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Is the glass half full or is it half empty? There are many reasons to be hopeful about the Turkish market and many reasons to be pessimistic. Experts believe that the market will pick up by 2016 at the latest.

Drink tea, keep hoping and just carry on

Turkey: Geopolitics, a burgeoning economy, lots of sunshine, and cheap technology are driving Turkey's solar PV sector, which is set to expand in the near future. But 2015 doesn't seem to be part of this future yet, with the Turkish PV sector having to fight several battles, bureaucracy being the main one.

To make the most in life, it is often said, one should view a glass of water as half full instead of half empty. The same philosophy should apply in the case of Turkey's PV market. There are various reasons to be hopeful or pessimistic, but the glass has lately started looking half full.

2014: Grand plans but only 78 MW

According to Turkey's Ministry of Energy and Natural Resources statistics, the country added 6,303 MW of new capacity in 2014, of which wind and solar power plants comprised 14% or 882.290 MW. The ministry report does not provide specific wind and solar PV installation data separately, which compels journalists and analysts to make guesses when calculating installed capacities. The rest of the newly added capacity in 2014 came from

fossil fuel power plants (3,899.960 MW), hydro plants (1,366.455 MW) and geothermal, biomass and waste power plants (154.169 MW).

However, according to a separate report published by the Global Wind Energy Council (GWEC) in February regarding wind power's global statistics for the year 2014, Turkey installed an impressive 804 MW of new wind energy capacity. This leaves solar PV technology only a minor 78.29 MW of installations in 2014. Turkey now has a cumulative photovoltaic power capacity around 100 MW.

228 MW approved in January

Low installations in 2014 disappointed the solar industry, which had responded overwhelmingly in the first licensing round in June 2013 for PV projects larger

than 1 MW. Developers had submitted applications for 8.9 GW of PV capacity, almost 15 times more than the 600 MW licensing cap.

Until January, Turkey's Energy Market Regulatory Authority (EPDK) had only awarded licenses for two projects, an 8 MW solar farm in the region of Elazığ and a 5 MW PV farm in the region of Erzurum, in Eastern Turkey. The two projects were initially awarded their licenses in May 2014 but the projects' construction was only given final approval in December 2014, meaning the plants were finally permitted to start building one year and a half after the closure of the application call.

On January 29 and 30, 2015, Turkey's electricity transmission company TEIAS tendered an additional 228 MW of PV licences as a result of the first licensing round. As in the case of the initial allocation of 13 MW of licenses in 2014, these are only preliminary licenses, meaning that awarded bidders of the 228 MW capacity will need to submit several permits to the regulator to have their preliminary licenses fully approved.

At the time **pV magazine** was going to press, TEIAS announced three more tenders of 302 MW of new PV capacity, which will take place on April 28, 29 and 30. TEIAS' tenders involve a nonrecurring fee to be paid per MW, which poses an additional obstacle to Turkey's solar PV deployment according to Hannes Beushausen, Project Manager and Turkey expert for the consulting firm Aprium, which is based in Berlin and has a representative office in Turkey. "In the 2014 licensing round the winning bids differed significantly, ranging from TRY 68,000 (\$26,622) per MW in Ezurum to TRY 827,000 (\$323,820) per MW in Elazığ. For several licenses of the 228 MW of PV capacity tendered in January that have high contribution fees, we don't see how one can establish feasible projects under the Turkish feed-in tariff," noted Beushausen.

Red tape

Experiencing Turkey's first licensing process has left investors wondering why this takes so long. Andi Aranitasi, an Istanbul-based senior member of the Power and Energy team at the European Bank for Reconstruction and Development (EBRD), told **pV magazine** that "bidding is a lengthy process which also includes

measurements and looking at the experiences of other countries and Turkey's own to avoid any mistakes."

Still, other countries, like for instance neighboring Bulgaria and Romania, were able to learn much faster and proceed with their licensing more efficiently.

Administrative hurdles matter specifically for the solar PV industry due to the character and size of PV projects. Wind projects on the contrary are far larger than most of the PV projects, therefore acceptance of a few wind power projects leads to greater amounts of capacity being installed more rapidly.

Turkey's action plan carries hope

The recent announcement of Turkey's National Renewable Energy Action Plan (NREAP) in cooperation with the EBRD has spread hope for better administrative practices and improving the business environment for the solar PV sector.

The National Renewable Energy Action Plan that the EBRD has helped to develop, said Aranitasi, "sets out the measures which need to be taken to cut red tape. The plan also transposes EU best practices in the Turkish context."

"In addition," Aranitasi told **pv magazine**, "in our dialogue with the Turkish authorities we have been promoting a centralized licensing entity [a one stop shop for renewable energy licensing] to speed up the process. We also think that introducing deadlines for responses would be a good practice."

