

The Challenges of Feed-in Tariff Law as a Policy Instrument to Promote Wind Power in Iran

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Abstract

This study was carried out with the aim of finding out the challenges towards Feed-in Tariff law instrument in order to promote renewable energy in Iran. The targets of the study were chosen among authorities and investors in the field of wind energy. Wind power was selected as the case study because of its more popularity among investors. Qualitative research design was used to conduct the study and semi-structured interviews served as the method. Although there were a few studies done with the focus on renewable energy challenges in Iran, however, none of them focused on the challenges through Feed-in Tariff law. The results show that the law's long administrative process, lack of communication between authorities and investors, and rather low remuneration rate are the barriers to promote renewable energy in Iran. Furthermore, lack of financial assistance and imposed political and economical sanctions against Iran play an important role in this regard.

Key words: renewable energy, feed-in tariff, wind power

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1. INTRODUCTION

1.1 Background

The world is facing a new energy crisis related to the trend towards scarcity of the resources. Meanwhile, entering of the important emerging economies such as India and China into the global energy market could be considered as the main reason. The demand for fossil fuels especially oil and gas is increasing which equals to a faster exploitation of the fossil fuel reserves. Coal reserves seem to keep up for a while, however, the main issue which arises in the one way exploitation of the fossil fuels is the worldwide environmental impact from extraction to the end use, as well as, further increase of greenhouse gas emissions globally. Anyway, politicians and the public are increasingly aware about the climate change effects, as some examples of global climate change can be observed around the globe (Müller-Kraenner, 2007).

Ferguson et al. (2000), discusses that there is a strong correlation between electricity consumption and economic growth. He concludes that the mentioned correlation is more considerable in wealthy countries and when it comes to the global economy as a whole, there is still a stronger relationship between electricity use and economic growth compared to what exists between total energy use and economy growth. Furthermore, we are in a point that world's energy consumption increases 1 to 3% every year. From one perspective, more and more fossil fuels are needed in order to fulfill the growing energy demand, which inevitably leads to higher levels of greenhouse gas emissions (Maczulak, 2010).

The demand for electricity grows more rapidly than the electricity which is delivered to the consumers. For instance, the net electricity generation increases at an annual rate of approximately 3% while the corresponding figure for delivered energy consumption is 1.8% (EIA, 2011). It is projected that the electricity demand for non-OECD countries continues to grow faster than OECD countries and reaches 60 percent of the total global demand by 2035 from 47 percent in 2008 (EIA, 2011). Electricity demand can affect energy security which is used as a relationship between national security and the abundance of the natural resources for energy use purposes. Furthermore, energy security is one of the main goals of energy policy (Winzer, 2012).

With such a great and growing electricity demand in the world, renewable energy could be considered as a solution to some of the mentioned issues, mainly pollution and energy security. The use of renewable energy not only mitigates the climate change, but also is an infinite energy resource. (Wengenmayr and Bührke 2008)

1.2 The status of renewable energy policy in the world

The share of renewable energy in the world electricity production is projected to be 5.1 out of 22.7 trillion kilowatt hours by 2015 which is approximately 22.46 percent (EIA 2011).

As renewable sources of energy are considered much cleaner than the conventional forms of energy and are also widely accessible, however, the related costs are still more expensive in many regards than fossil fuels and not all the renewable resources are available widely or distributed in a same level. Furthermore, they have their own set of environmental impacts (Komor, 2004). Currently, all developed and many developing countries through various policy instruments, are trying to promote the use of renewable energy technologies (Jordan-Korte, 2011). Komor (2004) also believes that the path towards a renewable energy dependent society is impossible without making a set of policies to support its implementation. Lechtenböhmer et al. (2010) points out that the renewable energies, similar to other new technologies with significant effect on economy, rely on governmental support in their early stages of development. Geller (2003) mentions that financial incentives are considered as one of the policy options which can particularly encourage the early adoption of renewable energy technologies and stimulate the process. Thus, what could be learned from such literatures and lots of more related studies and investigations in regional, national, and international level is that in order to stimulate the deployment of renewable energy technologies in the society there is a need for sets of rules and policies to introduce these technologies to the society and it means to provide sets of conditions to encourage investors to invest in renewable energy projects.

1.3 Energy status in Middle-East and Iran

The status of the renewable energy in the oil-exporting countries in Middle East, especially in the Persian Gulf countries is in a niche level. The main energy supply source is extracted fossil fuels in these countries, despite having great potentials in renewable energy resources such as solar power. There have been efforts to promote renewable energy technologies in Middle East, for instance United Arab Emirates started a process to transform the revenues from oil into sustainable renewable energy investment (Reiche, 2010).

Meanwhile some of these countries put subsidies on petroleum products and face low efficiency in energy use. Iran is among one of these countries (Birol et al., 1995).

Iran is located in the south-west Asia and the area is 1,648,195 km² and is an oil and gas rich country. The population was approximately 71.74 million in 2008 and the average rate of GDP for the decade from 1998 to 2008 rose over 5.5 percent (Mohammadnejad et al., 2011; Statistical pocketbook of Islamic Republic of Iran, 2010). Based on the Statistical Review of World Energy (2011), Primary energy consumption in Iran rose from 121.2 Mtoe¹ in 2000 to 212.5 Mtoe in 2010. It means that the total energy consumption increased by 75 percent in this period. The share of hydroelectricity in 2010 was 2.2 Mtoe and the share of the other renewable energy sources were 0.1 Mtoe. In the same year, the natural gas and oil were dominant in energy production with 123.2 and 86 Mtoe respectively (BP, 2011).

Currently, over 99 percent of households in Iran are connected to the national electricity grid. The status of different sources of electricity production in the year 2008 can be seen in figure 1 (Ghorashi and Rahimi, 2010).

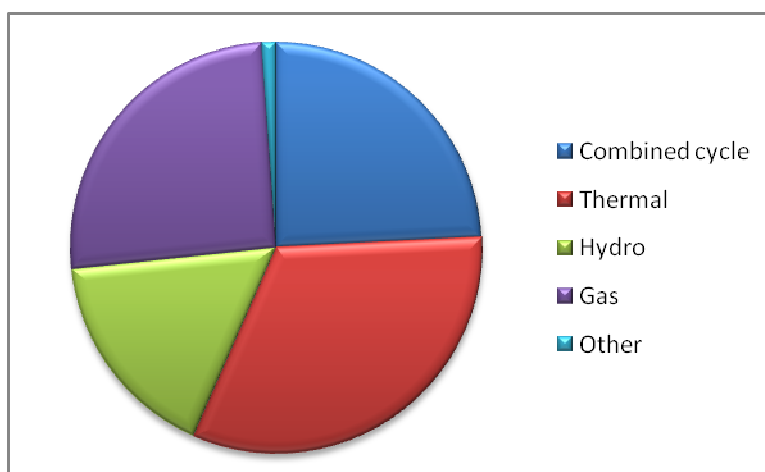


Fig. 1 The contributive share of different resources in electricity production in the year 2008

Based on the information provided by IEA (International Energy Agency), the total electricity production was approximately 203187 GWh² in 2009, which the share of renewable energy was 7233 and 227 GWh for hydro and wind power respectively (IEA, 2012). In the same year, the total consumption by different sectors was 171374 GWh, which could be concluded that electricity supply and demand is to some extent balanced in the country.

¹ Million Tons Of Oil Equivalent

² Gigawatt hours

1.4 Renewable energy policy in Iran

The year 2001 was the beginning of renewable energy policy making in Iran. In the February 19th of 2001, Iran's Ministry of Energy was obliged to purchase the electricity produced by the public and private power plants at guaranteed prices and some feed in rates were introduced. The introduced prices were set to be higher than the non-renewable electricity, so in that way investors benefit from selling their electricity. The instructions of how to implement the law were introduced in February 2005 and new feed-in rates were introduced in November 2008 (Lechtenböhmer et al., 2010). Among the different sources of renewable energy, wind power is at the center of attention by investors because first of all Iran has vast geographical areas with high wind velocity. Furthermore, a part of wind turbines needed for the projects, manufactures inside of the country which costs less for the investors. Therefore wind is one of the most viable renewable energy sources in Iran.

