



The emergence of Turkey's unlicensed solar segment (installations below 1 MW) has driven much of the country's optimism this year, with growth forecast to reach somewhere between 50 MW to 100 MW in 2014.

Ten points on the Turkish solar market

Turkey: A growing economy, an insatiable thirst for energy, high levels of solar irradiation and an enviable location at the crossroads of East and West. Are these conditions perfect for nurturing the next solar superstar, or a muddled cocktail where dormant potential is forever doomed to remain unfulfilled? **pv magazine** breaks down the Turkish enigma into these 10 key points.

1. As things stand

The latest estimates from leading industry sources suggest that there are approximately 20 MW of solar PV capacity installed in Turkey. In a nation of 77 million people and 62 GW of power generation capacity, that figure may seem minuscule, but there is hope that Turkey will end the year with an installed PV capacity somewhere around 100 MW to 150 MW as large-scale PV projects awarded under the first round of licenses come online.

Turkey's attractive feed-in tariff (FIT) was amended late last year to include solar PV projects up to 1 MW, stands at \$0.133 per kWh, and runs for ten years. Offering manageable returns of 8-9% on investment, the FIT is expected to drive small-scale solar installations over the next decade. With this in mind—and following the near-farcical situation earlier this year that saw 8.9 GW of solar applications submitted for the first 600 MW round of licenses offered by the government—expectations for Turkey's solar

market have soared. Analysts at IHS labeled Turkey the world's third most attractive emerging market at the turn of the year, forecasting a PV build-out of just 150 MW for 2014 but suggesting the sector could reach 1 GW as early as 2017.

2. The unlicensed segment

In leaping from 20 MW to approximately 150 MW in the space of a year, one might expect Turkey's terrain to lie peppered with large-scale solar installations. Not so; much of the country's solar growth this year is being driven by the unlicensed segment, which accounts for all solar installations below 1 MW. Because of bureaucratic delays and difficulties in obtaining licenses for solar projects, many investors in the country have simply gone in below the 1 MW mark – and the results have been encouraging.

"Looking back one year, we noted then that the unlicensed segment would become more dynamic than the licensed segment," said Matthias Kittler, princi-

pal at cleantech advisory firm Apricum. "This has now been confirmed due to the slowly moving administration that hinders the fast issuing of licenses."

Kittler expressed surprise that the FIT proved so attractive to Turkish developers operating in the sub-1 MW sector. "The rate in US dollars turned out to be appealing to private sector investors who are installing small scale systems mainly for the purpose of grid feed, not self consumption."

According to Apricum's senior advisor Deniz Polatkan – who also works as general manager for Ankara-based PV project development company Motif Proje – the unlicensed segment currently dominates Turkey's solar landscape, led by ground mounted installations financed by Turkish investors.

"Because of impressive investor dynamics, there is approximately 2 GW of unlicensed applications in the pipeline," he said. "I estimate that 1 GW represents serious projects, with Turkish,

Italian, German, and Chinese investors all involved.”

The commercial rooftop sector is also buoyant, Polatkan added, while the dormant residential rooftop market could stir into action towards the end of 2015. Apricum expects the unlicensed solar segment to grow by as much as 50 MW to 100 MW in 2014. “Quite a turnaround considering this particular market was close to zero last year,” added Kittler.

3. The licensed segment

In 2013, the Turkish Energy Regulatory Authority (EPDK) held the first round of its solar licensing program for large-scale PV projects of 1 MW to 50 MW, capping the application ceiling at 600 MW. The tender attracted applications for licenses totaling 8.9 GW – a situation that, while showcasing Turkey’s hunger for solar power – overwhelmed the authorities, and surprised onlookers.

“We expected applications in the range of 3–4 GW, but nothing close to 8.9 GW,” said Kittler. “This large number was surprising for us, but especially for Turkey’s energy decision makers who were taken aback by the sheer scale of applications.” An already cumbersome licensing process was thus made doubly obdurate, with reams of red tape and piles of paperwork slowing the application process further. “It was a mess,” added Polatkan.

Although Apricum expect the licensed segment to allocate between 200 MW to 300 MW of PV this year, this figure is far below what it could have been. Kittler and Polatkan are both positive that the government will introduce a higher cap later this year of around 3 GW, but they add that the EPDK must first allocate the lion’s share of the initial round of 600 MW before any concrete plans can be put into place.