Further to cutting the red tape, Turkey's NREAP addresses issues such as project financial support, improvement of the legal framework, interconnection infrastructure enhancement, and development of new support mechanisms.

"The document identifies the regulatory gaps hindering private investment in the sector and establishes measures based on international best practices and in line with EU legislation," said Aranitasi.

Sufficient grid

Prior to EPDK's call for large power plant applications, Turkey's electricity transmission company TEIAS had published a list of 121 transformer stations around which the projects should be built. "No formal explanation was given regarding such a move and certainly TEIAS' decision does not resonate on grid concerns," said Hannes Beushausen. 600 MW of new PV capacity is not much, said Beus-

hausen. "Turkey would be able to add a few GW of solar PV without facing any grid concerns."

Aranitasi agreed: "Turkey's grid is capable of supporting the solar PV growth for the time being." And he added, "Projects will concentrate on high irradiation areas such as Anatolian plateau and south west Turkey."

The reason for concentrating on these areas is that the Turkish Government has set a solar irradiation limit for sites that can qualify for solar PV development, while PV developers were requested to submit six months of on-site irradiation measurements when applying for a license, explained Beushausen.

Due to the government's solar irradiation limit for project sites, major power consumption centers that could benefit from solar PV are Antalya, Ankara, and Izmir. The Istanbul region in contrast does not satisfy the set irradiation standards.

Cautious financing

Receiving the license for the 5 MW solar farm in Erzurum, Yalçın Adiyaman, the Deputy General Manager of Halk Enerji, said that "after many years of waiting, Turkey has a real opportunity in 2015 to see a significant volume of systems installed and a photovoltaics market develop." Overall, Adiyaman added, expansion of PV power plants in Turkey in 2015 could be as high as 500 MW. Halk Enerji has already signed a memorandum of understanding with South Korean/Chinese module manufacturer Hanwha Q Cells to equip the 5 MW solar park.

Beushausen appears to be more skeptical. "A major obstacle that is projected to delay the construction of the newly licensed PV parks is access to financing. Developers can only seek financing after their projects have been awarded a license, therefore construction of the new plants may start quite later in the year." Should international developers step in, access to financing might prove less of a barrier and the construction phase could begin. "This is true," says Beushausen, "since international firms might secure financing from abroad, but to our knowledge the majority of licenses are awarded to locals. Unless, of course, a license is won by a local developer who is the subsidiary of a foreign brand." First Solar for instance acquired three licenses in January.

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Solar cell and module manufacturer CSUN opened a factory in Istanbul two years ago.

“To a certain extent,” explains Aranitasi, “local banks are capable of financing renewable energy projects in Turkey, however with a number of conditions: limited recourse, strong developers, and significant equity requirements.” Local financial institutions, he says, “seem to be less willing to take additional risk during certain phases such as early stage geothermal, or unwilling to take construction risk. Local banks will usually go for a straight sponsor guarantee for the construction period. On the plus side and unlike their Western counterparts they have appetite for substantial tickets.”

The EBRD has invested €2.1 billion in 55 sustainable energy related projects in the last six years, corresponding to almost half of the EBRD’s portfolio. “We plan to maintain the same levels of investment with a focus on renewables,” confirms Aranitasi, adding that the bank “would be happy to finance solar in Turkey in future, provided projects meet conditions for EBRD finance.”

The unlicensed market

One area of Turkey’s PV market with big expectations is the unlicensed segment, which refers to projects smaller than 1 MW. In this market segment, things proceed faster but expectations should be lowered, warns Beushausen.

First off, the so-called unlicensed projects also need a couple of permits, one of them being grid permission. Apricum’s understanding is that, as with the larger

projects, there was a certain grid capacity allocated to the unlicensed market segment that is almost fully taken now. Second, Apricum’s information is that the government considers allocating extra capacity for these installations but there will be a minimum requirement for self-consumption.

In theory, the self-consumption requirement exists for the current unlicensed installations too. In practice though, **pV magazine** has learned that investors often build two to four different projects together and nearby, totaling 1 MW capacity and by far exceeding their power demand. Beushausen confirmed this information, noting that Turkish institutions know about it and that a possible explanation is that they turn a blind eye in order to let the PV market roll out. “We expect new grid capacity allocations for the unlicensed market to be stricter regarding the minimum consumption requirement,” said Beushausen.

Aiming at energy security

Turkey’s foreign ministry says the main focus of the country’s energy policy is energy security. To this end, the ministry of foreign affairs adds, Turkey’s energy policy objectives are to “diversify its energy supply routes and source countries, increase the share of renewables and include nuclear in its energy mix, take significant steps to increase energy efficiency, and contribute to Europe’s energy security.”