1.5 Objectives and purposes of the study

Even though Iran is among those countries which have a legal framework to support the renewable energy, the progress of renewable energy development is yet slow in the country (Lechtenböhmer et al., 2010). Thus, some factors might be missed or probably were ignored in the current legislation and they are needed to be considered and be a part of the legislation's body. Iranian authorities took the first steps towards renewable energy development by setting a supportive feed-in tariff (FIT) law. However, laws may not be effective just by themselves and need a supportive environment to provide the best condition possible for the law's effect, as well as, enforcement mechanisms in order to play their roles appropriately. According to this being said, I am going to focus on following research objectives.

1. Have a better understanding of the role and status of FIT as an instrument to encourage the adoption of renewable energy with the focus on wind energy in Iran.
2. Investigate and discuss the challenges in FIT law, in order to encourage the investment in Iran's renewable energy sector.

1.6 Scope of the thesis

The main focus of the thesis is on the performance of FIT as an only instrument to encourage the public investment in the renewable energy sector in Iran. Although according to the official documents from SUNA³ which is the Persian acronym for Renewable Energy Organization of Iran, this law has been designed to cover all forms of the renewable energy

³ SUNA (Sazman'e Energihaie Noe Iran) is a governmental organization responsible for renewable energy development in Iran.

(mainly wind and solar power, geothermal, biomass, and small scale hydropower), however, in this study the focus is on the wind power mainly due to its higher economical attraction for the investors.

After introduction of the law in 2001 it was provided with implementation instructions in 2005 and new feed-in rates were introduced in 2008 (Lechtenböhmer et al., 2010), thus the focus on challenges towards the law will be after 2008 and in the wind power sector. In order to better understand the FIT instrument, an analysis of different FIT remuneration schemes is presented in this study.

2. FEED-IN TARIFF LAW TO SUPPORT RENEWABLE ENERGY IMPLIMENTATION

Renewable energy based power generation is generally more expensive than the conventional form of electricity production and cannot be accepted by the energy market without a set of rules and policies to support it (Mendonça, 2007). There are many successful cases in both developed and developing countries which are beneficiaries of FIT such as Germany, France, Spain, India, etc. The core principle of the FIT stands on the obligation of the electric utilities to buy the renewable generated electricity at a fixed tariff per kWh for a determined period of time (Klein et al., 2008; Butler, 2008). In different sources, FITs are also known as Feed Laws, Feed-in Laws, Renewable Energy Payments, Standard Offer Contracts, and Advanced Renewable Tariffs, (Gipe, 2010). It was first introduced in USA as a federal law in 1978 and named Public Utility Regulatory Policies Act (PURPA) which stimulated the wind power industry effectively in some states; especially California. One of the successful cases since 1979 which helped a lot to develop the FIT law is Germany's FIT law (Mendonça, 2007). For almost a decade no significant changes happened to the FIT instrument, however the breakthrough happened in Germany in 1990 after the acceptance of the law by parliamentary parties. It became the federal Electricity Feed Law or *Stromeinspeisungsgesetz* (StrEG). This law had a form of a rather simple one-page bill to assist the producers of renewable electricity generated by small hydro power stations and wind energy installations and then became the most important policy instrument to support the diffusion of renewable energy in Germany (Mendonça, 2007). In 2000 Germany introduced renewable energy act or *Erneuerbare Energien-Gesetz* (EEG), a replacement to StrEG for further promotion of renewable energy. The reasons why EEG replaced StrEG could be explained briefly in a set of amendments. For instance, reduction of the renewable electricity supplies costs and further development of the related technologies (Runci, 2005; Lauber, 2004). One of the other significant changes is that EEG guarantees access to the grid and introduced a set of guaranteed rates. Another interesting perspective of EEG would be the degression model or gradual reduction of the published tariff rate by a fixed percentage in each year. The philosophy behind the degression model is the technological development which causes decline in price of different components for renewable energy technologies (Mendonça, 2007). This strategy can stimulate the investment in a way that the potential investors know that the premium rates will not last forever and the quicker they act; the higher feed-in rates they could receive. Besides, the rates could differ based on the resource quality and project

size (Haas et al., 2011; Mabee, 2011; Ragwitz et al., 2010). EEG has been amended in 2004 and then in 2009.

2.2 A brief analysis on remuneration schemes provided for FIT

Investors' confidence on remuneration scheme of the FIT policy is an essential factor for the robust performance of the instrument. The significance of the properly designed remuneration scheme is that it can secure the investment and also provide an opportunity for renewable energy development which is the main purpose of the policy instrument (IEA, 2008; Dinica, 2006).

The basic criterion to characterize the different FIT policies is in their remuneration scheme, which either could be dependent or independent from the actual price of the electricity in the market (Klein et al., 2008). According to IEA (2008) and Mendonça (2007), market-independent FITs also known as fixed-price policies, offer a fixed or minimum price per kWh electricity delivered to the grid. Market-dependent FITs, which are also known as feed-in premiums, are a premium payment added on the market price of electricity.

2.2.1 Market-Independent FITs

In this section three widely adopted approaches are introduced and their general positive and negative points are mentioned.

Fixed price scheme is the most basic option which the generated electricity from renewable energy sources (RES) could be sold in a fixed price for the assigned period of time. This is the basic structure of the German EEG and the level of remuneration could be affected by the renewable energy technology type, power plant capacity and other characteristics. The assigned contract time is 20 years for most of the technologies in Germany and a degression rate is provided for every year as explained before (Langniß et al., 2009; Couture and Gagnon, 2009). One important issue to this type of the FIT is that it doesn't consider the inflation rate since the payment is fixed for the whole period of time (Couture, 2009). However, there are possibilities for further premiums if for instance the investor uses higher efficiency systems or most advanced technologies in the form of special price premiums in addition to the fixed payment (Langniß et al., 2009). In this case, this type of FIT could attract investors through price premiums, however might not have satisfying results in the countries with high inflation rate records.

To tackle the inflation problem some countries for instance, France, Ireland and Ontario in Canada are offering a fixed price type of FIT with inflation adjustment, which could fully or partially cover the inflation rate. In overall, such kind of design seems to attract more

investors compared to the fixed price FIT type. However, the high levels of inflation adjustment might put an extra burden on the electricity buyers on the basis of the longevity of the contract (Couture and Gagnon, 2009).

Another approach is to offer higher payments in the early years compared to the later upcoming years of the contract. This approach has also been implemented based on the resource quality (Klein et al., 2008). With higher revenues in early years, investors benefited better since they have to pay the initial costs and loans for running their renewable projects (Couture, 2009).

2.2.2 Market-dependent FITs

In this type of the FITs, market dictates the remuneration rate generally. Two⁴ of the most important such schemes, are briefly presented here.

One approach is the Spanish FIT system, in which the producer gets a price higher than the market price per kWh electricity produced. The premium amounts can vary depending on the technology type and project size (Held et al., 2007). In case of higher electricity price in the market, the investors are paid more and vice versa. However, in case of the frequent fluctuations in electricity price, negative consequences are projectable for market growth due to its associated investment risks (Klein et al., 2008). This Type of FIT is offered in Czech Republic, Slovenia, Estonia, and Denmark as a possible option (Klein, 2008).

Spain introduced a new approach to its market-dependent FIT policy in 2007 under the Royal Decree 661/2007 which the significant modification related to the remuneration system. This scheme not only offers electricity generators the option to sell their electricity into the market. It also benefits them from a variable premium payment that increases the predictability of future revenue streams by introducing a cap and floor on the total premium amount, for instance, if the market electricity price declines the premium increases to make up the difference and vice versa (Held, 2007). This scheme helps to increase the likelihood that the total remuneration will remain mainly cost-based over time. Furthermore, it keeps the motivation to produce electricity in times of high demand, while in a same time increasing the market compatibility of renewable energy generation. Furthermore, it provides more investment security in the times that the market price declines by increasing the premium amount (González, 2008).

