

ELECTRICITY DEMAND PROJECTION FOR TURKEY: BOTTOM-UP MODELLING APPROACH, AND COMPARISON WITH EU AND ASIA

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Overview

Electricity is a key energy source in each country and an important condition for economic development. In this regard, it is crucial to forecast the electricity demand in order to enhance the accuracy of the assessment of development trends.

The main intention of this study is to develop an electricity demand projection for Turkey for the period 2012-2035. The project covers the five main clusters of electricity demanding sectors that are: i) industrial sector, ii) residential sector, iii) Service/commercial sector, iv) transport sector, and v) others. Overall electricity demand forecasting process till end year 2035 has been carried out by taking into considerations of official demographic projections, and energy efficiency improvement expectations as well as the sector based growth and development expectancies.

Projection results show that electricity demand of Turkey is rapidly growing. It is essential to assess the domestic demand against other countries in order to make better interpretations of the state of the electricity demand growth. As becoming a member state of the EU is among the prior development targets of Turkey, it would be deemed necessary to benchmark the electricity demand performance against EU member states. But at this point it is worth mentioning that adversity and political obstacles faced throughout the EU membership path, along with the continuation of negotiations on EU accession, Turkey has not stopped the search for alternative structures such as testing the water for membership to Shanghai Cooperation Organization (SCO). The SCO and its member states in particular seem to be an important focus for Turkey. Political, economic, and cultural relations with Central Asian countries have already been developed due to Turkey's active engagement in the region since the collapse of the Soviet Union. In other words, Asia emerges as a new potential partner for Turkey other than its traditional Western allies. Therefore, Asian electricity demand benchmark has also been carried out

The paper is structured as follows: After the introduction the second section draws a brief overview about the historical development of Turkish electricity demand. The third section addresses the development and implementation of the bottom –up modelling strategy, and depicts the forecasting results. In section four, Turkish electricity demand benchmarking against EU and Asia has been carried out. In the final section the potential for collaboration in electricity sector is discussed.

Methods

i) Bottom-Up modelling: Modelling has been conducted under the LEAP (Long Range Energy Alternatives Planning System) model which follows the accounting framework approach to generate a consistent view of energy demand based on the physical description of the energy system. The power and effectiveness of the model comes from its sectorally detailed structure under an extensive and reliable database.

ii) Benchmarking: Comparison and interpretation of Turkish, EU, and Asian electricity demand profiles have been carried out

Results

First, macro assumptions, data sources, and structuring of the model has been presented.

Second, the electricity demand forecast has been obtained through the bottom-up model. The outcome the overall electricity consumption of Turkey rises from 197.5 TWh in 2012 (base year) to 316.7 TWh in 2023 (Strategic year for Turkey's development vision), and reaches to 474.4 TWh in 2035 (end year) respectively (See Figure 1). The compound annual growth rate (CAGR) of electricity demand throughout the modelling period is 3.9%.

Third, we found out through benchmarks that Turkey's electricity demand evolves in the way that it resembles EU figures in terms of sector based electricity demand shares. Turkey's electricity demand expansion is seen to reach to a certain level that is among the range of EU27+ countries. But on the other hand, high annual growth rates in electricity demand (3.9% in Turkey) depicts similarities with Asian trend which is 3% till 2040.

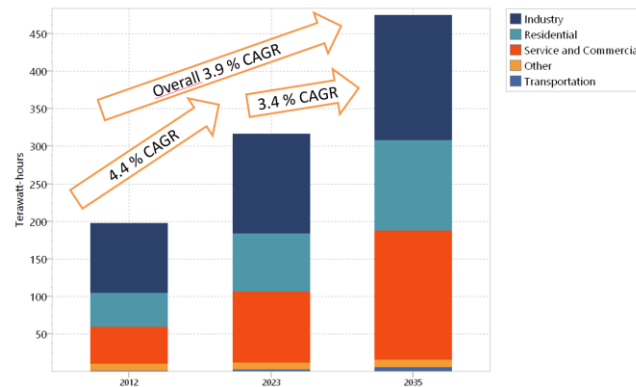


Figure 1 - Electricity Demand Growth Development in Turkey

Conclusions

It is seen that in all sectors comprising Industry, Residential sector, Service and Commercial sector, and Transportation the demand for electricity is rapidly increasing in Turkey. Accepted opinion on energy demand is that it is an indicator of development. In that sense, it can be said that Turkey is gradually approaching to its development goals set for EU membership. On the other hand, forecasts for electricity consumption trends depict that both Asian countries and Turkey have high annual growth rates in electricity demand. This situation can be interpreted as their economical development trends (which highly relies on industrial production) will show similarities and therefore there is a high potential for cooperation in electricity sector.

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