

# Future-proofing the frozen continent



Hostile but vulnerable, Antarctica's unique ecosystem is a natural laboratory that plays a critical part in environmental research and understanding global climate change.

Uruguay's Base Artigas is at the forefront of this important work. Situated on the inhospitable north-east coast of Antarctica, the base hosts scientists from Instituto Antartico Uruguayo (IAU) as they conduct crucial environmental research. In a place where temperatures can plummet to  $-40^{\circ}\text{C}$  and winds reach  $200\text{km/h}$ , it is a challenging environment for human survival, never mind the installation of a complex solar power plant. But this was precisely IAU's aim.

Traditionally Antarctic bases were powered by diesel generators, a costly option with high environmental impact. Due to the delicate nature of the Antarctic tundra, there's a pressing need to reduce the effect of work carried out in the frozen continent.

In 2018, IAU and the Uruguayan utility company UTE took crucial first steps towards a renewable future, with the first solar installation at Base Artigas. Now they were focused on a second installation.



Image: Leo Scarone Media

ABB was a key partner for the first installation, providing collaborative support to all organizations involved. IAU and UTE were impressed with the reliability and durability of ABB's solar inverters in such harsh conditions. Coupled with ABB's training, testing and support, the installation was delivered successfully. The experience was so positive that IAU, UTE and the Ministry of Industry, Energy and Mining (MIEM) turned to ABB for their second solar installation at Base Artigas.

This time, there were new relationships to cultivate — Smart Green Uruguay (SGU), an installer who had never worked with ABB before, won UTE's tender to deliver the project.

IAU, UTE, MIEM and SGU counted on ABB technology for success, including the tried-and-tested UNO-DM solar inverter as well as plant monitoring and control solutions. Due to the harsh conditions, there was no margin for error and it was important for all teams to work collaboratively.

The challenge was to build on the previous installation's learning. Due to harsh winds, the first solar panels had been mounted on building walls to minimize wind interference. However, the positioning wasn't optimal for best performance. This time, the solar panels had to be mounted to a structure that was bolted to the ground, achieving better positioning to receive sunlight. The solar plant also had to be closer to the biggest electrical loads of the base, better optimizing electrical distribution.

Due to Antarctica's severe winter conditions a summer installation was planned, giving the installers the benefit of longer sunlight hours.



Image: Leo Scarone Media

However, delays meant that the installation proceeded close to the start of Antarctica's winter season, with as little as three sunlight hours a day. To add to this, the installation had to be completed within three days.

**The installation used:**

- 1x solar inverter UNO-DM-6.0-TL (6kW at 230VAC 1ph)
- 1x MCB 40A 2-pole + 1x RCD 40A 300mA 2-pole
- 24x ground-mounted solar panels JINKO 270W (12 modules per string)
- Connection to ABB's Aurora Vision Plant Management portal via the inverter's embedded Wi-Fi interface

ABB's plug and play solar inverter meant that installation was massively simplified. It was important for everyone to be well-prepared, so ABB pre-configured the equipment by testing it in a laboratory, recreating the adverse Antarctic conditions. And if anything didn't go to plan, ABB Uruguay's local expertise provided peace of mind that new equipment could be quickly sourced and shipped to Antarctica.



Besides testing, ABB provided extensive, high quality training, enabling the installers, who hadn't previously worked with ABB equipment, to face the complex challenges ahead. ABB provided invaluable real-time support to SGU throughout the installation, even calling them in Antarctica to provide advice.

The Aurora Vision portal\* provided huge benefit to the project as well as the ability to remotely monitor the performance of the installation. The teams involved could compare the new solar plant's performance to the existing panels and gather invaluable insight and data to inform future expansions. IAU also made the portal available to view real-time online, encouraging public engagement with the base's sustainability efforts.

“This was a very challenging project, which was only possible to deliver if everybody worked as a team”

- Diego Giacosa, Engineer, UTE.

The work was successfully completed, bringing IAU one step closer to its ambitious eco-friendly targets. As a result, during sunlight hours in summertime, up to 10 percent of the instant power demanded by Artigas Base can be provided by the optimized solar plant. It has already offset 0.8 metric tons of carbon emissions in the first two months since its installation – reducing Artigas' impact on the delicate Antarctic ecosystem, and creating operational (OPEX) savings that will be put back into critical scientific research.

Smart Green Uruguay received great exposure from the project. And, their experience with ABB was so positive that they have chosen ABB as partners on numerous new projects.

**Thinking about your next installation project?**

With our huge portfolio of solar solutions, integrated digital services and reliable support network, you can count on us. To find out how ABB can help you achieve even more with your installations, visit [www.abb.com/solarinverters](http://www.abb.com/solarinverters) to find your local sales rep.

\*View this installation's energy savings in real time on the [Aurora Vision portal](#)  
You can also view the first installation portal [here](#)