The purpose of both market-independent and dependent policies is to promote further engagement of renewable energy share to the total electricity generation; however, each of

⁴ The second scheme is a modification over the first one.

them emphasizes more on particular points. For instance, while market-independent policies consider less investment risks by presenting a basic fixed price scheme, market-dependent policies emphasize more on the renewable energy electricity generation in order to reduce supply pressure by offering incentives.

3. FEED-IN TARIFF IN IRAN

Although with the presence of a law supporting the renewable energy development, the significance for investment in renewable energy in a fast developing energy-rich country such as Iran may not appear to be highly prioritized. This issue is due to the many other economic concerns to govern a country. Investment in renewable energy is without a doubt one of the most important elements for sustainable development and Iran's developmental policy is not an exception. Besides, advancement in renewable based electricity generation seems to be impossible without a supporting policy (Geller 2003, Lechtenböhmer et al., 2010). That's why, the Iranian parliament passed the FIT law to encourage the private investments in this field (chapter 1). This law however is a part of a major law supporting the privatization. In general, Privatization could be explained briefly as the transference of the property or responsibility from the public sector to the private sector (Vahabi et.al, 2009). The privatization law was approved by the cabinet on April 2001 and notified on May 2001. Iran's Privatization Organization (IPO) has been incorporated according to Article 15 of Islamic Republic of Iran's 3rd Economic, Social and Cultural Development Plan ratified in 2000, by changing the articles of association of the former Financial Organization for Promotion of ownership of Production Units. The articles of association was approved by the cabinet on April.18, 2001 and upon verification by Guardian Council, it was notified on May 2001 (IPO, 2012). According to SUNA (2012), article 62 of the same development plan is about renewable energy development in Iran (section 3.4).

With having privatization view in mind, financial incentives emerge themselves in the form of FITs and investors benefit from selling their renewable electricity with higher price than the non-renewable electricity. This difference in prices could also cover at least part of their early costs too.

3.2 The importance of investment in renewable energy for Iran

According to the business-as-usual scenario (BAU), Iranian electricity demand in residential sector will rise roughly by 40% from 2005 to 2030 (Moshiri et al., 2011). From the environmental perspective if the current energy sources are continued to be utilized, then by 2030 the greenhouse gas emissions will rise dramatically. According to Lechtenböhmer et al. (2010), the energy security which might not seems to be an issue because of the Iran's vast fossil fuel sources, will become a serious problem by accelerating the rate of the fossil fuel exhaustion in the coming decades. Besides, faster exploitation of fossil fuel resources for power generation purposes affects Iran's oil dependent economy. The more electricity needed

for the different sectors in the country, the more fossil fuels needed to be consumed for electricity generation. By taking such a short glimpse to the future, the need for renewables to fill at least a part of the rising energy demand in Iran would be a good solution. When the share of the renewable technologies in electricity generation rises, the more fossil fuels could be saved for purposes other than electricity generation in power plants. As mentioned before, these savings could be a help to Iran's economy.

The expansion of renewable energy electricity generation will reduce the greenhouse gasses. In BAU scenario CO₂ emissions will double, however based on the combined efficiency and renewable energy scenario, the generated CO₂ emissions associated with electricity generation purposes sink down around 45% by 2030. The saved fossil fuels could be, for instance, exported to help the economy. It means that emissions could be maintained at the current level even under population growth and economic development (Moshiri, et al. 2011). Renewable energy could reduce the extra direct costs on measures to decrease GHGs which eventually should be taken for instance in a BAU scenario.

Despite of the higher capital cost which is needed for the renewable energy technologies they are less labor intensive. However, the capital cost for renewable energy technologies is a subject of reduction since the related technologies are improving rapidly (Lechtenböhmer et al., 2010). Investment in renewable energy to keep and push Iran towards sustainable energy development seems to be logic. One reason is that renewable energy technologies are getting improved more efficiently.

3.3 Renewable energy potentials in Iran

According to the studies done by Renewable Energy Organization of Iran (SUNA), Iran has a high potential for utilizing renewable energy. For having a more accurate and updated atlas of Iran's renewable potentials many studies have been done so far. For instance, to prepare the wind energy atlas 150 anemometer masts were installed across the country to assess the wind velocity. Solar energy accessibility is also significant in Iran and in many geographical areas daily solar radiation is over 5 kWh per m² (Lechtenböhmer et al., 2010). Atabi (2004) points out that solar irradiation is very high in Iran and he estimates that the utilizable sunny hours are up to 2800 hours per year. There is a potential for geothermal energy in the north west of Iran and the geothermal potential estimates to be between 5000 to 6000 MW in the country (SUNA, 2012). Iran has a high potential in hydropower as well. Based on the World Energy Council (2001) hydropower potential in Iran is up to 48 TWh per

year. There also have been 2 biogas projects which started to work in 2010-2011 (SUNA, 2012).

Since the focus of this study is on Iranian FIT instrument to support wind power investment opportunities, more information is provided regarding Iran's wind power potential.

3.3.1 Wind Power

The last wind map which is cooperation between SUNA and 2 private companies is provided in the figure 2. Then northern part Iran has relatively more potential for wind power by having more areas with the maximum wind velocity.

