

Unlocking grid bottleneck key to Greece's blossoming PV potential

Emerging Europe | Tom Kenning on one of the most promising up-and-coming solar power players of Southern Europe, Greece. He asked experts about the challenges and opportunities for PV in the country.



Credit: HELAPCO

With an energy history dominated by lignite power plants, driven by its plentiful lignite reserves, Greece has started to make strong statements regarding the energy transition and it has already started to shut down some of the old power plants. Industry commentators see Greece as one of the most promising of Southern European countries for solar PV at present with a foundation of clean energy auctions that have been taking place since 2018/19.

It now also shows potential for a promising PPA market that is discussed in our cover feature about European markets. Greece is a small market with roughly 10.5 million inhabitants and with tourism as its economic mainstay. It doesn't have much heavy industry meaning there is comparably low electricity demand. Nonetheless, there are huge numbers of PV project applications in progress and Greece has the highest standalone energy storage target in Europe.

"I see Greece both as an opportunity as well as a challenge," says Philipp Kunze, MD BayWa r.e. Projects Greece at Munich-headquartered clean energy company BayWa r.e., which has a pipeline of 1.3GW of solar projects in Greece. "The interesting aspect of the market is Greece really has understood the energy transition, especially on the electrical side, because Greece does have a lot of solar and wind resources."

There are multi-gigawatts of applications pending for PV making Greece "a

very contested market", adds Kunze. Due to the country's relatively limited load, the grid has a limited capacity, which has led to PV grid connections being executed very slowly by the grid operator. Nonetheless, the operator has "ambitious plans" to expand the grid, while the potential to have additional connectors to various directly neighbouring countries is being explored, including a much-debated plan for an interconnection with Germany.

"The government has also taken a very specific stance on providing priorities for grid access," Kunze says. "And that has also made some international companies more concerned about the longer-term viability or the attractiveness of a market like Greece for big companies."

Zooming out from the fundamental grid issue, most signs are highly positive for the Greek solar market going forward. Stelios Psomas, policy advisor at HELAPCO, an association for PV companies in Greece, says that all indicators, whether installed capacity, pending applications, money invested or jobs, are pointing towards a peak period. Despite many complaints by developers disappointed by waiting months for grid connections, for Psomas, right now is the "best time" for the PV industry in Greece to date and "the prospects are even better."

Although statistics are not published yet, HELAPCO believes grid connections may reach 2GW this year, which Psomas says is "huge, huge number" for a relatively small country like Greece.

Solar power plant at Athen-Eleftherios Venizelos airport.

In 2022, the Greek market grew by 62% from the previous year to 1.4 GW, driven mostly by small ground-mounted PV projects up to 500kW, according to Solar Power Europe (SPE) in its 'EU Market Outlook for Solar Power 2022-2026' report. Positive growth trends were seen in both utility-scale and residential segments and PV was expected to win most of the renewables auctions between 2022 and 2025. SPE also expects Greece to add 10.4GW of PV between 2023 and 2026.

'Unambitious' to 'extremely ambitious'

For SPE, the progress has come about due to the simplification of authorisation procedures in the summer of 2022 and supportive messaging from politicians, but again the major bottleneck lies in grid connections.

Looking forward, though only in draft versions to date, Greece is also set to propose "extremely ambitious" new targets in its National Energy and Climate Plan (NECP) with a shift of PV target from 7.7GW in 2030 to 14.1GW.

"This is a huge change and I think everyone actually believes that the previous [target] was rather unambitious," says Panos Kefalas, senior associate at Aurora Energy Research for South Eastern Europe. "Now this is pushing a lot more for things to happen when it comes to grid connection and investments."

The target sends a message that now is the right time to invest in PV in Greece with a clear direction to decarbonise.



Industry commentators see Greece as one of the most promising of Southern European countries for solar PV at present.

Credit: HELAPCO

"It's doable from our part... we can even achieve more than that," adds Psomas. "But obviously, it's a huge increase compared to the old target."

