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Turkey: Dynamic energy market offers plentiful power opportunities

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*Prompted by a fast-track programme of liberalization and privatization, Turkey has become one of the world's go-to destinations for power companies. **Kelvin Ross** explores what makes the country so attractive, what untapped potential is still has, and if there are geopolitical problems on the horizon*



Elbistan lignite power station: Turkey is targeting more energy from lignite-fired plants
Credit: MHPS

Economic expansion, rising per capita income, positive demographic trends and the rapid pace of urbanization have propelled energy demand in Turkey to an all-time high.

The country's energy demand is estimated to increase by around 4 per cent a year until 2023, with the current 70 GW of installed capacity expected to hit 100 GW by that time.

This energy boom is attracting power players from around the world to the Turkish market. With a European market that has stalled for many equipment suppliers, what makes Turkey attractive, says Dr Matthias Jochem, chief sales officer at Mitsubishi Hitachi Power Systems Europe, is that "something is happening in the first place".

He says that Turkey's steady economic growth "has translated into power consumption" and in turn energy companies can "smell business".



After years of relying on gas from countries such as Russia and Azerbaijan for its power, Turkey has taken steps to wean itself of this dependence and this has translated into a new drive for lignite plants and [renewables](#).

The government has also changed its strategy over the ownership of power assets, selling off many previously state-owned plants to private investors.

This has resulted in a lot of what Jochem calls "newcomers" - not newcomers to Turkey, but newcomers to the power sector who were already established in Turkey in another area of industry. Some are family holding companies actively seeking sound investments.

This, he adds, has brought its own opportunities and challenges: "These companies have a certain perspective for their plants - they want to keep the plants in order but they are not experienced in dealing with these assets - how a tender is conducted and the quality of, say, Chinese equipment over European equipment. Sometimes we have to face unusual requests or deadlines."

On the subject of Chinese imports, he says "there is a much greater influx in Turkey than any other European country". Nonetheless, he stresses that Turkey "is a new game - it's a good market for us. Turkey is dynamic." Mete Malepe, general manager of GE Power in Turkey, says that Turkey "is in our top 10 or 12 countries in the world for power. It's a significant country for us."

GE set up a regional hub in Turkey in the early 1990s. Since then it has established a very strong presence in the [gas turbine market](#)- "More than half of the gas fired power plants in terms of MW, and also in terms of the number of units, are GE technology," says Malepe.

Istanbul is now the headquarters for all of Eastern Europe for GE Power Services, which supports gas turbines, steam turbines and renewable technology.

It is also strong in the [wind sector](#) and following the acquisition of the Alstom business, it has a presence "in coal projects with steam turbines as well as some hydro business".

Malepe says: "In the [coal](#) area, the government is supporting particularly indigenous coal. One of the priorities of the government is to reduce imports of energy products to improve the trade balance of the country, so gas but also imported coal is an issue."

But he stresses that "gas is not dead at all. We have over 1600 MW currently being constructed in gas."

He says gas makes sense for Turkey because "with more and more renewables in the market, you are seeing more and more variability, and gas power plants are very good at fast ramping up and down to support that."

However, he says that "we are definitely seeing more and more interest from investors and developers in renewables, primarily wind".



Manisa combined heat and power plant
Credit: Wärtsilä



Bandirma gas-fired plant in Turkey
Credit: MHPS



"Turkey last year was the number 10 wind market in the world with about 1 GW of installations, so even in those technologies that were once considered a luxury and we only saw in places like North America and Europe, we are seeing significant investment and growth."

Malepe says that five years ago Turkey was ripe for new business because the government "was worried about an energy crisis because of not having enough supply".

"Now you have a much more established, liberal market in Turkey. At the same time, significant capacity has been added and some of the electricity pricing has come down, so the economics are not as attractive as they were five years ago. But the fundamentals are there: the economy is growing, the population is growing, electricity demand is growing and the kWh per person in Turkey is still very low compared to the average in Europe."