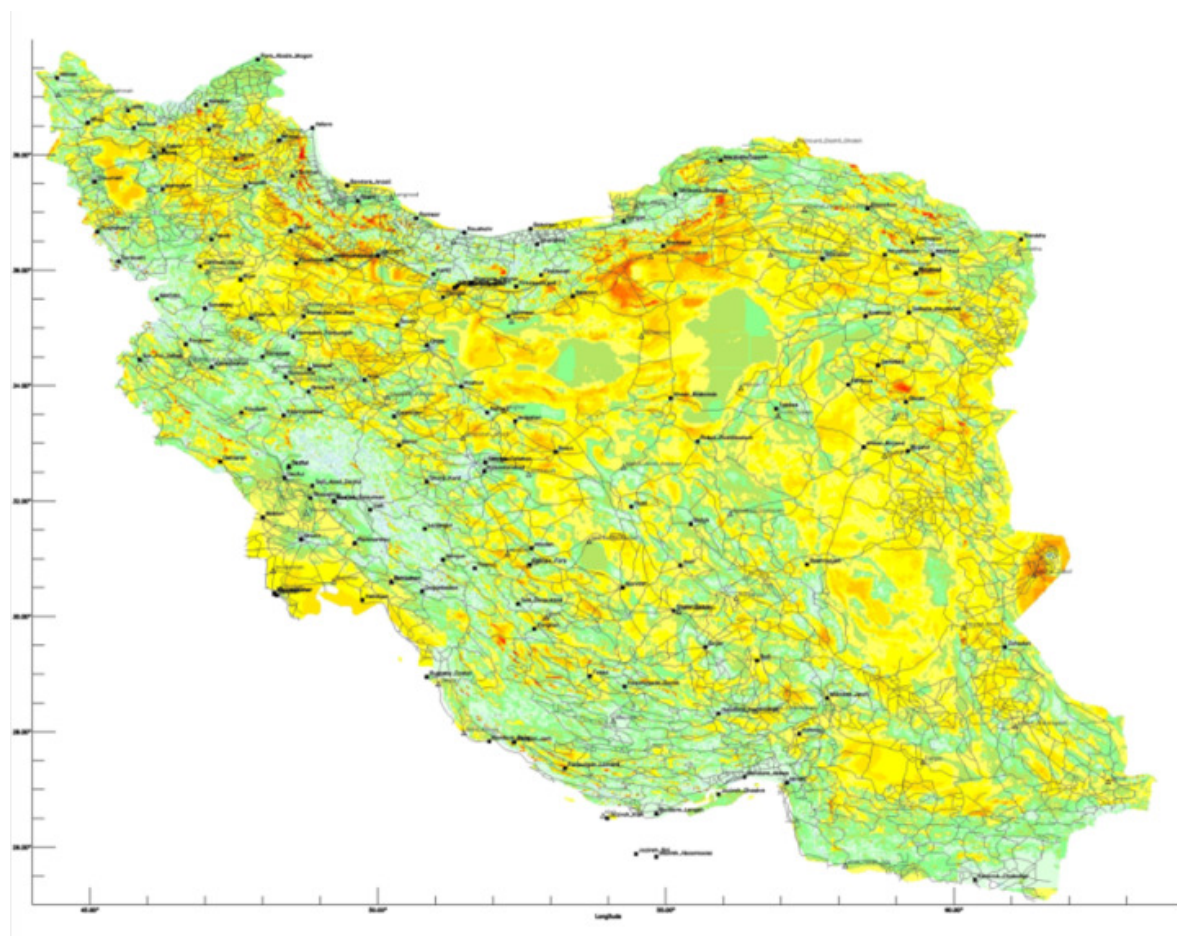


Fig2. Iran's wind power map in 80 meters above the ground, which red color represents wind velocity between 8-9 m/s, yellow represents 5.5-7.5 m/s, and green less than 5.5 m/s. SUNA's estimation of wind power potential is over 30,000 MW in the whole country (Lechtenböhmer et al.).

In 1995, the first wind turbines were purchased and installed in the northern province of Gilan. Now there are 5 wind farms located in two provinces (Gilan and Khorasan) with total capacity of 128 MW. Wind farms in Khorasan province which belonged to the public sector were sold to the private sector due to the privatization law in Iran which mentioned earlier.

Gilan's wind farms are also in the process for being sold. These two wind farms are the biggest ones in Iran and placed in a high wind velocity areas. Nowadays there is a wind turbine manufacturing company in Iran called Saba Niroo which has the capacity to manufacture turbines with the maximum capacity of 660 KW. However, the production is limited and doesn't respond the Iranian market demands (SUNA, 2012; Lechtenböhmer et al., 2010).

3.4 Feed-in Tariff policy in Iran

According to the article 62 of the third five-year Economic Development Plan passed on the February 2001, the ministry of energy was obliged to purchase renewable electricity produced by public and private sector in guaranteed prices. Article 62 is a part of the law of Government's Financial Regulations. The law has also been validated for the fourth and fifth Economic Development Plan. The feed-in rates were decided to be US \$ 0.067/kWh in peak and regular consumption hours (20 hours a day) and US \$ 0.047/ kWh in off-peak times in February 2001. On February 2005, the Ministry of Energy provided a set of instructions of how to implement article 62 which is further explained in the next section of this chapter. However, on November 2008 these rates were increased to US \$ 0.13/kWh (Approximately 1300 IRR⁵) and US \$ 0.094/kWh (Approximately 940 IRR) respectively. Based on the law, the maximum duration of renewable electricity purchase contract could be up to 20 years. Additionally, investors are allowed to sell a part or the whole share of their generated electricity to the other customers than the ministry of energy and even export it outside of the country.

According to the article 62, after the first revision in 2008 the feed-in rates are subject to revision in the following years. Based on the latest contact with an authority in SUNA the next changes in rates happened in the late 2013. The feed-in rate for regular consumption decided to be 4440 IRR/kWh. This amount equals approximately US \$ 0.178 by the date the contact made with the authority from SUNA. There was no information about the feed-in rate in the off-peak times. The revision rate is dependent on the inflation rate and fluctuations in exchange rate (e.g. IR-rial to US-dollar).

⁵ Iranian Rial

3.4.1 Administrative process of the Article 62 (Instructions to implement article 62)

According to the latest edition of the handbook presented by SUNA (January 2013), the administrative process includes 5 steps of instructions to implement article 62. All the time frames of each step are estimates and suggested by SUNA which is Article 62's executive organization.

Steps	Details of each step
<i>1. Project registration (authorization for the feasibility study)</i>	<p>a. The type of the project, capacity, and the project site determines by the applicant and registers in SUNA. A related application needs to be filled.</p> <p>b. After checking the applicant's capabilities, network's requirements, and the non-interference of the project with the other projects which are all being approved by Tavanir (Iranian Corporation of Production Management, Transmission, and Distribution of Electric Power), the permit for feasibility study is issued by SUNA.</p> <p>This step normally needs 2 weeks.</p>
<i>2. Feasibility study and issuance of the permit</i>	<p>This study mainly deals with the technical specifications of the power plant, which is being done by the applicant and is approved by SUNA. SUNA may provide some assistance to the applicants, for example, in case of the wind power plants SUNA provides the applicants with the statistics from the local anemometer masts.</p> <p>a. After SUNA's approval on the successful feasibility study project, the applicant should present his/her grid connectivity plan to Tavanir in order to get the grid connection permit. The applicant should also present the project to the Environmental Protection Agency to get the environmental permit too.</p> <p>b. By obtaining these permits, applicant should bring the project to the privatization office of the ministry of power, in order to get the initial agreement.</p> <p>c. Afterwards, the applicant should visit the Organization of Land Affairs (a section of Ministry of Agriculture) to acquire a permit for land</p>

	<p>utilization.</p> <p>d. Right after financing the project by the applicant, department of electricity and energy (a section of the power ministry), issues a license to construct the power plant.</p> <p>This step could take up to one year.</p>
<i>3.Contracting</i>	<p>In this step, a draft copy of the contract between the applicant and SUNA is being sent to Tavanir in order to be approved by them.</p> <p>This step takes 1 month which includes the time to review and sign the contract.</p>
<i>4.Construction period</i>	<p>The investor should manage to do the executive operation of the power plant and SUNA supervises the process.</p> <p>The time needed to finish this step is according to the schedule which the investor proposes.</p>
<i>5.Operational period</i>	<p>a. Whenever the power plant gets ready, the network connectivity equipments are checked by Tavanir and the operational permit will be issued upon approval.</p> <p>b. Finally, Tavanir is responsible to pay for the net electricity generation of the power plant.</p>

Table 1

Table 2 shows the status of the wind power related contracts up to January 2012. According to the authorities in SUNA, the permit to generate approximately 10000 MW of electricity has been issued in the wind power section which around 30 MW of it is operational and the rest divided between feasibility studies and contracting phases.

Stages of power plants advancement	MW
Operational (Step 6)	28.4
Contract (step 5)	679
Contracting procedure (Steps 3 and 4)	5639
Feasibility study (step 2)	2733.53
Cancelled licenses because of passing the deadline	1129.5
The sum of the potentially formed electricity generation capacity to date (permit granted)	10209.43

Table2. According to SUNA's information, there were 17 private companies which were between steps 2 to 5 until January 2012 (SUNA, 2012).

4. METHODOLOGICAL APPROACH

In order to gather the information regarding challenges in Iranian renewable energy development in the context of FIT instrument, 7 interviews have been performed. Three of those interviews were performed with authorities and the remaining four were done with the investors. Along with the interviews, literature review concerning the FIT in the world and Iran was done and the grasped information was used to deliver information and support the arguments in this thesis.

4.1 Qualitative Methodology

Dabbs (1982) believes that the concept of *quality* is indispensable to the nature of things while *quantity* is basically an amount of things. When it comes to the qualitative methodology Berg (2001) mentions that qualitative methodology is not predominant in social sciences. He elaborates this notion by explaining qualitative methodology as a more time consuming methodology compared to the quantitative methodology. Furthermore, he believes that qualitative methodology requires higher clarity of goals during design stages and a qualitative based study should be analyzed by the minds of the researchers and cannot be easily analyzed by computer programs as quantitative methodology based studies can. Berg (2001) explains the difference of qualitative and quantitative methodologies in one sentence:

"Qualitative research refers to the meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things, in contrast, quantitative research refer to counts and measures of things."