Kunze agrees that the key policy driver is the NECP, which also sets targets for wind and energy storage.

"In the past, the Greek solar market has been predominantly driven by auctions and by fixed tariffs for 20 years – that has changed significantly," he says. "The government has recently announced that there will be more rounds of auctions, which will, however, by far not cover the large capacities particularly of solar projects expected to be built."

This may not necessarily spell trouble for solar since the government has understood that solar power plants can run subsidy free just with PPAs, a market for which it has started to set a framework, and which is discussed in PV Tech Power's cover feature.

With an election looming, one industry commentator claims there is "a lot of uncertainty in the market" because a new energy minister coming in could change the trajectory. However, Psomas says the May 2023 elections are unlikely to affect the prospects for PV in Greece.

Grid congestion and priority list drama

Most medium-voltage grids for small and medium-scale PV plants (8MW or less) are already congested, according to SPE's report, and the same is soon likely

to happen with the high and ultra-high voltage grids for the largest scale solar projects.

New applications are no longer being received for small systems, says Psomas, and while there are still some large capacities available, there are a lot of mature projects that already have grid connection offered and are being constructed.

For high voltage projects there are so many applications pending that a priority list for grid connection was released for such projects in August 2022, which led to numerous complaints from interested parties, especially international investors.

"In these grid permit [approvals], a lot of the grants were given to local Greek companies with a good bunch of the international investors having been left with few grants or no grid access," says Kunze. "That is one of the other concerns that international players do have a little bit about the current Greek market; to which extent is foreign investment really welcome in the market?"

Rome-headquartered renewable energy heavyweight Enel Green Power, for example, is in the final stages of selling all its operating plants in Greece and for projects in development, it has decided to adopt a stewardship model, where it keeps just 50% of the ownership. So, companies are pondering how to approach this market environment.

"It's just a bit of a sign how international players position themselves a little bit more carefully vis-a-vis the market," Kunze

adds, also noting that he believes the issues will be sorted out over the next few months.

"There seems to be the case that this grid connection priority list might need to be prioritised again to allow also for these project to come alive," adds Kefalas – adding that there is some positivity in that the DSO and TSOs in the country have said they believe the highly ambitious NECP targets could be reached.

Extending the grid

To address the priority list complaints, the Greek government has created a roadmap for future grid enforcement and development.

"Of course, this is not a static situation, it's dynamic, and measures are [being] taken to increase the capacity of the grid," adds Psomas. "So, this is not the end, but obviously, the grid connection is nowadays the most important issue for an investment."

Both the grid operator ADMIE and system operators DEDDIE are obliged to present their rolling 10-year plans annually, taking into account the situation and revising their plans, which now includes strategies to extend the grid.

"I believe that they should be more aggressive on that," says Psomas, "The investor appetite is much, much higher than the grid operator's business as usual. Grids will continue to be a major problem for the next three or four years before we really find the balance."

Psomas also asks for TSOs to be more transparent with publishing on activity at each substation and transmission line, which in theory they should release every couple of months.

"They're not doing that and this is really ugly," he says. "There is a lack of transparency, so mostly developers are just waiting without even knowing when their application will be examined."

Psomas says the current plan of the DSO is that the Greek system could accommodate up to 28GW of renewables by 2030, which seems very ambitious considering that at present there are 11GW of installed renewable energy capacity. There are also more than 11GW of projects that have already got connection terms and there are pending applications for connection of 25GW, along with an even higher number of extra applications for newcomers that have not yet reached enough maturity to apply for grid connection.

"We have almost 100GW of renewable energy projects [of which two thirds are PV] that have acquired the first license, the so-called product producers certificate," says Psomas. "Half of them – almost 50GW – have applied for grid connection, so there is a lot of people queuing there."

Curtailment prospects and other challenges

Kunze expects the market to become more complex over time and start to require energy storage and new future market designs. Also if more downregulation of renewables because of overproduction occurs, this could lead to innovations using storage for saving energy during peak periods.

