

Project briefing



IRAN'S FIRST LARGE-SCALE SOLAR PROJECTS

Project name: Persian Gulf and Amir Kabir

Location: Tehran, Iran

Project capacity: 7MW each

With United Nations sanctions lifted on Iran in spring 2016, the solar industry was just one of many that pondered the risks of entering this previously restricted market. Just a year later and the Middle Eastern giant can already boast its first two large-scale solar plants, with the project rights developed by local firm Aftab Mad Rah Abrisham, but delivered and wholly funded by German PV specialist Athos Solar.

The two plants, located near the capital Tehran, have a combined capacity of 14MW and are named Persian Gulf and Amir Kabir. Both are spread over 10 hectares each in the province of Hamedan and look set to pave the way for Iran to go big on solar. Statistics from Renewable Energy Organization of Iran (SUNA) in March showed that 34 companies had already signed long-term power purchase agreements (PPAs) for nearly 370MW of solar projects.

Many solar firms have described Iran as a tough country to do business in, so putting up the first ever large-scale plants came with some unique challenges.

Regulation

Many of the classifications and regulations in place in Iran are largely the same as in other countries, says Christian Linder,

managing director of Athos Solar.

For example, developers need to use land that has the least ecological value and must remain environmentally sensitive in the construction phase. "They examine the site after you have finished construction [to check] if you have polluted it in some way and it's quite similar to what you see in Europe on regulation," adds Linder.

Nevertheless, regulation is still one of the biggest bottlenecks in Iran since the ministries are not as experienced when it comes to allocating the right customs rates and deciding whether to import equipment or source locally.

"I wouldn't call it problems, it's more like missing experience," says Linder. "Usually the expectations from investors nowadays are that such a site is built within three to four months. This is a very tight timescale if you want to sort out questions with various authorities."

Furthermore, while the Iranian population is well educated and well trained, it also enjoys multiple religious holidays and other breaks during the year, which can disrupt attempts to communicate with authorities and progress with projects. Trying to get confirmations through letters and contracts can also be confusing.

"This is very different culturally," says Linder. "Usually it's a given that agreements are written contracts. Here culturally the gentleman's word or agreement is sometimes more the legal document; even

with authorities."

Linder says it would be an interesting development if larger international investors came to Iran and had to deal with misunderstandings over written emails, contracts, word of mouth and indeed legality. This is not to say that Iran does not also suffer the same troubles of development in other countries such as adapting to alternating conditions in winter and summer.

100% equity

The lack of international investors and a generally cautious approach to the historically troubled country, gave rise to one of the most unique factors of the Athos Solar installations. They required nearly €20 million (US\$22 million) investment, with the full 100% equity coming from Athos Solar. This is the only way that projects can be financed in Iran at present, says Linder, with financing via banks not yet possible, he claims.

The projects' history started with Tehran-based Aftab Mad Rah Abrisham, a wholly owned company initiated by two business partners from Iran and Ireland, both living in London. As an Iranian special purpose vehicle (SPV), it developed the project rights in early 2016. Later in the autumn, 99.9% of the shares of Aftab Mad Rah Abrisham were sold to a German holding company, "DISEG", which is 95% owned by Athos Solar and 5% owned by the two men mentioned above. Athos went on to build the project during winter 2016 using an approved EPC firm also from Germany.

One bottleneck in this case was project rights, says Linder, but the partners who developed the site did an excellent job to get the site ready, he says.

However, Linder adds: "The biggest bottleneck – obviously you need to have trust and equity together so that you can finance the whole project on your own."

This risk-taking approach of offering full equity was ultimately the main reason that Linder gives for Athos being able to get ahead of the pack to deliver the country's first utility-scale PV plants.

The projects receive a feed-in tariff (FIT) during the 20-year PPA of €0.16-0.17/kWh.



By Tom Kenning



Credit: Huawei

The two projects benefit from a higher FIT as the subsidy is split into two categories – above and below 10MW for individual projects. A category for more than 30MW was later added in May last year.