Qualitative research, due to method flexibility has a greater spontaneity and adaptation of the interaction between investigator and the study participant. In case of this study, approaches could be better accomplished through a qualitative method. One reason is the limitation regarding the numbers of FIT studies done in Iran. Although there are many studies connected to renewable energy perspectives in Iran, however a small number of them focus on FIT as an instrument for renewable energy development. Therefore, taking a qualitative approach and in particular interview method provides the information needed for this study.

4.1.1 Limitations of the Qualitative Methodology

However the qualitative methodology has its own limitations. For instance, the research quality is completely related to the researcher's skills to control the direction of the study and avoid the personal biases (Willing, 2008). The volume of the collected data that need to be

analyzed and interpreted could be time consuming and consequently findings could be more energy and time consuming in order to be characterized in a visual manner. Furthermore, with having small amount of respondents it is difficult to generalize the data. Validity could face lack of clarity because the researcher may not be completely aware of the respondent's truthfulness (Willing, 2008).

4.2 Applied method

The conducted interviews were done in a semi-structured format. Semi-structured interview tries to uncover the world from the interviewees' point of view and takes their opinions into consideration by letting them explain their experiences towards a particular subject (Kvale, 1996). As Willing (2008) points out, the interviewer starts by asking a particular question and gives this opportunity to the interviewee to further discuss a particular matter or question.

The reason to follow this method was to establish a direct connection with the authorities and investors due to the lack of the studies and researches done regarding FIT in Iran. Hence, this study was based on semi-structured interview method. In addition to collect the information needed, semi-structured interview resulted on getting some extra information outside the question boundaries which some of it was relevant to the study and has been used in the thesis. In order to have a friendlier discussion, most of the interviews were conducted in the weekends so the interviewees could focus more on the subject away from the work stress.

4.3 Challenges of the semi-structured interview

When it comes to the semi-structured interview, it turns somehow ambiguous in some points (Willing, 2008). The reason is that this type of interview, tries to combine the features of a formal interview with an open conversation. Each question has its own path to be answered, however, the interviewee has the freedom to discuss it further based on his or her experience and by that even encourage the interviewer to ask sub-questions. These further questions which have been asked in several occasions for this study helped to disclose some untouched areas along with more clarification of the subject itself. However, it took more time to analyze the answers and separate relevant from non-relevant information.

Since further discussion is allowed in semi-structured interviews, it could take a relatively longer time than a structured interview. For instance, the time range for interviews of this study was somewhere between 0.5 and 2 hours and therefore it asks for more patience and accuracy in later analysis.

When it comes to the analysis of the acquired data, it is very important to systematically analyze each interview in order to find a pattern for it. For example, the case of irrelevant information which could either be neglected or used in a different category of results analysis.

4.4 Participants of the study

The focus of this study is on the challenges of FIT instrument in Iran. Therefore, the concept was to conduct interviews with authorities and investors inside of Iran. In order to find the participants, several phone calls have been made with Renewable Energy Organization of Iran (SUNA) and after having three interviews with the authorities in SUNA, more telephone numbers were given by SUNA to contact the investors. Afterwards, four more interviews have been conducted with the investors. Five of the interviews were done via telephone and the remaining 2 were conducted via Skype. Some information about the study was presented to the interviewees upon their request before conducting the interviews. All the interviews were recorded and then written and translated from Persian to English.

The respondents of this study were chosen from both the authorities and investors in order to have the both sides' points of view. From three interviewed authorities, one is the head of SUNA's wind and wave office while the remaining two are consultants in the same sector. Three selected authority respondents have a long time experience on Iran's renewable energy market. These authorities are familiar with Iranian FIT law from its introduction at 2001 and have been involved in many renewable energy projects, especially wind power projects. Their involvements mostly consist of giving consult to the potential investors and guiding them through procedures. They are also active in holding workshops and conferences regarding wind power in Iran. The interviews with authorities conducted between April and August 2012.

Four more interviews were conducted with private investors of four different companies, which include three executive managers and one CEO. These individuals were in direct contact with their projects by the time the interviews conducted. These four interviews were done between August and November 2012. Since there is a gap between the dates interviews done until the date the study was done, one of the authorities were contacted again in November 2013 in order to update the findings if needed.

4.5 Limitations of the study

The most significant limitation for this study was the lack of interview participants and cooperation. It became a more challenging limitation when it came to interview the investors. Although SUNA gave away fifteen numbers of its investors, however, just a few of them

accepted to do the interview which in the end four of them was interviewed. Some of those other companies strictly refused doing the interview and some others could not arrange a time with the right person who could be accountable for the interview because of their engagement in projects. Therefore, they were uncertain and the interview could not be prioritized for them. The lack of literature and studies in this particular field in Iran can also be added to the limitations of the study.

5. THEORITICAL FRAMEWORK

5.1 Major barriers to renewable energy development

Painuly (2001), points out that some barriers to renewable energy development could be related to a specific technology and some may be specific for a country or region. By that being said and by studying articles related to the Iranian case, some of the barriers mentioned in the table 3 appeared to be more prominent for Iran's renewable energy status and it arises from the studies done on renewable energy barriers in Iran. However, the points mentioned in the table 3 are general barriers towards renewable energy development, while the focus of this study is on the FIT law and the challenges towards implementing it. With that being said, the focus will be on the points that have been derived from Iranian related studies which are a part of the major barriers mentioned in table 3.

Major Barriers	Reasons of Each Barrier
<i>Market Imperfection</i>	<ul style="list-style-type: none">• Government's high control over energy sector and lack of private sector presence in this sector.• Lack of information and awareness regarding technology, cost, benefits, and potentials of renewable energy.• Restricted access to the technology which could be caused by the developer's reluctance to import due to e.g. restrictive policies.• Lack of a proper competition in renewable energy market caused by existing regulations or barriers created by existing suppliers.• High transaction costs.• Market infrastructure's issues such as under-developed supply channel, logistic problems etc.• High investment requirements
<i>Market Distortions</i>	<ul style="list-style-type: none">• Subsidies on conventional energy which makes it favorable over renewable energy.• Taxes on renewable energy technologies.• Higher costs of renewable energy production compared to the conventional form of energy.• Trade barriers on import/export of the renewable energy technologies.

<i>Economic and Financial</i>	<ul style="list-style-type: none"> • Economically non-viable e.g. high costs of the renewable energy produced, from resources used to implementation, maintenance, and high user costs. • High discount rates on equipment manufacturers, renewable energy producers, and consumers can increase the financial uncertainty. • long payback period • Limited/small market potential and limited access to international market • High cost of capital and limited access to capital mainly through poor governmental policies and regulations. • Lack of financing instruments/institutions although having high capital costs for investors.
<i>Institutional</i>	<ul style="list-style-type: none"> • Lack of institutions to promote and enhance the market and generate and disseminate information. • lack of a legal or regulatory framework • Issues related to realizing financial incentives e.g. complicated procedure, corruption etc. • Unreliable macro-economic environment, e.g. high inflation rate, unstable currency, lack of coherent economic policies etc. • Difficulty in having an effective communication with the stakeholders. • Opposition in interests, e.g. renewable energy challenges against conventional energy, lobbies against renewable energy technologies etc. • lack of R&D • neglecting private sector's participation • Lack of professional institutions and proper feedback to policy makers in order to promote renewable energy.
<i>Technical</i>	<ul style="list-style-type: none"> • Lack of institutions/initiatives to set a standard, codes, and certifications • Lack of trained and skilled personnel due to

	<p>inadequate training facilities etc.</p> <ul style="list-style-type: none"> • Lack of entrepreneurs due to the restrictive regulations • Power system's constraints e.g. capacity limitation • Product's low level of quality
<i>Social, Cultural and Behavioral</i>	<ul style="list-style-type: none"> • Low level of consumer acceptance due to e.g. low information, resistance to change, cultural reasons, aesthetic reasons, etc. • Low level of social acceptance for some renewable energy technologies. They regard these technologies as non-conventional and therefore of no use.
<i>Other Barriers</i>	<ul style="list-style-type: none"> • Uncertain governmental policies regarding renewable energy. • Environmental issues related to renewable energy technologies • Regarded as highly risky area for investors • Lack of proper infrastructure such as roads, communication to the grids, etc.

