TURKEY

CONNECTING TWO CONTINENTS

Characterized by its growing industry and service sectors, Turkey is an emerging market with a large traditional agricultural sector. With its strategic loction as a transcontinental country proving advantageous throughout history, GDP since 2016 nonetheless reflects the recent developments that have left the economy struggling with unfavorable international conditions.

Although Turkey is largely dependent on oil and gas imports, it is blessed with significant hydropower resources. Hydropower generation represents a share of more than 30% of the total installed capacity that, as of 2018, has reached 85,200 MW. Of this total, thermal capacity of 46,927 MW represents 53% and renewables including hydro of 40,513 MW accounting for 47%. Hydro itself has an installed base of about 27,273 MW, a share of 68% of all renewable energy sources and 32% of the national installed capacity.

The increase in energy consumption in Turkey is picking up pace and in addition to conventional power generation, renewable sources such as wind and solar power plants are intended to be built on a large scale. Due to Turkey's high import dependency for its primary energy, the Government has been encouraging the use of renewable resources.

With more variable renewable capacity anticipated over the coming years, the need for flexible generation capacity will also increase. Technologies able to balance and store energy – like pumped storage hydropower stations – will become far more important. No pumped storage projects have been executed in Turkey to date, but their capabilities will definitely be necessary to solve these growing energy supply and demand issues.

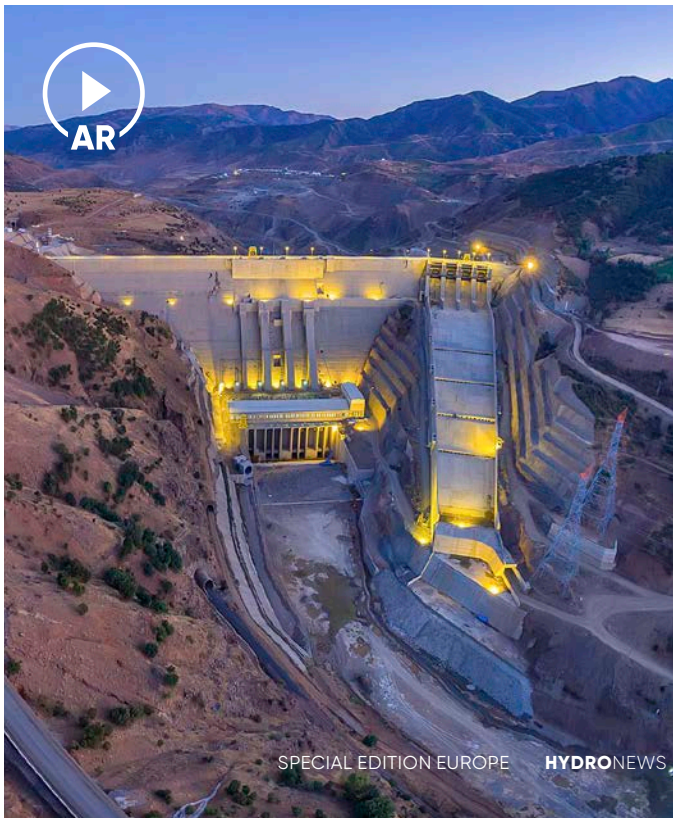
The coming decade (2020–2030) is crucial for the development of flexible generation, given the expected strong growth in electricity prices – driven by a tighter supply/demand-balance, increasing gas prices and additional contributions from carbon emission costs.

Turkish generation capacity is expected to almost double between now and 2040, with solar PV experiencing the fastest growth rates and onshore wind the biggest absolute increases. Together they are set to cover about one third of total national capacity in 2040. Meanwhile, hydropower capacity is going to grow by about 30% over the same period to add about 8,000 MW, excluding pumped storage.

ANDRITZ HYDRO IN TURKEY

ANDRITZ Hydro has been active in Turkey for many decades, reaching as far back as the 1920s when the first turbine deliveries took place. Over the years, the company has become the established market leader for electromechanical equipment with 15,733 MW of supplied or rehabilitated turbines and 8,180 MVA of generator equipment delivered, representing market shares of 57% and

Upper Kaleköy Dam, Murat River



30%, respectively. Currently, ANDRITZ Hydro projects under execution total some 2,700 MW of large hydropower projects and 12 small hydropower plants, which will collectively add about 137 MW of capacity in total.

Our local service center in Izmir is close to our clients and is part of an on-going long-term relationship with the Turkish market. Besides state-of-the-art technological solutions, the center offers immediate response times and experienced project implementation and execution, as well as efficient spare parts management.

