Chapter 12
An Empirical Review of Long Term Electricity Demand Forecasts for Turkey

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ABSTRACT

Energy consumption has been increasing steadily in Turkey due to growing population, industrialization and increasing living standards. Considering the fact that energy infrastructure projects are of the immense cost and/or creates long term dependencies on imported energy resources, inaccurate planning may cause significant demand-resource mismatches and considerable financial consequences in the long term. Unrealistic elaboration of energy structures and inaccurate political decisions can create structural problems in long-term energy planning and sustainable development of the economy. This study shows how actual figures deviate from official forecasts and present reliability of other techniques used by academia. Possible reasons for forecast models to produce inaccurate results which naturally lead to incorrect policy implementations are also discussed.

INTRODUCTION

Energy is one of the important components of economic growth for Turkey. Energy consumption has been increasing steadily in Turkey due to growing population, industrialization and increasing living standards. This trend seems to continue in the near future as well. It has been and will be extremely important to assure that the energy supply matches the energy demand when planning national energy policy.

The national energy policy of Turkey aims to ensure the development of energy sources to provide the required energy on a timely, reliable, cost effective and environment–friendly manner to support future economic growth end social development in the country. Hence, high growth in energy consump-

tion requires adding supplementary generation capacity to the system in a timely fashion. The decision makers depend on the long-term demand forecasts when shaping up the policy tools so that the required energy will be available when required by the consumers whether households or industries. Adding new generation capacity brings up a couple of issues that the government should handle. First is the fact that Turkey has limited primary fuel sources (e.g., oil or natural gas) but have some renewable sources such as hydro, wind, geothermal and solar. Not only the amount of additional capacity but the fuel source of the additional capacity is important for the decision makers. For instance, natural gas based capacity generation units are relatively faster and cheaper to construct but increases the dependency of the country on imported fuel sources. Second issue is the financing of the new capacity investments. Usually, energy investments are of immense cost so they can easily increase the budget deficit of the nation if the investments are undertaken by the state alone.

It is easily foreseeable that inaccurate capacity planning may cause not only significant demand-supply mismatches but also considerable financial difficulties due to imported fuel for energy production in the long term. Unrealistic elaboration of energy structures and inaccurate political decisions can create structural problems in long-term energy planning and sustainable development of the economy. As Bhattacharyya and Timilsina (2009) show clearly in the case of India that if energy and growth dynamics of a country is not very well understood, consequently there occurs inadequate infrastructure development or poor adaptation with the environment.

Turkey's current per capita consumption of electricity is around 2500 KWh while the average consumption is approximately 8000 KWh in OECD countries (World Bank, 2015). In other words Turkey's consumption is the same as the 1950's Europe. Turkey's energy demand will continue to increase in the future in correlation with the expected economic and social development of Turkey. The issue is about answering two questions: when and by how much? The decision makers use the official forecasts of demand created by the Turkish Electricity Transmission Co., (TETC) [1] on behalf of Ministry of Energy and Natural Resources (MENR). The quality of these forecasts is extremely important for the decision makers who shape up the national energy policy. For instance, during the 1990's the projections had foreseen that there would be a great demand increase in a very short period of time. Consequently, natural gas power plants reached a capacity of 20.000 MW in less than 20 years since they are relatively faster and cheaper to construct (TETC, 2014).

The official demand forecasts do not have a perfect track record when one looks at the deviations between the demand predictions and the realizations over time. In general the official forecasts by MENR overestimated the consumption numbers during the past two decades. On the other hand, forecasts produced by the academia seem to have performed better in estimating the energy consumption for the same sample period of time.

In line with the world, the Turkish energy market went through substantial structural and regulatory changes since 1980s. A review of these changes will be reviewed next so that one can better judge the current energy market structure in Turkey. An overview of electricity load forecast approaches and techniques observed in the energy forecasting literature will be given in the third section. Official forecasts used in policy decisions in Turkey and academic studies regarding future demand projections as well as their success are particularized in the fourth section. The reasons behind the failure of projections and their policy implications conclude the chapter.

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