Table3. Major barriers to renewable energy development

5.2 Major barriers to renewable energy development in Iran

The concept behind this thesis arises from reading articles regarding renewable energy development challenges and barriers in Iran. However, such studies were less in numbers. No need to say that the studies related to the FIT law in Iran were extremely rare. Nevertheless, an attempt was formed to better understand the functionality of FIT law in Iran. This thesis focuses on the challenges towards renewable energy and in particular wind energy development in Iran, however, the part that makes this thesis unique is its FIT oriented perspective on the challenges. In other words, this study separates the law-related challenges from non-law-related ones in order to better understand the challenges that FIT law faces in Iran from authorities and investors perspectives. Furthermore, the non-law-related challenges were presented because of the significance they have in affecting the functionality of the law. In other words, they are not necessarily connected to the law, however, they are considered as barriers which are more general than just the FIT law boundaries thus they have their effect on the law.

In a study done by Atabi (2004), he believes that there is a need for a set of clear guidelines in order to implement renewable energy projects in Iran and the main reason for this issue arises from lack of knowledge and insufficient renewable energy development strategies.

According to Lechtenböhmer et al. (2010), the main challenges towards renewable energy development in Iran are presented briefly:

1. *The low price of the conventional energy forms compared to the renewable energy forms.*
2. *Lack of consensus among authorities and policy makers regarding investment in renewable energy sector.*
3. *Lack of acceptable records in governance indexes such as government effectiveness, rule of law, corruption control, regulatory quality, and voice and accountability.*
4. *The absence of a set of law enforcement mechanisms and penalties in case of the law violation by the government agencies which raises the investment uncertainty. Besides that, the determining role of the government in setting new Feed-in Rates increases this uncertainty.*
5. *Financial sanctions towards Iran which have affected financial transactions, foreign investment, and technology transfer to Iran.*

Fadai et al. (2011), concludes that although the potentials of renewable energy in many fields such as wind, solar, hydro, etc. is high in Iran, however, there are reasons of non-development in renewable energy in the country.

1. *Lack of sufficient and effective planning for implementation.*
2. *Lack of transparency for distinction of different duties between and within the organizations involved in administrative and executive levels.*
3. *Lack of a defined cooperation scheme between specialists in renewable energy and policy makers.*

In addition to the mentioned study which targets the renewable energy in general, in a study done by Nejat et al. (2013), the reasons why wind power development does not follow the goals set by the government could be presented as follows:

1. *There is a noticeable absence of collaboration between university and industry as well as lack of an organized cooperation model between private and public sector.*
2. *Administrative and supervisory structure issues which affect both productivity and projects' fulfillment tempo. There is a need for adequate separation of responsibilities both within and between organizations.*

3. *Discrepancy between identified goals and management capabilities. If non-achievement of the goals could be justified through, for instance, the lack of budget or trained personnel, then the goal itself should be modified in such a way to be fulfilled.*

By comparing the points mentioned, the main barrier which could be seen in all of them is institutional barrier which explained briefly in table 1. More or less, the other mentioned barriers are also noticeable in these studies. Although many challenges pointed out in the above mentioned studies and all of them are interesting areas to further study on, however, there is a lack of information which directly points on the FIT challenges in Iran. The FIT law existed in Iran from 2001 and in order to be able to start a renewable energy project the investor shall go through the law procedure, however, none of the above mentioned studies dedicated at least one chapter regarding the FIT law in Iran. In other words, there is a gap regarding the functionality aspect of the FIT law in Iran.

By knowing these points and reviewing the Iranian FIT law, ten questions have been formulated. The significance of the questions arises from the fact that they both cover the subjects related to the FIT law and subjects which are not directly connected to the FIT law, however, affecting it. The questions regarding FIT law implicate on the functionality of the law through its acceptability, transparency, and remuneration rate, while the other questions are about the financial assistance and sanctions affecting the wind energy section. Therefore, the questions presented in two general groups of law-related and non-law-related forms (table 4). The interview questions are provided in the appendix section.

1. Law-related		2. Non law-related
1a. The acceptability of the wind power through FIT Law Instrument	1b. Tariff rate	1.The status of the financial assistance to run the wind power projects
<ul style="list-style-type: none"> Authorities' point of view on the necessity of wind power development through FIT in Iran The investors' points of view on transparency and applicability of the law 	<ul style="list-style-type: none"> Authorities' and investors' points of view on the tariff rate. 	2. Sanctions

Table 4

6. Result and discussion

The focus of this chapter is on the challenges related to the renewable energy development in Iran through the FIT instrument. Further related discussions are presented at the end of each section. The results show numbers of challenges which need to be further discussed. The significance of these points arises from their repetition by the interviewees, as presented in here.

Before presenting the results and discussions, it is necessary to mention the one year time gap between the conducted interviews and the time they were analyzed and reported as results⁶. However, by the time the report was written several contacts were made with the authorities and investors in order to find out what have been changed during this time gap and what needs to be further incorporated in the results. The efforts to contact the authorities and investors resulted in four responses. One of the four respondents was an authority from SUNA and the remaining three were among investors whom all had been interviewed before. In general there were two main changes which have happened in the time gap. The first one is related to the tariff rate and the other one concerns the administrative procedure. The results of the mentioned changes were incorporated in the respective sections.

6.1 FIT Law-related challenges

6.1.1 Authorities' perspective on the necessity of wind power development through Feed-in Tariff in Iran

Based on the interviews conducted with the authorities in SUNA, there are 3 factors which justify the need for renewable energy development and in particular, wind power development.

1. Very high exhaustion rate in fossil fuel resources due to the fact that they are widely utilized to generate electricity and consequent environmental impacts which rises day by day due to the growing demand for electricity in Iran as a developing country. Sustainable energy development strategies generally involves 3 factors which replacement of fossil fuels by renewable energy is one of them, the other two points are energy saving on the demand site, and efficiency improvements in the energy generation phase (Lund, 2007). Therefore, renewable energy development is highly

⁶ The interviews were conducted between April-August 2012 and the report was written almost one year later.

significant in the context of depreciation in fossil fuel consumption. One of the authorities explained:

"Fossil fuel reserves are exploited partly because of the electricity generation purposes which consecutively lead to pollution problems. Renewable energy could be at least one of the right choices to tackle this problem. Besides, like the other nations, Iran has the right to upgrade its knowledge to implement renewable energy."

2. Non-renewable resources and in particular oil, are highly valuable and can bring very high benefits to Iran's oil dependent economy. Therefore, by development in renewable energy sector, Iran's economy as a whole could be affected positively. One of the authorities elaborates:

"There is no need to have a super computer to count how much money could be saved for the next generations from preserving fossil fuel resources."

Although the studies show that the Iranian oil reserves could be extracted for nearly 87 more years considering no new oil field discoveries and Iran's natural gas reserves are second largest after Russia, they will eventually finish and widely affect Iran's economy (Salehi Esfahani, 2012). Therefore, in electricity generation context it is important to preserve fossil fuels for economical purposes by lesser using them to fuel power plants and instead substitute conventional power plants with renewable energy technologies.

3. Iran as a country with high potentials in different types of renewable energy resources, especially wind power, has the right to transfer the related technology from the leading countries in this area, study, and develop renewable energy technologies.

Public participation is essential in renewable energy development and Iranian policy is not something apart from it. Furthermore, there is a policy which encourages privatization in Iran. By this being said, FIT as an instrument with a remuneration plan which the rate has the capability to raise in the following years mainly because of the inflation increase, could be more acceptable for the investor comparing to the other available policies. On the other hand, the national priority is electricity generation through renewable technologies rather than protecting the environment, which as Iranian authorities believe, is number one priority in the other renewable energy policies such as tradable renewable energy certificates.

