monopoly gradually became obsolete and the grounds were provided for various sectors to compete with one another. The measures to improve the power industry for providing better and more convenient services to consumers are called the power industry reform process.

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"Ownership reform", "law reform" and "structure reform" are three important reform areas in the power industry (Mosleh Shiraz, Talebnezhad and Zamani, 2013: 133). Iran's power industry started to change its organizational structure since early 1990. However, various studies on structural reforms and restructuring the power industry suggest no significant changes in Iran's power industry after about twenty years since the beginning of the reform. Vertical separation of the elements of industry, as one of the most important and influential measures in structural reforms of the power industry, is insignificant in Iran's power industry (Manzoor and Askari Azad, 2008: 35-80). The figures released by the Ministry of Energy indicate that the rate of privatization (which is one of the steps to create a new power structure) in combined cycle and gas power plants is insignificant after twenty-one years. These factors hindered the development of a competitive power market in Iran. On the other hand, the future of this reform is not so clear. It is uncertain whether this reform will result in profits or increased costs. Thus, the benefits of privatization as well as the current status of the reform and restructuring of Iran's power industry are the main issues that should be examined.

2. Government policy and privatization in power industry

With the victory of the Islamic Revolution, fundamental revision of policies in the power industry was required to coordinate them with the great objectives of the revolution. According to the principle of self-sufficiency, investment in factories manufacturing equipment for the power industry, cutting off the hands of external consultants and contractors and paying attention to the optimal utilization of internal capabilities gave the power industry a new direction. The widespread use of electric energy for economic and social development and poverty elimination, opened up new horizons for the industry officials.

During the eight-year-long Iran-Iraq war, in addition to the maintenance and operation of existing facilities, Iran's power industry was committed to implement development plans in the production and transmission as well as distribution and services to customers to support the people and defend the land. Rural electrification by the end of 1978 was accomplished in 4237 villages near cities. Thus, it became one of the fundamental aspects of the power industry. Despite all the difficulties during the imposed war, more than 1,800 villages were electrified on average. At the end of 1988, the number of electrified villages increased from 4327 to 22541. In the early years after the Islamic Revolution and during the war, despite all the difficulties caused by the war, the power industry continued to grow in all aspects.

With the end of the imposed war, the managers and directors of the power industry focused on repairing the destructions caused by war. For example, studies showed that 2210 MW of the installed capacity was unavailable due to war damages. Considering power transmission facilities and other equipment, one can imagine the huge effort required for reconstruction of the wreckage caused by war. Repair of war damages began in late 1988 and was completed after three years by the end of 1991. Damaged facilities and units were reconnected to the national power grid. By the end of the war, the power industry activities that had been negatively influenced by the war, became more systematic and went ahead in line with the 1st and 2nd Economic, Social and Cultural Development Plans of Islamic Republic of Iran.

As a result of these efforts, the power industry has been able to successfully leave behind the war and post-war crises and achieve its well-deserved international status. According to UN figures, Iran was in the first place in terms of the power industry in the Middle East and West Asia in 1995. Iran also achieved the twenty-first rank globally in the power industry (Besharatirad and Tabatabaee, 2010: 45).

The electricity industry has attempted to change its organizational structure since the early 1990s. Iran has carried out structural reforms in the power industry. These consist of two phases:

First: formation of power production, transmission and distribution company (TAVANIR) and independence of the power industry

Second: formation of organizations affiliated to TAVANIR (TAVANIR, 2012).

In line with the restructuring of the power industry, the following actions have taken place:

- Formation of regional power companies
- Formation of production management companies
- Move towards the decentralization of tasks and activities of subordinate units of the power industry and delegation of authorities and raising them to the autonomy level through formation of respective companies
- Changing the structure of companies from governmental to non-governmental and private companies
- Relying on the power industry revenues for the development of the industry instead of relying on public funds
- Measures to attract investments outside the industry for the development of power production through B.O.O and B.O.T contracts
- Energy exchange with neighboring countries
- Use of the national grid facilities and establishment of the power market with the formation of Iran Grid Management Company
- Independence of power activities and TAVANIR
- Functional structure of production
- Transmission and distribution in TAVANIR headquarters
- Formation of trade association for production and distribution companies
- Increasing the production capacity by employing appropriate methods for attracting small investments in small-scale generators (distributed generation)
- Provisions for subsidies and moving towards real price of electricity
- Establishment of the power market (MoslehShirazi, Talebnezhad and Zamani, 2013: 141-140).