Claudio Spadacini, chief executive and founder of Italian company Exergy, agrees that "Turkey has become one of the fastest growing and most attractive energy markets".

He attributes this to the privatization of power assets, which he adds "the government has been able to support with reforms that have created a highly competitive and dynamic market".

"Turkey is also one of those countries offering private investors favourable conditions in terms of feed-in tariff for power generation from [renewables](#). The incentive regulatory framework, the economic growth of the country that paved the way to an increasing energy demand, made the Turkish energy market attractive for investments."

Exergy has been active in Turkey since 2011 when it participated in the consortium for the Pamukören 1 and Pamukören 2 [geothermal](#) plants. Since then it has established a 100 per cent wholly-owned Turkish subsidiary.

"This was a winning choice and gave us an additional competitiveness deriving from offering a Made-in-Turkey production," says Spadacini.

Exergy is also the first supplier of organic rankine cycle (ORC) solutions for power generation from geothermal sources in Turkey.

Marianna Caputo, marketing manager at Italian cooling technology company SPIG, believes that Turkey is "one of the most attractive and favourable investment environments in the world".

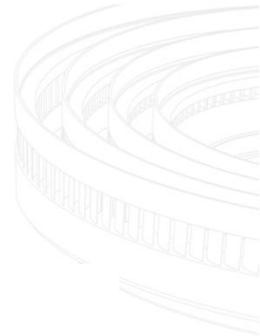
She says that the government's massive programme of restructuring and liberalization has created a "strategically-located huge energy market that has become more competitive, offering several opportunities".

She adds that Turkey plays "a significant role in the global economy and world trade, standing out as a promising emerging market alongside the so called BRIC club countries."

However, she observes that "this status needs important steps still to be taken such as to accelerate its innovation and R&D capabilities aimed at transforming the country into a centre of excellence. To sustain its economic growth in the long term, the country needs to boost its structural transformation."

Turkey's vision for 2023 includes:

- o Raising the total installed power capacity over 100 GW



- o Increasing the share of renewables to 30 per cent
- o Maximizing the use of [hydropower](#)
- o Increasing installed capacity based on wind power to 20 GW (an additional 15 GW)
- o Installing power plants that will provide 600 MW of geothermal and 5 GW of [solar energy](#)
- o Significantly enlarging the transmission capacity of the high voltage grid
- o Reaching a power distribution unit capacity of 158,460 MVA
- o Extending the use of [smart grids](#)
- o Raising the natural gas storage capacity to 5 billion m³
- o Establishing an energy stock exchange
- o Commissioning [nuclear power plants](#) (two operational with a third under construction)
- o Increasing [coal-fired installed capacity](#) from the current 14.5 GW to 30 GW

The SPIG Group started operating in Turkey in the 1990s and in 2004 set up a local subsidiary. Since then, Caputo says "we saw an overall progress in the emerging market and a significant expansion in the power generation sector, driven by a steady growth in the country.

"Turkey has attracted a large number of foreign investors who brought their know-how, innovative products and experience, helping to fuel the country's development."

Peter Gisbert, vice-president of sales for Eastern Europe with Siemens' Power and Gas Division, maintains that Turkey's biggest energy asset is quite simply its location: "Turkey's geopolitical position in the middle of three continents is a great opportunity to build new energy corridors. Turkey is geographically located in close proximity to over 70 per cent of the world's proven gas and over 70 per cent of oil reserves, in particular those in the Middle East and the Caspian Basin.

"It thus forms a natural energy bridge between the source countries and consumer markets and stands as a key country in ensuring energy security through diversification of supply sources and routes, considerations that have gained increased significance in Europe today."



