

Chapter 23

The Effect of Population, Public Investments, and Economic Growth on Regional Renewable Energy Consumption in Turkey: Dynamic Panel Data Analysis

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ABSTRACT

Making the use of renewable energy sources widespread is of paramount importance for Turkey as for all countries. In this regard, the determiners of renewable energy consumption have been investigated. The effect of determining or factors affecting the use of renewable energy sources on a regional scale to Turkey were examined with different qualitative and quantitative research techniques. In this study, the factors of economic growth, public investments, and population are analyzed by considering regional differences on the consumption of renewable energy resources. The effect of regional economic growth, regional public investments, and regional population on the amount of regional renewable energy consumption were investigated by using panel data of 26 statistical regions of Level-2 classification in the period between 2010-2018 in Turkey. The results obtained by the dynamic panel data analysis concluded that economic growth and public investments at the regional level increased renewable energy consumption while the population growth decreased.

INTRODUCTION

Renewable energy sources are the safest alternatives to fossil fuels produced from oil, natural gas and coal. The reasons for searching alternatives to fossil fuels may be stated as their being generally exhausted and their damage to the environment. Therefore, renewable energy sources as an alternative to

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fossil fuels in energy production are of paramount importance for all countries with different levels of development. The use of fossil fuels in large quantities in energy generation since the Industrial Revolution has supported the development of social productivity to a great extent but has caused important problems such as environmental pollution (Wang Q et. al., 2020). Energy use increases the economic growth and development of a country but results in the problems, such as global warming and carbon emission (Khan H. et al., 2020). Fossil sources such as oil, natural gas and coal, used widely in energy production, will run out of. This problem poses a threat to the sustainability of energy supply. The renewable energy consumption influences sustainable development positively and in a statistically significant manner (Güney, 2020).

Environmental agreements, to which many countries are a party, such as the Kyoto protocol, have also encouraged the search for alternatives to fossil fuels (Sasmaz et. al, 2020). In countries where the share of non-renewable energy sources in the overall energy mix is higher, the increase in energy consumption results in an increase in carbon emissions (Pata, 2018). Accordingly, large industrialized countries play a key role in the solution to this problem as they use most of the fossil fuels produced and technological development (Byrne et. al., 2007).

Increasing demand for energy consumption, strong commitments to remove environmental concerns, technology development and political support will enable the renewable energy an increasingly important role in the global energy mix in the long term (Anton and Nucu, 2020). The renewable energy sources, such as solar, wind, hydraulic, geothermal, biomass, wave, hydrogen either do not cause or result in very little emissions causing global warming. In this respect, encouraging the use of renewable energy sources is of utmost importance for providing a sustainable economic growth in environmental respects (Le et al., 2020).

While the energy supply in the world was obtained from oil, coal and natural gas respectively between 1990-2018, the supply provided from the renewable energy sources was least (International Energy Agency, 2021). As in many other countries across the world, Turkey also has limited fossil fuel reserves. Being dependent on outside financial sources regarding fossil fuels results in an economic burden for countries. In addition, any political tension between countries poses a threat to energy supply. For this reason, the ability to create their own resources using renewable energy resources provides social, economic and environmental benefits for countries. For example, the benefits of employment generation cover more than the income obtained from employment, produced goods and services due to “multiplier effect” (Le et al., 2020).

In 2019, Turkey provided approximately 45.2% of its energy production from renewable energy sources. A large part of this ratio has been generated by hydraulic sources with dams, which are not defined in YEKDEM legislation. Therefore, most of energy demand in Turkey is supplied by fossil sources. In general, policy-makers conduct research in many different fields for the increase in renewable energy sources. In this regard, renewable-sourced electricity generators are provided with a guarantee of purchase at certain prices, and there are different supports for the domestic spare parts used. Moreover, Turkey is also a party to environmental agreements such as the Kyoto protocol. Local administrations provide support in this respect by participating in various organizations. In Turkey, İzmir, Konya, Gaziantep as well as Seferihisar, Karşıyaka, Şişli, Kartal, Tepebaşı, Çankaya, Seydişehir, Fındıklı district municipalities are members of the International Council of Local Environmental Initiatives (ICLEI), which is the most common network of the local climate protection cities campaign in the world.

In this study, a regional evaluation was carried out regarding Turkey. All data were obtained in regional level. The goal of the study is to examine the effects of regional gross national product, population and

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