Having come from an off grid / island grid background, Kunze says more downregulation of renewables because of overproduction is something that the whole industry has to eventually come to grips with and he hopes that because Greece is committed to the energy transition, it will adopt new developments faster than other markets.

Konstantinos Zygouras, CEO of Sunel Group, an EPC company based in Greece, also notes that Greece is suffering from many of the same constraints as other markets at present, from COVID-19 and the war in Ukraine.

"We have problems with supply chain, transportation and we see prices fluctuation," he says. "Now things have become a little bit better. Of course, one problem

that remains in most of these [Southern European] countries is the availability of skilled workers and also experienced engineers. A lot of projects have been constructed in these markets and this creates this lack of people related to the industry for the installation and the supervision."

Auctions

Current plans involve almost 4GW of renewable energy auctions, two thirds of which will be for PV. The first is expected around the end of the year, suggests Psomas. However, there is a greater focus at present on auctions for standalone energy storage systems because deadlines are looming for "some easy money" the EU is offering to support such auctions. Psomas believes the renewables auctions will come soon after and with a timeframe up to 2025 there is still plenty of time to hit the 4GW milestone.

An auction in September 2022 was undersubscribed for the first time, as developers saw the prospects of large revenues but low prices, with some focus straying towards merchant opportunities, says Kefalas.

Energy storage charging ahead

A 'European Battery Market Attractiveness Report' from Aurora Energy Research in April this year stated: "The five most attractive markets for battery storage in Europe are (in alphabetical order) Germany, Great Britain, Greece, Ireland and Italy, Aurora assesses, considering factors such as policy support, revenue stacking opportunities and demand for low-carbon flexible energy. Ambitious deployment targets have boosted Greece and Italy's attractiveness – Greece aims to install 6GW of battery storage by 2030, the highest target in Europe."

Psomas says energy storage is "going amazingly well" in Greece. In 2022, the Greek parliament introduced a regulatory framework for storage involving an auction process.

"We have a lot of applications for standalone storage," adds Psomas. "We have over 23GW of projects that have already gotten the first production license and some seven more gigawatts pending. That is a total of 30GW of standalone battery storage."

Following the European coalition acceptance of Greece's storage auction plans, the aim is to have three auctions this year for a total of 1GW of battery

storage capacity, with the first one taking place in June (400MW), followed by September (300MW) and the last for 300MW by year-end. According to the scheme approved by the European Commission, there will be a double support scheme with those winning in the auction receiving a capex support equal to €200,000 per megawatt installed. They will also receive operation support for 10 years. The systems are to be installed by the end of 2025.

"This would be a very serious beginning of the storage market in Greece," adds Psomas – noting that there is no installed capacity in the country yet.

Standalone battery projects outside of the auction will have to survive in the free market, which Psomas believes will only be possible if a capacity remuneration mechanism, which does not yet exist, is put in place. Discussions on this mechanism are taking place as part of discussions between the Greek energy ministry and the European Commission.

Separately, Greece's Ministry of Environment and Energy has introduced a new €200 million subsidy programme for residential solar-plus-battery systems – the first such programme to support self-consumption for PV systems up to 10.8kW coupled with batteries. HELAPCO expects around 30,000 residential systems to be installed from now up to 2024.

Terrain and equipment

Terrain in Greece is typically hilly and mountainous, with the larger plains dedicated to agriculture, says Kunze. Due to the shortage of flat land, most PV plants use fixed-tilt systems. Much solar development has taken place in an area called Kozani in the North where many lignite power plants had been located previously, so this area offers grid connection opportunities to PV newcomers joining the network that traditionally feeds the high loads in Southern Greece. However, solar will still be scattered around the country.

Projects are growing in size with juwi developing a 200MW plant and Baywa r.e. working on a system of up to 433MW. Some of the big Greek utilities and international utilities also have 100-200MW projects in the country. Zygouras also notes that there are plans for 500-600MW projects too.

Overall, it is clear that most prospects for Greek PV are positive, but the really large capacity additions in the pipeline remain reliant on solving the grid bottleneck. ■