There have been several promotional conferences and meetings regarding the possibility to invest in wind energy sector. The advertisements include those in the media and on the internet. According to interviewed authorities most of the investors were aware of the FIT law at least from the date of its last improvement in 2008. They had connections in the ministry of power or Iranian renewable energy organization (SUNA) or other related authorities and most of them have followed the latest news regarding investment opportunities in renewable electricity generation.

6.1.2 The investors' points of view on transparency and applicability of the law

The fact that how a potential investor could easily grasp the conditions and regulations included in the law is of a high importance. There have been discussions with the policy makers and some of investors about the transparency of the law which in the most cases the answers were short and brief. Some of the investors think that the law and its regulations are clear, however, the long bureaucratic procedure which is highly energy and time consuming could be reformed. Although this procedure have been slightly reformed in November 2013, however according to an authority from SUNA:

"This is still too early to find out if the changes incorporated in the administrative procedure could help the investors to save more time, however our attempt was to decline the bureaucratic procedure by combining Feasibility study step with Issuance of the Permit step."

However the investors haven't had the same optimistic opinion regarding the current changes. One of the investors mentioned:

"The bureaucracy is generally high in all the administrative levels and it takes more time and cost than it is expected."

The most important concern in this regard is the long bureaucratic procedure in Iranian organizations in general. The investors find it really hard to estimate the time and cost needed to spend on administrative and transaction costs. Therefore, some companies lose their motivation. For example, those companies which are involved in some other projects along with renewable energy projects lose their interest to invest in wind energy projects. The reason arises from the complications they face in planning their projects generally caused by

long administrative procedure. Del Rio et al. (2007) points out that FITs do not need complicated levels of administrative procedures and they are considered to be relatively simple to implement. He also mentions that the administrative procedure is one of the factors which can affect the deployment of the renewable energy technologies.

There is a point which has been repeatedly mentioned by the investors which is about the lack of communication between authorities and investors, as one of the investors pointed out:

"Public perception was not so positive regarding wind power generation almost 20 years ago when the first activities to build wind farms started in Iran. However, although nowadays the feasibility of wind power generation is much clearer to everyone and is supported by the law, there is still lack of coordination between government, authorities, and investors."

Some of the investors think there is not a major accountable and open reference or authority to guide them through the process. There are suggestions from the investor's side; however, the authorities' response is often not convincing or ineligible. For example, one of the sections of this law indicates that in some cases investors should temporarily stop power generation and they get the notification 24 hours before shutting down. An important question which arises here is how the investors could get a compensation for their loss in such occasions. The connection between the renewable energy policy makers and investors in implementing and improving the law is very important and effective for renewable energy development (Mendonça, 2009).

An employee in SUNA said:

"In general, just a very small number of suggestions from investors' side get the opportunity to be considered and go operational. The reason is, for instance, a particular suggestion should be aligned with the general conditions of energy supply and government's financial costs."

6.1.3 Authorities' and investors' points of view on the tariff rate

The tariff rates were doubled by constitution in November 2008 and further increased in November 2013 (SUNA, 2013), in order to make the investment in renewable energy sector more attractive for the private investors. However, the new feed-in rates are equal for all types

of renewable energy resources used to generate electricity (SUNA, 2013). One of the investors mentioned:

"There is a need to set different amounts of feed-in rates not just for different types of renewable energy technologies, also within the wind energy sector. Some of the wind projects are more expensive to build, operate, and maintain than the others. That's why this is more desirable if they get paid slightly higher per each kWh."

The feed-in rates for wind power introduced in 2008 were considered too low by the majority of the investors. Although the rates were doubled compared to the rates from 2001, however, investors think that the rates are still low mainly because of the economical instability and devaluation of the national currency. According to SUNA, in the year 2008 the decided new rates were in a same range with the other countries using FIT system. The rate was roughly 10000 IRR to 1 USD which changed to 35000 IRR to 1 USD in the free market in October 2012 (figure 3).

One of the interviewed authorities explained:

"The currency devaluation caused uncertainty towards renewable energy market in Iran not only towards the remuneration plan, but also towards purchasing and importing the needed technology from the other countries."

As it could be expected, the introduced rates in 2008 which were in IRR are considerably affected by the devaluation of the national currency. This devaluation is clear when it comes to the comparison of the rates between 2008 and 2013. The rate for regular and peak electricity consumption hours was US \$ 0.13/kWh (1300 IRR), which is expected to rise to US \$ 0.178/kWh (4400 IRR) by the end of 2013 (SUNA, 2013). One of the investors mentioned:

"The growth in the tariff rates were highly demanded from the investors' side and by the latest changes in the feed-in rates in 2013, the future of wind energy market seems to be brighter for us."

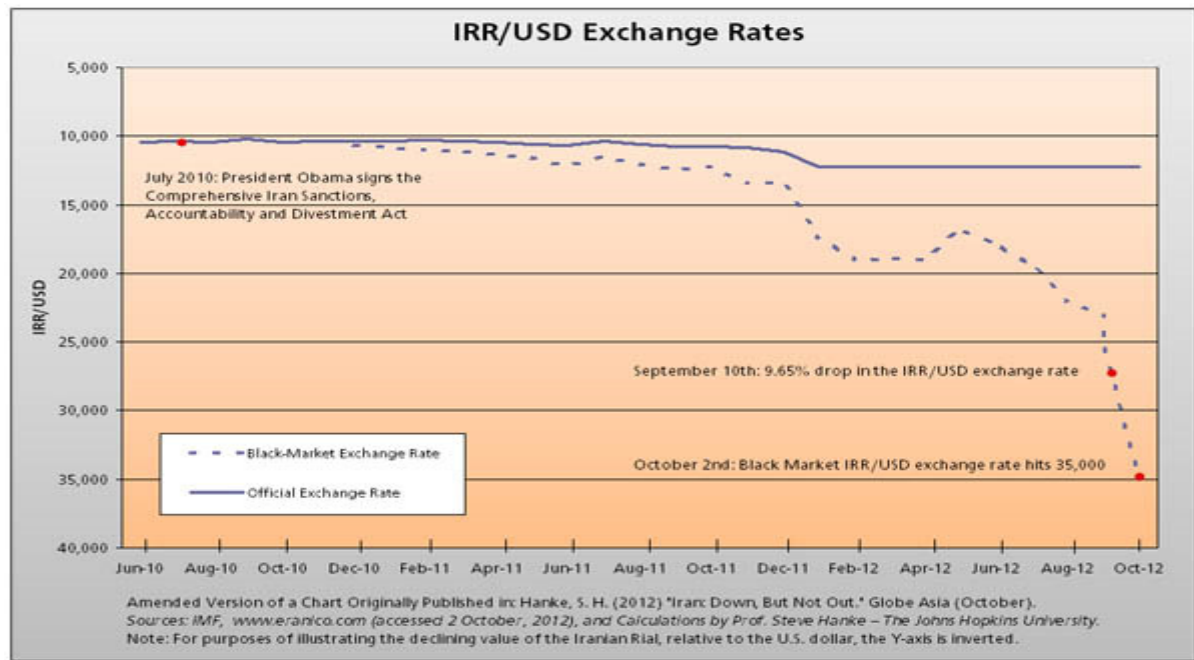


Fig3. Iranian Currency changes from June 2010 to October 2012 (Cato Institute, 2012)

In addition to the mentioned discussion about the tariff rate, a major question arises from investors' side which asks about the assurance of payment. As one of the investors mentioned:

"There is no transparency about the specified annual budget for renewable energy. Therefore, it reduces public participation and raises an uncertainty for the investors about having a regular remuneration."

Another reason which strengthens the uncertainty is investors' perception towards governmental organizations in Iran, which is always with doubt. The ministry of power which is in charge to buy and pay for the renewable electricity has a bad reputation in paybacks to the contractors which it had and has collaboration with.

