



Developing Renewables in Iran – A must or choice?

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Abstract

There are several grounds put into question the increasing reliance on fossil fuels in Iran: steady growth of energy consumption, investment inseparability of fossil fuels, limited financial resources, high water intensity in developing fossil fuels and in particular in the course of their conversion into electricity, the country's low resilience due to the intense concentration of production and refining platforms and oil and gas transmission and distribution networks, low labor intensity of fossil energies along with severe pollution following their consumption. This have made the country's shift towards renewable energy inevitable. However, despite these facts and the emphasis from policy makers and upper hand policies (which stipulates that the share of renewable energies in the electricity supply must reach at least 5% till 2021) the share of the renewables in the total energy supply of the country is still very low and far behind the plans. In this paper, employing an evidence-based method, it is shown that developing renewable energies in Iran, is not any longer a choice amongst several choices, rather, it has become an inevitable policy.

Keywords: Renewables, Water shortage, Investment segregation, Occupation, Fossil fuels

1. Introduction

In recent decades, renewable energy has been considered by policy making institutes as a solution to address environmental concerns; Sources that produce far lower pollution, require less water, are dispersed, experience a declining cost and more importantly are infinite so have great potentials to meet the growing energy needs of economies [1].

In 2016, 13.6% of the world's primary energy production came from renewable energy sources [2]. In Iran, due to the high potential of renewable energy and also the limitations and challenges faced by fossil fuels (high pollution, water intensity, low labor intensity, lack of financial resources etc.) several efforts have been made to develop renewable energies including but not limited to different courses of law or policy makings, plan drafting and regulations. As an example, in Article 50 of the Law on the Sixth Five-Year Plan, the government is required to increase the share of renewable and clean power plants to at least 5% of the country's electricity capacity by 2021. However, until 2017, only 0.5% of the country's electricity generation capacity has been provided by wind, solar, biogas and heat recovery power plants [2]. This gap between installed capacity and approved planned shows that the renewable sector has not been recognized as appropriate by relevant authorities. Using evidences from Iranian and world economies, this article seeks to demonstrate that the development of renewable energy is not a choice for Iran any longer rather a must.

2. Why renewable energy?

2.1. Rapid Energy Consumption Growth

Studies show that energy consumption in the country will grow by at least 3% over the next 25 years [3]. In 2028, consumption will exceed supply, which means zero oil and gas export. Most of the efforts are made to provide this amount of energy by development of new oil and gas resources, which requires massive investment. In the next section, we address this and show that Relying on oil and gas resources cannot be a good solution to meet the country's energy needs.

2.2. Separable vs. inseparable investment

Estimates show that we are abundant oil and gas resources to meet the demand for around 100 years, however, developing such a massive resource requires 10 to 19 billion dollars annually which doesn't seem to be viable. On the other hand, investment in oil and gas is not divisible or separable. However, this investment cannot be broken down into very small components or phases and made during the time by different people. There is no such restriction on renewables and the investment can be distributed separately among a large number of individuals or households over time. In fact, it is possible for wind or solar energy development to be done by millions of households or production units across a country simultaneously using micro-capital.

2.3. Security of supply

Fossil energy sources are not evenly distributed and their use in different parts of the country requires either oil and gas transmission lines or construction of refineries and centralized power plants. This accumulation of units and utilities (such as what we see in South Pars complexes) makes the national security vulnerable to attacks [4]. While, renewable energies can generate energy in a completely dispersed and on-site manner which makes it a reliable alternative for fossil fuels from the passive defense point of view [5]. Also, these energies can be used in remote areas easily.

2.4. Reduction of losses in the electricity network

We are experiencing an average 10% loss in electricity transmission and distribution. In renewable energy, this loss can be minimized as the producer and consumer are either identical or fairly close.

2.5. Saving Water

Renewable sources of electricity generation have significant savings in water consumption compared to thermal power plants [6]. At present, annual energy production accounts for about 15% (580 billion cubic meters) of fresh water consumption in the world, of which approximately 66 billion cubic meters (11%) does not return to resources. On average for oil extraction per million BTU to 8.3-3 Liters of water are needed for drilling, flooding and Stimulation of tanks [7].

Using the average water consumption to produce one kilowatt-hour of electricity, the corresponding water savings is estimated to save 1203 million liters, which is equivalent to urban water consumption in Tehran.

3. Summaries and policy recommendations

Over the past 100 years, the country, has relied heavily on fossil fuels, particularly oil and gas and the change in policies and investments towards renewables has been too slow. In this article we have shown that for various reasons moving towards renewables is no longer a choice between several choices, rather it has become an inevitable option. Towards this, we showed that environmental pressures and air pollution have reached critical limits; water resources are severely scarce and due to the lack of investment in various oil and gas fields, production from these resources will decline sharply. In addition, the development of electricity and gas transmission lines to new end users is capital intensive. At the same time, the focus on oil and gas has exposed the country to numerous risks in terms of passive defense. Analyzing as to why

investment in renewables is behind and what are the best promoting policies are subjects of future research.

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