Turkey has significant wind power potential

Credit: GE

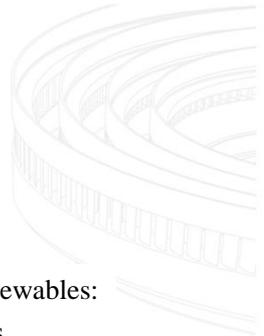
Gisbert agrees that Turkey offers investors favourable incentives, such as feed-in tariffs, purchase guarantees, connection priorities and license exemptions. However, he observes that the "return-on-investment period in Turkey's energy market is little longer than in other investment areas - such as construction - so local and foreign investors may evaluate alternative countries." He believes Turkey's government "should fortify its promising energy policy to encourage foreign investors".

Yücel Hurkal, general manager at Wärtsilä Energy Solutions in Turkey, says that the country's "transition to a free market has been an obvious necessity".

"The Turkish power market was driven by governmental companies, therefore it was controlled as monopoly for a long time. As a fast-growing market, it became evident that the ever-increasing demand for electricity could not be met solely by public resources and the additional resources needed to meet this demand required extensive investments."

Wärtsilä has been active in Turkey since 1994 and reached 4 GW in established capacity by the end of 2015. Its most significant growth came between 2000 and 2010 due to the liberalization and privatization of the market.

Hurkal says the liberalization "constantly increases the competitiveness of the market, while privatizations offer a variety of investment opportunities which also serve the purpose of increasing competitiveness".



So where is the untapped power potential in Turkey? Exergy's Spadacini says it is undoubtedly in renewables: "If we consider the renewable potential in Turkey - wind, solar, geothermal and hydro - the country is exploiting only 20-30 per cent of it.

This number is expected to increase, as the Turkish government has made it a priority to bring the share of renewables in the country's energy mix up to 30 per cent by 2023, and Spadacini says one of the most interesting renewable energy potential areas is geothermal.

"The total geothermal theoretical electricity potential of Turkey is 2500 MW. The total electricity production from geothermal at the end of 2015 was approximately 600 MW, so there's still a huge market to seize. That's why the Turkish market is where almost all the geothermal technology suppliers currently are investing for binary plants."

Gisbert at Siemens agrees that "Turkey ranks seventh in the world and first in Europe in terms of geothermal energy".

However, he adds that "as important as renewables are for Turkey's energy strategy in the coming years, technologies in such fields as waste processing and greenhouse gas reduction are also often cited together with this new form of power generation as critically important supplementary practices".

"Sustaining the environment by resorting to renewable resources is accompanied by a number of measures and regulations that are either currently in effect or will soon be in effect, including lowering carbon emissions, increasing generation/transmission efficiency and promoting the use of waste management technologies."

He adds that "privatizations will have a hidden capacity increase effect." He explains that the increased share of private entities in the electricity generation sector - from 32 per cent in 2002 to 75 per cent in 2015 - has had a positive effect. "Privatized power plants perform significantly better after takeover. After rehabilitation and replacement periods, the overall capacity factor is expected to increase from 45 per cent to 80 per cent."

Siemens is celebrating its 160th year of business in Turkey this year. Its first activity was the supply of telegraph equipment in 1856 followed by Dolmabahce Gazhane power plant in 1906 to provide electricity for lighting Istanbul's streets.

Today Siemens has over 3500 employees and two manufacturing plants in Turkey and the company claims it is involved in around one third of Turkey's installed power capacity in terms of products and solutions.



Gas turbine for Hamitabat combined cycle power plant
Credit: Siemens

Gisbert says that another step taken by the Turkish government towards a more competitive energy sector is the establishment of an energy stock exchange. "Once operational, it will not only enhance the liberalization of the market, but also ensure transparency and help maintain a healthy balance between supply and demand."

On untapped potential in Turkey, Wärtsilä's Hurkal says the projection of the future power market shows that "established capacity has to reach 120 GW in 2023. This means that there might be a 15,000-20,000 MW project potential for the coming years in addition to nuclear power plants, which will have a total 15,000 MW of installed capacity with three nuclear power plants in 2023."

