



## The Future Role of Renewables in Turkey's Electricity Supply Security

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### ABSTRACT

As a fast-developing economy, Turkey's energy needs have also been growing rapidly for several decades. Its indigenous resources have been evaluated as insufficient to meet this rapidly increasing demand for energy, especially power. Therefore, it imports around half of its energy needs for power. Recently, it has newly started tapping into renewable sources, especially wind and solar. Considering these developments and official aims, this paper attempts to answer the question of which role this renewable developments can play in providing electricity supply security, which is a critical part of energy security. Whereas it seems clear that Renewables will certainly grow, whether this growth makes a significant difference from a reliability perspective is questionable. In other words, due to the problem of the intermittency, the requirement to provide backup power from thermal capacity seems obvious under today's technological conditions. Therefore, the official policy needs urgently to consider and encourage investments in technological solutions (especially energy storage).

**Keywords:** Renewable Energy, Energy Security, Reliable Power Supply

**JEL Classifications:** Q21, K32

### 1. INTRODUCTION

It is indisputable today that energy is a key issue and a vital resource for socio-economic development of all societies. Energy security is therefore a key priority for all countries. Its eminence has been visible in the economic and political agendas of national policies as well as international relations. As a concept, energy security is a complex and debatable issue with multiple dimensions.

The International Energy Agency (IEA) defined energy security as "the uninterrupted availability of energy sources at an affordable price" (IEA, 2016a). In their recent and rigorous literature review on the conceptualization of energy security, Biresselioğlu et al. (2017) point out that it currently includes the utilization of a variety of different sources (diversification), freedom from depending on a certain geographic region, self-sufficiency in energy, and ensuring the protection from external shocks. The European Commission (2000) defined energy security as the "uninterrupted physical availability of energy products on the market, at a price which is affordable for all consumers." In another brief definition, Cherp

and Jewell (2014) proposed energy security as "low vulnerability of vital energy systems." Definitions may vary, but one of the key components of energy security is diversification (Yergin, 2006); the other is independence, which is basically understood as self-sufficiency (Yergin, 2011).

One crucial element in this context is supply security of electricity on which we will present a literature survey in the first section with an emphasis on intermittency problem. As a backbone of modern economies, electrical energy is produced and delivered practically in real time, and there is no convenient method to readily store it. This makes it necessary to maintain a continuous and almost instantaneous balance between production and consumption of electricity in power systems (Prada, 1999). It is therefore critical that adequate power capacity needs to be provided in a reliable way. What becomes interesting at this point is the problem of intermittency, which is currently a salient feature of Renewable Energy Resources (RES).

It is clear on the one hand, that RES rapidly increases (due to cost reductions and decarbonization policies) its share in