4. Government inaction

Turkey’s presidential elections were held in August, with incumbent Prime Minister Recep Tayyip Erdoğan securing the majority vote. As in every major democracy, pledges were made during the election run-in that may never see light of day post-ballot. However, Polatkan is confident that September will see the next round of solar licensing allocations released, of which 3 GW is the likely figure. Up until now, though, signs of governmental encouragement for the licensed solar sector have been few and

far between. “I foresee a number of future problems in this segment due to the legislation and attitude of the government,” said Polatkan. “There is no support for licensed systems because this decision is made by Turkey’s Energy Market Regulatory Authority (EMRA) and, even if support was forthcoming, the bidding procedure is difficult to understand.”

Written exclusively in Turkish, embroiled amid arcane Turkish law and peppered with legal loose ends, the application process is burdensome, especially for foreign companies. However, Kittler is at least hopeful that the government has learned the tough lessons handed out by its dealings with the wind energy sector. “A couple of years ago the government doled out licenses for wind projects whenever they could, but quickly realized that it was not the best strategy,” he said. “Now they are a bit more controlled, better regulated, and eager to ensure that the grid, at any specific point, can cope with the addition of solar capacity.”

Such fastidiousness prolongs delays, but erring on the side of caution may aid the solar industry in the long run. “The government also wishes to work more closely with the local distribution companies, but are currently only in a position where they can allocate a handful of MW here and there...they have become paralyzed by paperwork,” added Kittler.

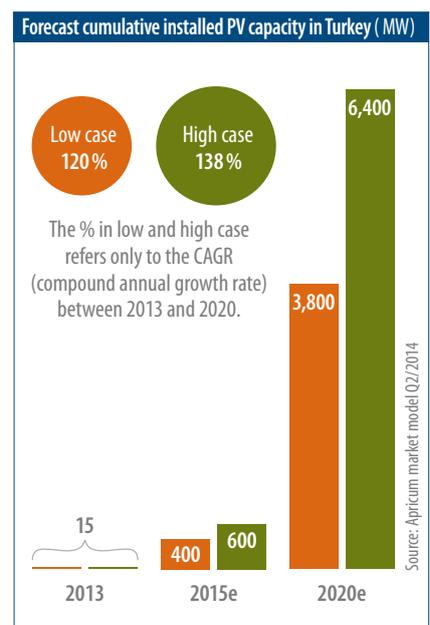
5. Geographic gravitas

As Europe’s second-most mountainous country after Switzerland, Turkey – despite its size and relatively low population density of 100 people per square kilometer – is not the most ideal terrain for a mega roll-out of utility-scale PV plants. Its middle, while flat and sparsely populated, is mainly allocated for agriculture. “The government does not allow solar developers to build on agricultural land,” said Polatkan. “I back this decision. Farming is very important for the Turkish economy. But it does mean that developers often have to look elsewhere, but the west and east are both very mountainous areas.”

Foreign investors concerned by Turkey’s sharing of borders with Syria and Iraq may be surprised to discover that these border regions in the country’s south and east are actually some of the industry’s most popular areas. “The land near Syria has a lot of solar projects coming through, mostly because they are

being developed by local investors who have fewer issues with security concerns. We will continue to see PV solar development in these regions, particularly Kilis, on the Syrian border,” said Polatkan.

Turkey’s central and southern regions in particular boast excellent solar irradiation levels (as high as 1,600 kWh per kWp), and indeed the entire country from east to west, north to south, receives good sunlight for most of the year. But Turkey’s true trump card is its serendipitous geo-



graphical location, placing it at the very crossroads of Europe and Asia.

“Being so close to Europe but also part of MENA (Middle East and North Africa) makes Turkey an interesting market for Chinese module manufacturers,” said Kittler. Chinese companies can set up production in Turkey without having to worry about duties levied on countries in the European Union. “CSUN have spearheaded this kind of development, and we envisage that more and more Turkish companies will partner with Chinese manufacturers in the future to supply the local market.” Kittler adds that many tier-2 and tier-3 Chinese solar manufacturers will also head for Turkish shores over the coming years because their lower-priced products are exactly what Turkish investors prefer.

“The FIT rate is attractive already, particularly as Turkish investors do not place the highest emphasis on top quality product, tending instead to go for cheap technical solutions in order to make a margin,” Kittler revealed.



Turkey's growing economy is fueling demand for more energy and greater energy independence.