He says the drive to reduce gas imports means that the government believes that existing gas plants "are enough... and there shall not be additional big investments on this type of fuel".

He expects to see growth in solar and wind together with coal, and also adds that "reciprocating engine-based natural gas power plant investments may continue as peaker plants, due to their fast ramp-up and -down capacity, short delivery time and flexibility".

Gisbert says that a growth area will be solar. "There are already structured comprehensive incentives for wind, hydro and local coal. Structuring a solar policy with special solar-related incentives may ramp up the solar market. Today's annual solar investment is 50 MW but with a structured policy there is a 500 MW-a-year market for the coming years."

He also sees Turkey as an important market for new opportunities in onshore wind power. "According to estimations of the German Foreign Trade and Inward Investment Agency, potential for the utilization of wind power in Turkey is up to 30 per cent higher compared to Europe."



Is there anything - be it policy or market-driven - that would stimulate further opportunities in Turkey? Spadacini says that despite the government support and regulations "which are not done so effectively in most other countries, private investors still find some difficulties in the bureaucratic process".

"Getting a license is a difficult and long process. To foster the growth of the energy market and meet the 2023 target, some measures should be introduced to speed up the bureaucratic procedure. The current incentives that are in place should be extended beyond 2020 with increased rates for feed-in tariffs."

He adds that the grid structure is also "a key factor which requires constant upgrade in order to allow for addition of new installed capacity, especially renewable energy-based power plants, since all renewable resources other than geothermal are intermittent and will require adaptation to existing grids."

Political tension

Turkey's proximity to the troubled hot spots of the Middle East have seen it make the headlines all too often in the past year or so, and these developments cast a shadow over the power sector's potential.

Spadacini says that "considering the geopolitical location of Turkey, there is constant political tension among the neighbouring countries in the region which will affect investments in the east and southeast regions of Turkey".

But he adds that "considering that most of the industrial zones are located in the west and central Turkey, investments will continue as long as the general world economics allow growth".

Caputo at SPIG is not so sure. "Turkey is facing challenges both at home and region-wise, because of the current difficult international environment. Moreover, Turkey's economy needs deep structural reforms to boost productivity and transparency.

"The country's political and economic stability are highly vulnerable, while its security faces rising threats from regional Islamist extremists. The continuing domestic political uncertainty and tensions influence the country's growth. This may negatively affect consumer confidence and investment sentiment, strongly depending on how the political issues will be solved. Turkey needs a stable government and deep structural reforms in order to restore investor confidence."

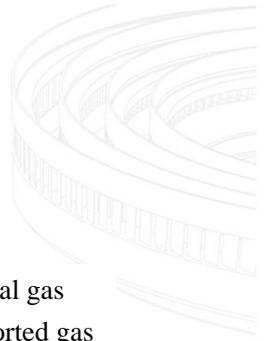
Jochem cautions that "political ups and downs" have "paralyzed decision-making and getting the green light for large energy projects."

However, Gisbert says that Siemens believes that the Turkish electricity market will "continue to be a strategic sector for the investors and the financiers due to sound fundamentals in the long term".

"Current political situations in neighbouring countries and Turkey's current foreign policy are heavily affecting the power market in Turkey," but he adds that regarding Turkey's internal and external dynamics, "we are used to experiencing some fluctuations and crisis in the market".

It is Turkey's dependence on Russian natural gas that he sees as the most "fragile situation".

Of Turkey's annual gas imports, Russia accounts for 55 per cent, Iran 19 per cent, Azerbaijan 13 per cent, Algeria 9 per cent and Nigeria 4 per cent. And natural gas is the source of 48 per cent of total energy production.



Gisbert says Turkey "needs to strengthen its political and economic relationship especially with natural gas exporter countries. Although there is no risk in supply of natural gas currently, the price level of imported gas should be optimized to produce profitable electricity and ongoing CCPP investment in Turkey."