Project briefing

DEFYING COVID AND PROTESTS IN SOLAR'S LATIN AMERICA HOTSPOT

Project name: Atacama Solar
Location: Pica, Tarapaca, Chile
Capacity: 170MW
Expected generation: 485,000MWh per year
Developer: Mytilineos
Asset owner: Sonnedix

Chile has emerged as one of the brightest hotspots in Latin America's solar sector, helped by generating conditions so ideal one seasoned developer referred to them as "unmatched" when the results of a tender earlier this year were announced. Hundreds of megawatts of solar have been deployed in 2020, with industry stalwarts all vying for their share of the prize. That pace of development only looks set to accelerate after the aforementioned tender awarded 2.6GW of capacity and a follow-up competition, slated for next summer, will hand out gigawatts more.

One party to have witnessed first hand the rise and further rise of Chilean solar is Mytilineos, the Greek engineering, procurement and construction (EPC) company tasked with the development of the 170MW Atacama Solar Farm, belonging to independent power producer Sonnedix. The project is one of a number Sonnedix has in the country, with its total pipeline of projects at various stages of construction in the region topping 1GW.

But, amidst the rush to develop projects in Chile, the development of the Atacama Solar Farm, built near Pica, Tarapaca – with the Atacama Desert towards the north east of the region – has been far from straightforward.

Mytilineos signed the contract with Sonnedix in April 2019, with a notice to proceed issued on 3 September 2019. Construction started shortly after, only for works to be somewhat beset less than a month in. In October 2019, protests erupted in the country sparked primarily by an increase in fares for the subway in the capital of Santiago, but grew throughout the month as citizens rallied against spiralling inequality and increased privatisation. The situation escalated until Chile's President Sebastián Piñera declared a 15-day state of emergency in Santiago before, on 25 October 2019, more than a million people in Santiago and thousands more across the country demonstrated, prompting swathes of the country's cabinet to resign.

The protests triggered significant disruption to Chile's infrastructure and Nikos Papapetrou, general manager of renewables and storage development at Mytilineos, says the protests sparked some concern as a result of constrained logistics in the country. However, any concern sparked by the riots would pale into insignificance just a few months later.

Chile: Solar's LatAm hotspot

While other Latin American markets on solar's radar may have cooled somewhat in 2020, especially Mexico, Chile has emerged as the leading destination, with the Atacama region of particular interest to many developers. Previous editions of *PV Tech Power* (23 and 24) have detailed not only the rise in prominence of Chile's solar market, but how the Atacama region in particular has emerged as one of the most highly sought-after areas for solar development in the world. This summer, a raft of renewables heavyweights including EDF, Engie and Solarcentury were amongst the winners of a 2.6GW solar tender that represented a total investment value in excess of US$2.5 billion. Solarcentury bagged three projects with a total generating capacity of just over 1GW/963MWac and, once complete, those projects are expected to generate as much as 3,000kWh per year for each kWp deployed. This, the developer said, was attributable to Chile being an "unmatched" solar resource due to its location and altitude. "The land we have secured in this auction represents some of the best land in the world to develop solar as it combines great irradiance with cool temperatures," Cristian Fuenzalida, business development senior manager at Solarcentury LatAm, said at the time. Chile is now looking at a repeat process, with authorities in the country confirming in November 2020 plans for a new auction for both solar and storage projects, aimed at procuring 2,310GWh of power. The auction is due to take place in May 2021.

A view of the protests in Chile's capital of Santiago on 25 October 2019

Credit: Hugo Morales

Counter-COVID measures

The onset of the novel coronavirus from the start of 2020 onwards had a drastic impact on the entire solar supply chain, but deployment felt the brunt of this impact from March and April onwards. Entire continents were placed into significant lockdown measures at this time in an attempt to control the virus, affecting logistics and construction altogether.

Papapetrou says the Atacama Solar project was nearly half-way through development at the time of the 'first wave' of COVID-19, and Mytilineos first

suffered delays as a result of restrictions being put in place at ports. These ports, critical to getting components on site from manufacturers, were understaffed and "almost closed" during first lockdown period. There were further issues in the overall supply chain which was suffering at the hand of factories being shutdown or not operating at full capacity, transportation problems and raw material shortages. As a global issue, there was unlikely a facet of construction that was untouched.

Thankfully, mechanical and electrical construction activities were not as significantly impacted as other infrastructure sectors, perhaps most notably building construction. Once sectors have adapted to the confines of operating under the auspices of COVID, it would seem, activities can resume fairly quickly as long as governments allow for it. Papapetrou says that despite concerns of lengthy delays to construction, in total the project was set back around two months in the early stages of COVID-19, time that was managed to be made up during the construction phase.