The Ministry of Energy is in charge of energy policies and macro-planning in energy and power sectors as well as balancing of power supply and demand and maintaining its quality in line with sustainable development and security of energy supply. The Ministry of Energy provides the necessary conditions for coordination between the activities of the private sector, cooperatives and the public sector in all areas with policy-making, planning, organizing, directing, monitoring and formulating the rules and regulations and related legislation. Supporting the optimal consumption and boosting the national and international business environment in the power and energy sectors, the Ministry of Energy complies with the rights of all its stakeholders including the public, industrial, agricultural, services, government and legislative bodies.

By increasing productivity and utilization of new eco-friendly technologies compatible with current and future infrastructures and the development of specialized human resources and creative participation and productivity as the most valuable assets, the Ministry of Energy plays a determining role in social welfare and power exchange with countries in the region in order to reduce energy intensity and increase self-efficiency and the use of renewable energies. Using diverse sources of energy, demand management, relying on an integrated structure and powerful and creative professionals, the Ministry of Energy aims at promoting Iran to top ranks in the region in terms of the safety, reliability, and quality of power supply (according to international standards). Providing necessary conditions, the Ministry of Energy allows open access and fair competition in the power market so that the Islamic Republic of Iran is considered as a regional power grid operation center.

1. Improving the business environment, development of privatization and cooperation and promoting the capabilities of the private and cooperative sectors in the field of energy and electricity: the government duties in this regard include: motivation and confidence to invest the private and cooperative sectors, minimal activities of the public sector, improving productivity in the privatization process, facilitating investment in the private and cooperative sectors and creating a power bank, supporting the development of exports of goods and services of electrical engineering and establishment of a trade-economic mechanism to use functionality and ICT opportunities and so on in the power industry.
2. Improvement of policy-making in the power and energy sector: the government duties in this regard include: developing a comprehensive energy plan for the country, sovereignty and oversee the activities of the energy sector and expanding cooperation in policy making and planning.
3. The promotion and development of demand management system and modification of the pattern of energy consumption in different sectors to reduce the energy intensity: the government duties in this regard include: participation of the people for optimal use of electricity, development of non-governmental energy service

companies to optimize the energy consumption, changes in the system of subsidies for electricity according to the law of targeted subsidies, supporting the development of electric transportation, development and promotion of standards for power consumption and manufacture of electrical appliances, supporting research centers and related industries to develop new technologies in order to reduce energy consumption, modification of existing structures for demand management and energy intensity reduction, the development of smart grid power systems, the establishment of the electricity pricing based on supply and demand and the development of the power market and simplification of power tariffs.

