



# TEİAŞ



- CASE STUDY
- Preparing Turkey's electricity transmission and generation system for future energy demand with Capacity Expansion and PROMOD



TEİAŞ

TURKISH  
ELECTRICITY  
TRANSMISSION  
COMPANY

## The customer

As one of the largest electricity companies in Europe, the Turkish Electricity Transmission Company (TEİAŞ) is responsible for the generation, transmission and distribution of electricity to its consumers across Turkey. With a motto of “Power of Energy,” TEİAŞ proudly serves all the citizens of Turkey with the transmission of electricity in a continuous, reliable and economical manner whilst remaining sensitive to the environment and promoting the efficient use of resources.

The TEİAŞ transmission system has 68,204 KM power transmission lines, 736 substations, 163,849 MVA of transformer power and 12 interconnection lines with neighboring countries. Today, TEİAŞ operates an interconnected power system with 88,551 MW installed capacity, 47,660 MW peak load and 295.5 million MW annual power production.

## The challenges

With Turkey’s electricity demand growing by almost five percent annually, the Turkish government began an initiative to diversify its energy production through an increase in renewable sources and use of other indigenous sources. In addition to its environmental benefits, this initiative also provides Turkey with the opportunity for more energy independence by reducing imported fossil fuels.

With renewables currently making up 48 percent of Turkey’s total installed capacity of 88,894 MW, along with additional planned investments into renewable energy technologies, Turkey is on track to meet its 2026 wind and solar goals. However, this expansion in renewable energy must continue to grow if it is to secure the country’s future energy supply and keep up with the demand to sustain its economic development and population increases.

Taking these facts into consideration, TEİAŞ asked Hitachi ABB Power Grids to prepare a long-term electric energy generation expansion plan that took the following into consideration:

- 20-year demand forecasting
- Existing supply potential
- Potential supply means
- Fuel sources
- Structure and development plan of transmission and distribution systems
- Import and export capabilities
- Source diversity in accordance with the relevant laws and regulations

TEİAŞ also wanted to replace its aging software infrastructure, used in electricity system planning and analysis, with newer technology, as the current system was unable to meet the requirements of renewable generation due to limited functionality.

“We needed a software infrastructure program with the most up-to-date functionality and user interface capabilities in order to meet the increasing demand of renewable generation in Turkey and the surrounding countries.”

Team member – Generation Planning Department, TEİAŞ

Hitachi ABB Power Grids solutions equipped TEİAŞ with the tools to properly plan for long-term electricity generation for its growing economy. We also enabled TEİAŞ to develop a plan to submit to the European Network of Transmission System Operators for Electricity (ENTSO-E), for greater cooperation between TEİAŞ and other transmission system operators in Europe.

## The solution

TEİAŞ announced a public tender for its long-term transmission planning in 2018, inviting competing offers from suppliers able to provide goods, services or products needed for the project.

The funding was to be provided by The World Bank, an international financial institution that is currently supporting more than 12,000 development projects around the world. After evaluating multiple providers, TEİAŞ turned to Hitachi ABB Power Grids for two solutions and a license for Power Reference Case data for the Turkish system to use for comprehensive energy market forecasting.

The first of the two solutions, Capacity Expansion, is a long-term economic optimization-based electricity generation expansion planning tool. The Capacity Expansion model will help TEİAŞ produce a resource investment plan for the next 20-year horizon to deliver long-term reliability for the expanding Turkish system.

PROMOD, the second solution selected by TEİAŞ, is recognized by the industry for its flexibility and breadth of technical capability. PROMOD is designed for generation system modeling using extensive details of the characteristics of generating units including their operating conditions, unit commitment, transmission constraints and the operation of the market. With this modeling capability, TEİAŞ will now be able to plan future transmission networks to efficiently manage Turkey's increasing energy demands.

## The results

Even prior to project completion, the software solutions were creating clear benefits and improvements through increases in operational productivity and decreases in capital expenditure. With the insights obtained from Capacity Expansion, TEİAŞ is confident that they are now able to properly prepare for the future energy demands of more than 80 million Turkish citizens.

PROMOD and Capacity Expansion have a single, user-friendly interface, simplifying training and making adoption of the solutions easy. Additionally, the solutions include data and pivot-view functionality and easy visualization that allow TEİAŞ to model a variety of scenarios for comparison to optimize operations and results.

TEİAŞ is committed to strategically preparing its generation and transmission investments and operations for the future. With the new solutions and planning data, along with feeder management relays already in use, TEİAŞ is now poised to integrate renewable energy sources into Turkey's expanding electricity system. With a new 20-year perspective into the energy market, the Ministry of Energy will have the necessary information to make sound investment decisions regarding Turkey's generation capacity.

“Hitachi ABB Power Grids went the extra mile to understand our business needs and implement a solution that delivers real value to the Turkish market.”

Ilker Ilaşlaner  
MANAGER-Security of Supply and Generation  
Planning Department, TEİAŞ





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