Today, Turkey’s installed power capacity stands at around 70 GW and the government aims to install an additional 110 GW by 2023. The AKP-led government has said that 90% of the country’s electricity in 2023 will be equally provided by gas, coal and renewable energy plants (30% each), while nuclear power will provide the remaining 10%. Currently, imported natural gas provides the main bulk of Turkey’s electricity generation, around 40%, while in February, Russia granted Turkey a 10.25% discount on the gas it supplies. The country’s electricity and gas prices are among the lowest in Europe.

Criticism

Renewable energy supporters have highly criticized the government’s insistence on nuclear power. The country’s first nuclear power plant, the Akkuyu, will undergo construction of its first nuclear reactor in 2015 by Russia’s nuclear construction company Atomstroyexport, with financing also provided by Russia. All four of Akkuyu’s reactors are planned to start operation by 2023, totaling 4.8 GW. In 2013, Turkey also signed a memorandum of understanding with a consortium led by Japan’s Mitsubishi and France’s Areva to build a second nuclear plant consisting of four reactors totaling 4.6 GW capacity. China is in line to build a third nuclear plant with U.S. technology. Turkish Energy Minister Taner Yildiz revealed in February that Turkey will send 80 more students to Russia to get nuclear energy education in addition to the 300 students who have already been to Russia for the same purposes. Nuclear energy critics argue that Turkey’s high levels of seismic activity is a major threat to the country’s nuclear safety, while others point out that nuclear safety requires institutional transparency at the highest level and that is far from being the case in Turkey.

Non-governmental environmental organizations have also critiqued the country’s reliance on coal. Last year Turkey revealed that it is in talks with China regarding a \$10 – \$12 billion investment deal for the Afsin-Elbistan coal field and power plant project in southern Turkey. The project includes the construction of a mammoth 8 GW coal power plant using fuel from Turkey’s lignite reserves. However, critics have expressed disbelief at the government’s safety guarantees of the country’s fossil fuel energy infra-

structure and point to last year's mining disaster that killed 301 mine workers in Soma, Manisa Province, in Western Turkey as an example. The Soma mine had passed a labor ministry safety inspection while Energy Minister Yildiz had also praised the facility's safety while visiting the mine prior to the accident, critics point out. They are also concerned about the risks of nuclear energy in the country, especially if the same safety standards are applied to Turkey's nuclear plants.

Furthermore, a 5 GW target of solar PV by 2023 translates to only 2.7% of the overall projected power capacity and is rather low for a country which, according to its Renewable Energy General Directorate, has a total annual insolation time of 2,737 hours (a total of 7.5 hours per day).

Wind energy on the contrary has fared much better. To date, Turkey has installed 804 MW of wind power and aims for 20 GW of wind capacity by 2023. Last year, the World Bank approved \$300 million in financing to help Turkey upgrade its grid infrastructure to absorb higher sums of renewable power. Mikul Bhatia, the World Bank's Project Leader, told **pv magazine** that the project will help all renewable energies, however the project document does not include a word about solar or other renewable technologies and refers solely to wind.

Market rules

A recent review of Turkey by the EBRD has praised the country for its efforts to liberalize its energy sector and apply market rules. However, the review says, although electricity distribution companies and some power plants were recently privatized, progress towards liberalizing the natural gas market has been slow.

The renewable energy sector adds that the EBRD review has attracted investor interest, but while "financial incentives and price guarantees introduced by recent laws have boosted investments in the sector, some of these incentives, such as bonus payments for locally sourced content, may distort the market."


Expanding on the EBRD critique, the bank's Aranitasi told **pv magazine**, the "feed-in tariff premium to local content is considered an economically distortive measure as it hinders fair competition between equipment providers. In our view, that premium should be progressively eliminated since local manufacturing capacity will develop in any case (as occurred in both solar and wind in Spain) in a non-economically disruptive manner."

Moreover, Aranitasi added, "based on WTO jurisprudence, a local content preference may be considered against the General Agreement on Tariffs and Trade (GATT), as in the case of Japan vs. Canada. This entails a clear regulatory risk for investors and local manufacturers alike."

"Lots of companies are suspicious of the Turkish market because they were very optimistic in the past and proved wrong," Aprium's Beushausen told **pv magazine**. "FITs for example had often been up and down in the past. Despite the very slow start and discouraging red tape, we see all the fundamental factors that will let Turkey's solar PV emerge. I don't believe 2015 will be an astonishing year, but from 2016 onwards we could see the Turkish PV market picking up," Beushausen concluded.

Meanwhile, it would help if Turkey sent a few of its public officials to neighboring countries to learn how to reduce the red tape for solar, instead of sending its students to Russia to learn how to build out nuclear energy. ♦

Ilias Tsagas



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