4. The financial reform, diversification, development and financial resources needed for the development of the power industry: the government duties in this regard include: updating the regulations to facilitate the acquisition of new revenue sources for the power industry, especially multi-purpose use of the industrial installations, diversification. Optimal management of financial resources and financial support to the power sector with emphasis on non-governmental resources and attracting domestic and foreign capital to the power and energy sector in proportion to development plans.
5. The promotion of research and development and technology in the power and energy sector: the government duties in this regard include: guidance and support of internal research centers and research companies or private consultants, identifying and evaluating opportunities and advantages, identification, transfer and localization of environmentally-friendly technologies, increasing the power and energy sector engagement with capable domestic and foreign scientific and research centers and institutionalizing it, revision of the system for definition and referring applied research projects, studying the application of new methods of power transmission and storage including superconductors, extra high-voltage (EHV) transmission systems, high voltage transmission systems with direct current (HVDC), flexible AC transmission systems (FACTS), batteries, compressed air, hydrogen, etc.
6. The development of production, transmission and distribution capacities tailored to managed customer needs and modernization and optimization.
7. Improving power production efficiency of power plants: the government duties in this regard include: the development of plants with a higher efficiency and actual fuel charges and environmental costs of production and supply of electricity in financial relationships, the use of distributed generation technologies with an emphasis on the simultaneous production of electricity and heating and cooling, the establishment of economic and trade mechanisms in power plant optimization, the use of modern technology and equipment with a higher efficiency, optimal management of operation of hydroelectric plants and increased coordination with thermal power plants, fuel diversification in plants and the development of legal capacities for prioritizing fuel supply, the use of thermal power plants adjacent to or within cities for use in homes and industrial units.
8. The development of management and human resources in energy sector: the government duties in this regard include: the establishment of professional competence license system, promotion and development of substitution system at all levels of the electricity industry, promotion and development of individual and organizational learning to documenting and transferring knowledge and experience, the establishment and development of a knowledge management system, promotion and development of absorption system, empowerment and maintenance of human resources commensurate with the objectives of the power industry.
9. Promoting the production of renewable electricity and renewable energy sources: the government duties in this regard include: focus on research and localization in activities related to the production of power from solar and wind energy, allocation of a certain percentage of research funds to localization of new and renewable energy technologies, proposing and implementing projects in the field of renewable energy and commercializing them, providing infrastructure support and participation of the private sector to develop renewable energies, public participation to support the production of renewable electricity and renewable energy sources, reasonable rules in the energy market to expand the use of renewable energies (Ministry of Energy, Strategic Plan 1404, 2013: 51-58).

3. Iranian government policies to support small-scale generators

Special support of the government to encourage and facilitate the private sector's participation in the power industry with the aim of construction of small power generators in the consumption centers and facilitating entry in the power market include the following items according to Article 20 of the Fourth Development Plan:

1. Power cost prepayment including prepayment up to 15 percent, increasing to 20% of prepayment in the case of the sale of electricity through bilateral contracts, increasing to 2 times the amount of above prepayments in the case of using domestic generators, paying the costs of a split of the necessary facilities for gas supply of the generators through prepayment or managed funds, payment of expenses for generator connection to the power grid through prepayment or managed funds.
2. Investor may use banking facilities for the construction of small-scale generators like other manufacturing (industrial) projects and other power plant projects.
3. Restoring the subscription at current prices (about 10% of project financing).
4. The long-term lease of substation land.
5. The contracts to guarantee 9 months of fuel supply for small-scale generators, 12 months of fuel supply for CHP generators. In addition, 12 months of fuel supply (like CHP generators) is guaranteed for small scale generators which are installed and designed to add facilities needed for heat recovery and the use of recovered heat at the site.
6. Direct supply of electricity including signing of "consumer power supply contract" with consumers (transit of electricity), free transit, guaranteeing the power supply of the consumers by signing a "power supply guarantee contract" with the grid management, guaranteeing the purchase of electricity from self-supply consumers (consumers who install generators in their own facilities).
7. Power sales based on one or a combination of power supply methods.

7.1. The use of the national power grid facilities for power sales to consumers (bilateral agreement). With power supply contract with the consumer, the investor may supply power directly to consumers. The investor can also give over the rights and interests resulting from exploiting all or part of production capacity through contracts with other suppliers. If a consumer installs small-scale generators in his/her facilities, he/she will be able to purchase its power needs in the form of current subscription with distribution companies according to the approved tariffs or through power supply contracts. An investor can transit its own power production without payment of transit charges only by compensating the losses caused by this transit through medium or low pressure grid.

At the request of the investor or consumer, the grid management concludes a power supply contract with or on the behalf of the consumer. With the signing of this contract, in the absence of power supply (due to the lack of fuel supply or impaired power grid in small-scale generator side), the investor will guarantee power supply. In this case, only the cost of power supply will be received.

7.2. The investor can sell its power produced to the grid management. Respecting the administrative instruction, Paragraph (b), Article 8 of the power purchase regulations, the investor sells its power generated with guaranteed rates plus ten percent or sell the power to the wholesale market like other power plants provided that the necessary facilities needed for the exchange of information to participate in the wholesale market (including exchange of information on available capacity and output per hour) are available. The grid management guarantees the small-scale generators to attend the wholesale market free of discrimination for the power production and supply.