Asked about how Athos sought to bring the overall levelised cost of electricity (LCOE) down as low as possible, Linder says the firm did not prioritise cost reduction, but focused more on meeting its international quality standards to construct a plant that delivers the expected production figures for the next 25-30 years.

The 20-year PPA is with SUNA, but Linder says it's more accurate to call it a 19-year PPA as the contract time starts at signing of PPA and it takes nine to 12 months from PPA signing to complete grid connection.

The site

Ralf Weidenhammer, who is also a managing director at Athos Solar, says site levelling was necessary particularly with the desert ground. In such conditions, if it rains the water stays on the ground, so it becomes essential to have drains or ditches built in to get the water off the site. On the flip side, the desert conditions also bring a lot of dust so Athos is currently evaluating the best possible operations and maintenance (O&M) approach for removing dust off the panels.

"Water consumption is obviously an issue in a desert so therefore we see it as a challenge to have clean panels on one hand and not to waste too much resources in terms of fresh water," adds Weidenhammer. "We currently see it would be most efficient in terms of input and output to use water to clean."

The plants faced restrictions on the size of the plot of land that could be used (10 hectares) as well as a restriction on the maximum export on the AC side. These two factors determined the 7MW size of both plants. Athos had to use low-grade land on which to build the systems. Athos

used a local surveyor for evaluation of the landscape and a yield report produced by a German provider.

"We have taken care to start an early communication with all local stakeholders like the farmers and people living in the village around to keep them informed on the development," says Weidenhammer. "In terms of environmental factors, we used the same standards as we use in Germany or the UK, which covers all local requirements and goes in some points beyond this. Keeping the dialogue with the local stakeholders is of major importance."

The Athos executives say that they also received great support from the local governor's office to realise the project. Meanwhile, the German EPC will be in charge of O&M in connection with local partners and site security was handled by Aftab, the Iranian SPV. Athos also commissioned Iranian companies both for preparatory land works and for electrical works.

Components

The projects include 40,000 modules from China-based manufacturer Canadian Solar, while inverters were supplied by Huawei. Both companies are Athos Solar's long-standing suppliers and business partners. The modules are 72 cells with a frame that makes them capable of handling heavy snow loads as well as desert conditions, says Linder. Robust modules were important as the projects are pitched at 1,800 metres altitude and temperatures can range from -20°C to +40°C.

Athos Solar decided against using trackers as the company wanted to keep the project setup as simple as possible, opting instead for a fixed mounting structure from Germany with three modules in portrait formation.

There were several issues during the construction phase, starting with a time-consuming process to get a German export licence and the Iranian import licence. Other

challenges included organising the logistics, customs and VAT charges and customs clearance process, lead times on local products such as transformers and ensuring that requested quality standards were met. These factors were particularly important given that the majority of the project components had to be imported to Iran.

"Communication with local suppliers is sometimes difficult due to the lack of communication skills in English," says Linder. "But we want to point out that we did receive quite a lot of help from authorities and Iran is really very much interested in getting on track with green energy."

Both plants were connected to an existing 11kV power line – one connection was done via a ground cable and the other line was constructed on poles. Athos was asked to replace existing poles and install a new wire over a distance of 4 kilometres.

In early February 2017 the two plants officially commenced operations, with both German ambassador Michael Klor-Berchtold and Iranian energy minister Hamid Chitchian present at the ceremony and main TV news reporting on the same evening.

Iran's solar future

The plants were completed within nine months of first contact with the Iranian developer and Athos Solar now plans further projects in Iran. The firm is expecting to complete its next project in the region in around August this year and it is looking for equity investors to secure a better return on investment than going through the bank finance route.

"The overall plan, which the [Iran] government has set up, is to achieve 5GW in solar by 2020," says Linder. "We think by the end of the year they might have finished 250MW in total and after that might be able to do 1,000MW [per year]."

The outlook is clearly optimistic for a country whose market was all but impenetrable just a year ago. But the signs are good: in late April power firm Ghadir commissioned a 10MW solar plant in province of Isfahan with trackers. It remains to be seen whether the momentum can be maintained. ■