6. Foreign investment

More than \$2 billion has been poured into Turkey's renewable energy sector via the European Bank for Reconstruction and Development (EBRD), which steered \$70 million directly to Turkish national bank *Turkiye IsBankasi* (*IsBank*) to be plowed into renewable energy projects. In May, the World Bank approved a loan of \$300 million from the International Bank for Reconstruction and Development (IBRD) and a further \$50 million loan from the Clean Technology Fund (CTF) – monies all earmarked for investment in renewable energy.

With Turkey's energy demand rising at a rate of 6% a year, any investment is met with open arms, with talk of a first nuclear power plant also gathering pace after it became apparent that Russian pledges to build one are increasingly likely to amount to nothing. "Financing is the market's most relevant bottleneck, especially for the unlicensed solar segment," said Kittler. "So anybody who brings money to Turkey for PV projects is very welcome. The private banking sector does not currently have the necessary experience to deal with large-scale solar financing, and so it is in the interest of the EBRD to bridge the financing gap until such a time that Turkey can stand on its own two feet." *Apricum* forecasts that Turkey's solar market is likely to be dependent on foreign investment for another two to three years.

7. Growing economy

TEİAŞ reported in May that Turkey's energy consumption increased by 78% during the past decade, reaching 235 billion kWh in 2013, and is on course to top 256 billion kWh this year. By 2023, Turkey's energy minister *Taner Yildiz* expects the country to consume 450 bil-

lion kWh of electricity annually – reflective of a growing economy and relatively stable political climate. Prime Minister *Erdoğan* has maintained a low interest rate in order to stimulate lending and consumer and business spending – a stance partly influenced by the Islamic belief that charging interest on loans is immoral. The impact has been largely positive, and with the PM securing another term this summer, these policies are expected to be pursued with renewed enthusiasm in the years to come.

On the energy front, the delayed construction of the *Akkuyu* nuclear plant on the Mediterranean coast coupled with the deadly mining disaster at *Soma* that killed 301 miners earlier this year has pushed public appetite for renewable power to record levels. Meanwhile, the push for energy independence is growing. "The neighboring conflicts in Syria and Iraq, Turkey's relationship with Russia, and the growing need for energy is all supporting the call for Turkey to invest more in renewable energy and secure its energy independence," said Kittler.

8. Local knowledge

According to most industry experts, the formula for solar success in Turkey is complex. It requires patience, deep pockets, and a smattering of local partners with reliable ties to the authorities and a good grasp of Turkish law and language.

A lack of local installation experience and quality assurance expertise is problematic for foreign investors, but signs are afoot that Turkey – and a handful of interested foreign companies – will be addressing these concerns. In April, *pV magazine* learned that German inverter company *Danfoss* had teamed up with Turkish solar developer *Zenit Enerji* to deliver a three-year solar

training course for 1,000 students at the *Izmir Katip Çelebi University*.

With training and education of local Turks high on the agenda, the country should be able to enjoy a measure of energy independence within a generation. "You could develop Turkey's market for another ten years solely with product brought in from abroad," said Kittler. "But this is not going to happen. In other industries, Turkey has already gone a fair way in localizing its production base, and solar will do the same."

9. Potential hiccups

War in Syria (and/or Iraq), or an escalation of the Israel-Gaza crisis or the Ukraine-Russia skirmish could all have a negative impact on neighboring regions, if not Turkey directly.

The PM's economic policies could prove disastrous, setting the economy back years, while the government's continued muddled management of solar applications could continue to delay large-scale solar projects, spooking potential investors in the process.

"During the first bidding process for the *Elazig* project, *Solantegre Enerj* won the contract by offering close to \$400,000 per MW. Can you imagine that? It is a crazy situation that cannot continue," *Polatkan* commented. For all its potential, the unlicensed segment cannot alone propel the Turkish solar sector to the heights it is fully capable of. Large-scale, FIT- and government-supported solar plants have to play their part too.

10. What the future holds

Turkey's EPDK has targeted the installation of 3 GW of solar PV capacity by 2023. An overly ambitious goal? Not so, believe both Kittler and *Polatkan*. "We can be even more bullish than that," enthused Kittler. "Turkey is likely to go well beyond 3 GW, possibly up to 5 GW. The speed bumps are not enough to discourage Turkish entrepreneurs and investors who really want to move into the sector."

Polatkan is even more confident. "I wouldn't rule out 10 GW by 2023. It is a healthy market, and European and Chinese investors are starting to penetrate. My main hope is that the government steps up its support. If everybody – from businessman to bus driver – wants to have PV, then the government will obey. Turkish people must steer the country's solar future." ♦

Ian Clover