7.3. Another government initiative in support of small-scale generators is to conclude guaranteed contracts. If the effective electrical efficiency of small-scale generators is higher than the average efficiency of thermal power plants, TAVANIR (or Distribution Company) will sign a long-term power purchase agreement or long-term energy conversion contract at the request of the investor (where TAVANIR is responsible for the cost of fuel). The contract comprises the following items:

- The buying rate per kWh of power is determined by adjustments resulting from changes in the basic conditions in accordance with the provisions of the Article Six of the guaranteed power purchase regulations. The difference in effective electrical efficiency of the generator with an average efficiency of thermal power plants and the difference in the "average grid losses" and "the mean use of grid facilities" caused by the connecting the generator to the national grid will change the basal condition and adjustment in the average rate of power generation (energy conversion).

- Fuel supply for small-scale generators is guaranteed for 9 months of the year.
- Fuel supply is guaranteed for 12 months for CHP generators and small-scale generators that use liquid fuel as backup fuel and their electrical efficiency is more than one and a half times the average efficiency of thermal power plants.
- Fuel supply is guaranteed by the early 2015 for small-scale generators that are designed and installed to use the recovered heat in place.
- Small-scale generators that do not produce electricity despite the readiness on the command by the center or reduce their production rate will be paid for the standby capacity that is not used for power production according to the purchase rate by subtracting the average variable cost.
- If an investor is scheduling for the direct sale of power generated to consumers so that TAVANIR commitment to purchase power does not exceed five years; TAVANIR will prepay 5% of the total value of annual production with the base rate of energy conversion contract (power purchase agreement) during construction. If the direct sale of power to consumers is scheduled so that the commitment period (volume) of TAVANIR to purchase power decreases, the above-mentioned prepayment can be increased 5.2 times according to this decrease.

8. Other facilities that the government intended to support small-scale generators include:

- An investor can use banking facilities (local and foreign) like other production plans (industrial) and other power plant projects for the construction of small-scale generators. At the request of investor, the plan will be referred to the banks as an approved plan of the Ministry of Energy to receive banking facilities (including the allocation of foreign exchange from foreign exchange reserve account).
- TAVANIR supplies a part of investor's input through managed funds (with a minimum interest rate/fees foreseen in the relevant regulations).
- The investor is provided with space required for constructing small-scale generators in power substations in the form of long-term lease (or ownership transfer in accordance with provisions), if it is possible to establish and operate such generators technically. In order to facilitate the granting of loans to investors, the substation owner (regional electric or Distribution Company) will assist the bank or financial institution for mortgaging the land for small-scale generators (with a right to use as a substation).
- After obtaining a construction license (in cases where a construction agreement is obtained, after obtaining the construction agreement), the investor can offer its request for "introducing his/her plan as a plan approved by the Ministry of Energy" to the participation department for receiving support and facilities (through foreign exchange reserve account), currency allocation or other means.
- To facilitate investment in the construction of small-scale generators, at the request of investors, TAVANIR (or its subsidiaries) can provide the investor with financial resources required for the establishment of branches, construction of facilities for gas supply and connecting the generators to the power grid through power purchase prepayment (in addition to other power purchase prepayments) or through managed funds (in addition to other facilities).

4. Conclusion

Distributed power production has technical and economic advantages for the Ministry of Energy as the custodian of the national power supply. Therefore, policies entitled "development of distributed production generators" have been adopted for on-site power supply in order to decentralize the power generation units and to improve the grid reliability and productivity. In general, the plan aims at providing facilities and incentives to increase power production in distribution grids by the private sector. Statistics on the development of distributed generation projects using private sector capital and the increase in small-scale generators in Iran indicates the non-fulfillment of government policies and plans in this area. Scrutiny of this statistics reveals the significant role of the government in power generation. A significant percentage of small-scale generators contracts has been terminated and this is the most important sign of the failure of policies adopted by the Ministry of Energy in encouraging the private sector to participate and invest in power generation through the distributed production.

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