6.2 Non law-related challenges

6.2.1 The status of the financial assistance to run the wind power projects

Despite having a law which supports renewable energy development, starting such projects are costly (Couture, 2009). Therefore, in many cases a project needs financial support from external sources such as banks and governmental incentives. In this part the possibility of financial assistance from banks and government is presented according to the conducted interviews. Though wind energy is not a new subject in Iran and there also is a considerable

interest in doing wind energy projects, however a reliable financial support to assist the investors in order to initiate their projects were pointed out numerously by the interviewees. There are several issues in this regard which are presented here.

Mendonça et al. (2009), mentions that the insufficient financial support is one of the factors which can hinder the renewable energy projects. An investor said:

"There is a lack of an allocated financial support in order to initiate the wind power projects or even the other types of renewable projects."

It means investors expect to cover at least a part of their costs by getting paid with a specified type of loan from a bank after getting their permits to start their projects. The loan is expected to have a lower interest rate and longer reimbursement period compared to the other types of project-based loans. Banks, as economic enterprises, prefer to get involved in conventional and common projects such as oil and construction. An investor said:

"Since there is not a particular wind power project started by a private company without having government contributed in it, therefore banks refuse to give loans to such projects. They find these projects highly risky for investment and even if they convinced to grant a loan for a wind project, the loan is short-term followed by a high interest rate which doesn't suit such kind of projects."

There also have been offers in the form of governmental assistance, for instance, an investor explained:

"There is a plan named Prioritized Projects which includes wind power projects along with many other constructional and developmental projects. The purpose of this project is to facilitate the transfer of financial assistance required by wind power projects. Furthermore, recently another plan was introduced by the presidential office which has the same purpose. However, getting such kinds of financial assistances has its own procedure and a small company like us faces lots of complications in order to get these assistances."

6.2.2 Imposed sanctions against Iran

Despite all the challenges which have been pointed out, the political condition of Iran could directly and indirectly affect the status of wind power development in the country. Iran was under sanctions after the revolution in 1979 and these sanctions became broader and they

consist of many more economic related areas in the recent years. As it is presented in the chart1, in July 2010, USA Signed the comprehensive sanctions against Iran which then further signed by European Union and some other countries, affected the renewable energy development in Iran. An investor pointed out:

"Sanctions lead to national currency devaluation and by that the ability to purchase and import wind turbines and the other accessories for the wind farms have changed drastically. Therefore it becomes so expensive for the investor to import and install and maintain the needed technology even more expensive than if for example the project was in Europe."

Complications to purchase and install the wind turbines and their related equipment could be classified as the direct effect of the sanctions. Wind power technology transfer is literally stopped and except one company which manufactures outdated turbines with low quantity, there is not any other company involved in this field. However, additional indirect effects of the sanctions such as depression of international investment and severe complications to get foreign finances affected wind power development in the recent years.

6.3 Education

Education plays a central role in the context of renewable energy development, from public awareness to train technicians, engineers, and policy analysts. It also has a great effect on the consumer (Jennings, 2008). One of the authorities in SUNA elaborates:

"There have been several efforts from SUNA in order to organize workshops to promote public understanding regarding renewable energy. Furthermore, SUNA tries to organize seminars to keep the connection between investors and authorities. Moreover, some of the universities in Iran offer some courses related to the renewable energy technologies including wind energy. However, there is an essential need to promote both public and academic education regarding wind energy and the current knowledge needs to be updated faster."

7. CONCLUSION

The purpose of this study was to better understand the status of FIT law in Iran and by that investigate the challenges face the law and development of renewable energy in Iran. To have a more focused investigation, among all types of renewable energy, wind power was chosen due to more investing demand from the private sector. Furthermore, the assumption was that more interviewees from investors' side would be available.

Regarding the process that each investor should pass from the first stage which is project registration until getting to the operational phase, the findings show that the whole process takes generally more time than expected. Therefore, it causes more time and cost for the investors that even some of them had to stop the procedure. Even though the procedure faced a slight change in November 2013, however, the results are remained to be seen. As the investors pointed out during several occasions of the interviews, the process needs to be reformed in a way that authorities accelerate the applications in each stage. Furthermore, investors should be able to trace their applications thorough different stages accurately and the authorities should be more responsive in this regard.

Lack of communication and coordination between legislator, authorities, and investors is visible. The relationship between authorities and investor is rather unilateral. It means that many suggestions that come from investors in order to improve the process is being either rejected or ignored by the authorities. On the other side, authorities answer to that is mainly non-alignment of the proposed suggestions to the general conditions of energy supply and government's financial costs. Investors in wind power projects believe that they should have the opportunity to propose their ideas in order to improve the law. Therefore, a sort of targeted meetings and conferences between authorities and investors with the presence of legislative representatives is required.

The remuneration rates from 2008 are not interesting to the investors anymore due to the harsh currency devaluation and inflation rate mainly after current imposed sanctions by USA and European Union against Iran on 2010. It caused uncertainty towards Iran's wind power market and renewable energy market in general. The other issue which elevates the uncertainty in this regard is the lack of transparency on the specified annual budget for wind energy section which investors tend to know in order to be certain about regular remuneration. According to the latest information⁷ acquired from SUNA the remuneration rate is going to increase by the end of 2013. Although feed-in rates will increase considerably in Iranian currency (from 1300 Rials to 4440 Rials), however due to the devaluation of currency which

⁷ November 2013

happened in Iran after 2010, the feed-in rates shows just US \$ 0.048/kWh growth over current feed-in rate which is US \$ 1.3/kWh. The regularity of the feed-in rate growth is more important for the investors rather than its amount.

There are other barriers which are not directly connected to the FIT law itself but they strongly affect the renewable energy market and specially wind energy development in Iran. The most mentioned issue in this regard in the conducted interviews was the lack of financial assistance. Both investors and authorities believe that the wind projects are highly expensive and a type of financial aid which could assist the investors to start the project is inevitable. However, the banks for instance are reluctant to assist in such projects by giving convenient loans to the investors mainly because they perceive such investments risky to invest in. Therefore, even in programs such as prioritized projects, the wind energy projects are not in priority.

Sanctions due to the political complications mainly between Iran from one side and USA and European Union from the other side, affected the import of the wind turbines and the rest of the needed accessories to Iran. It also drastically dropped the international investment and foreign finances in this field. Needless to say, the severe currency devaluation and rising inflation rate was accelerated by the sanctions.

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9. APPENDICES

Appendix 1

Interview questions

1. What do you think about the necessity of wind power development in Iran?
2. What are the ways to advertise the opportunity to invest in wind power industry and in case of the investors, in which way they got informed about it?
3. What do you think about the current feed-in rates level? What improvements could be considered to make it more attractive for investors?
4. What do you think about the transparency of the law and what suggestions would you have in order to improve it?
5. What do you think about the clearness of the grid connection responsibility which is on the renewable energy producers? (suggestions)
6. Has it been any debate(s) about having some complementary policies such as mandatory market share policy or tradable renewable energy certificates? If yes, has it been any progress? Please explain more.
7. Is there any specific financial incentive(s) besides the current law which could encourage the investors in wind power sector?(directly or indirectly)
8. Has there been any discussion about setting a time frame for reaching specific goals in the wind power share of total electricity generation?
9. How is the current state and quality of education regarding wind power technologies?
And what needs to be done to make it better?
10. How strong is the effect of imposed sanctions on wind power development in Iran?
11. In the end if you have some complementary information please mention them.

Appendix 2

Interviewees

Name	Position	Company
<i>Authorities</i>		
Mr. Zaferanchizadeh	Head of the wind energy sector	SUNA
Mr. Raheli	Consultant	SUNA
Mr. Khalafi	Consultant	SUNA
<i>Investors</i>		
Mr. Ahmadi	CEO	Tose'eie Tamam Paidar
Mrs. Makinasab	Executive assistant	Royan
Mr. Maranlou	Executive manager	Aban Wind Turbine
Mr. Dokhanchi	Executive manager	Bargh'e Sabz'e Binaloud

Table 5