In order to restart construction, Mytilineos implemented a number of safety measures, consisting of both those imposed by Chile's Ministry of Health and others considered by the company to be essential as well. All construction workers on site were submitted for frequent COVID tests to ensure the site remained virus-free, and personnel were checked daily for any potential symptoms or signs of the virus. Offices were rearranged to ensure social distancing was adhered to, and all on-site activities were conducted in a similar fashion. Enhanced personal protective equipment (PPE), such as face masks, were issued to each worker and regular briefings were held with those present on site in order to ensure that they were understood. The measures went as far as to include travel to and from the site, as well as the accommodation booked. Replaceable plastic covers had to be installed in vehicles used during construction and no more than two people were permitted per trip.

The 170MW Atacama Solar project

Credit: Mytilineos

Likewise, accommodation was limited to just two people per house, and even food deliveries were made differently, limiting the vectors that could possibly transmit the virus.

Despite these measures being implemented solely for the virus, Papapetrou says some have become the standard in all of its project developments moving forward. Right the way from the recruitment phase, construction personnel are inducted and acquainted with all HSE rules and standards to ensure their compliance with the intention that, should the virus or any other pandemic flare up again in the future – with most epidemiologists warning that the coronavirus could be here to stay – any changes to construction practices are minimal.

But as any developer will attest to, there are multiple hurdles to overcome when it comes to connecting a project on time and, COVID aside, the Atacama Solar Project was no different.

Mytilineos' COVID-compliant measures

- Frequent COVID tests
- Daily checking on personnel about potential symptoms
- Distancing with regards to offices and on-site activities
- Enhanced PPE clothing, such as masks
- Regular briefing about the measures
- Plastic replaceable covers in all vehicles
- Vehicles with no more than two persons per trip
- Accommodation with no more than two persons per house
- Food delivered in isolated covers

Navigating the desert at altitude

The Atacama desert is famed for its aridity and altitude, with parts of the Antofagasta region averaging an altitude of around 10,000ft. This, coupled with its irradiation portfolio, make it a near unrivalled placement for solar projects. But this comes with its challenges, both in terms of construction, module selection and even personnel.

Papapetrou explains that logistics were not of a particular concern – aforementioned issues aside – due to the project's location of less than 170km from the nearest port of Iquique, which allowed for freight to be delivered easily. Port closures associated with COVID did create a bottleneck in component imports, but this was cleared shortly after they reopened and approached normal activity.

But issues did arise surrounding factors like site security and telecommunications, with basic internet lacking in an environment that, for all intents and purposes, remains a desert. Security measures were tasked with a reputable provider to limit breaches and also help control the daily in/out activities of personnel and visitors. Internet was sourced using a satellite connection, common in such remote project sites.

Papapetrou says the remote desert environment also contributed to another perhaps overlooked area of project construction in the health and wellbeing of personnel. For workers to relocate

"We tried to keep everyone focused on the work. Team building activities, frequent family visits and similar activities were promoted so as to retain the consistency of the team."

to the desert for a buildout time of 15 months is no short ask – despite this being somewhat common for Chile's workforce, a possible throwback to the country's mining industry – and this did take its toll on personnel.

To overcome these, Mytilineos shifted priority onto the needs of the team, Papapetrou says. "We tried to keep everyone focused on the work. Team building activities, frequent family visits and similar activities were promoted so as to retain the consistency of the team," he says.

The desert also contributed significantly to component selection. At 170MW, the Atacama Solar Farm remains amongst the country's largest and is expected to generate around 485,000MWh each year. For those expectations to be met, the project must maintain as high an operational availability performance as possible in an environment that has been proven to be corrosive to electronics.

Papapetrou says this meant that all components, from the inverters to component boxes, to electrical boards and motors, had to meet at least IP55 standards to protect against any dust ingress. Modules were too selected with this in mind, however bifacial panels were avoided for this particular project. Backsheets were selected in order to specifically preserve the mechanical and electrical characteristics of the module throughout the site's expected lifetime, Papapetrou says, with backsheet-related failures of modules on the rise, a study conducted earlier this year by DuPont found.

Attention has also been granted towards the ongoing operation and maintenance of the site, and more specifically on the kind of module cleaning required in such arid, dust-laden environments. Frequent cleaning is an absolute necessity, however water scarcity is rife in the region. Alternative but equally suitable solutions were required, and a full solution was sourced to allow for water-free cleaning of modules.

Chile looks set to continue its climb up the solar ranks, with gigawatts set to be deployed over the coming years as a result of government solar tenders. But while contracts and the promise of spectacular solar generation conditions may tempt developers, navigating the country's desert environments poses myriad challenges, right the way through from component selection to finer development details, with staff wellbeing also an often overlooked, but critical component.