Some of the highlights from the ANDRITZ Hydro portfolio in Turkey include hydropower plants such as Upper Kaleköy, Beyhan-1, Cetin, Boyabat, the Kandil Cascade, Ermenek, Borcka Muratli, Deriner and Birecik. This is in addition to major projects like Karakaya, Keban, Ilisu and Atatürk – still the largest hydropower plant in Turkey.

ILISU, TIGRIS RIVER

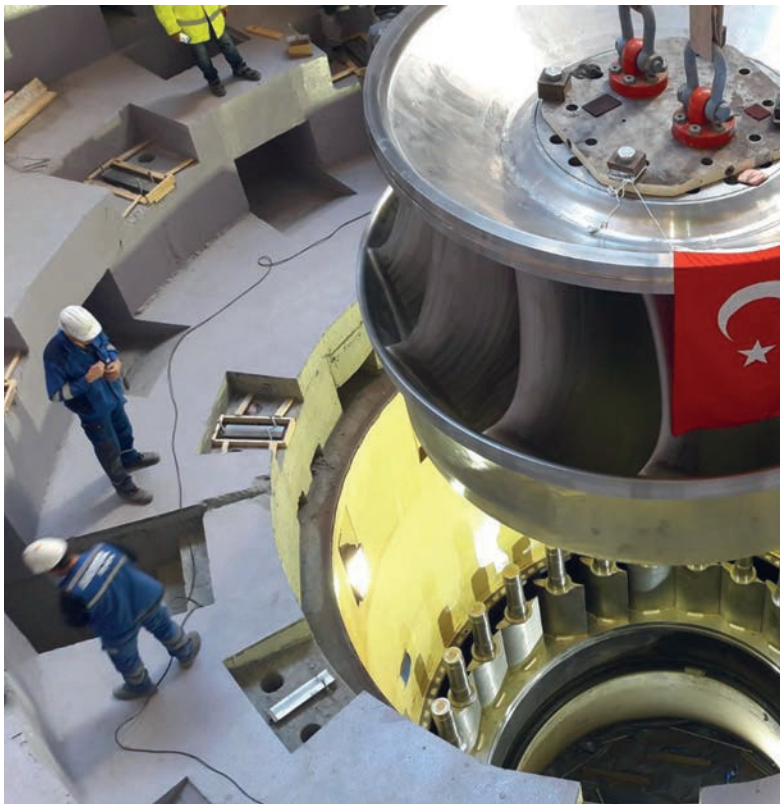
At one of ANDRITZ largest current projects, the Ilisu hydropower plant on the Tigris, the scope of supply comprises both hydro-mechanical equipment and the entire electro-mechanical equipment. The delivery includes six 204 MW Francis turbines. Ilisu will provide about 3,833 GWh of sustainable renewable energy for about two million local households, contributing significantly to the stabilization of the grid in southeastern Turkey. Commissioning is scheduled for mid-2019.

LOWER KALEKÖY, MURAT RIVER

ANDRITZ has received an order for the supply, installation, and commissioning of three 186 MVA generators here. The hydropower plant is part of the Beyhan-Kaleköy hydropower complex. It will supply some 1,200 GWh of electricity annually, providing important support to the Turkish energy network. Commissioning is scheduled for early 2020.

YUSUFELI, ÇORUH RIVER

This new hydropower plant will have a total installed capacity of 558 MW. At 270 m, this double-curvature dam will be Turkey's highest and the third highest of its kind worldwide.



Installation work at Ilisu, Tigris River

Our contractual scope of supply comprises design, supply, installation, and commissioning of three 186 MW generating units with all auxiliary equipment and automation systems, as well as hydro-mechanical equipment. The start of commercial operation is scheduled for the third quarter of 2019.

TO KNOW

GENERAL FACTS

Population: **80,745 Mio.**
Access to electricity: **100%**
Installed hydro capacity: **27,273 MW**
Hydro capacity under contruction: **5,000 MW**
Share of generation from hydropower: **19,6%**
Hydro generation per year: **58,219 GWh**
Technically feasible hydro generation potential: **216,000 GWh**

ANDRITZ HYDRO IN THE COUNTRY

Installed and/or rehabilitated capacity: **15,796 MW**
Installed and/or rehabilitated units: **336**
Locations: **Izmir**

Source Facts: The World Bank, IHA, CIA Factbook, Hydropower & Dams World Atlas 2018