Calama Radar Station

An entirely solar-powered Air Traffic Control Radar Station

Thales is to deploy the world's first entirely solar-powered Air Traffic Control radar station in Calama, Chile. This system leverages 330 solar panels to take full advantage of the high levels of sunshine in the region. This solar radar station comprises an advanced primary radar and a secondary radar.

Starting date of the project	January 2022
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable	Calama in Chile This solution can be adopted for air traffic control radar stations situated in regions with high levels of sunshine.
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	The objective is to operate a radar station that satisfies all the operational surveillance requirements of air traffic control, using only sustainable, alternative energy provided by solar panels. The innovation is not only in the solar panels, but also in the power management system and the advanced battery technology, as well as the back-up generators that are deployed to secure the radar station operations and to safeguard it against power cuts or limited availability of regular sources.
Detailed project description	Thales provides an air traffic control radar solution that allows its Chilean customer to significantly reduce its own operational emissions. This project includes the installation of a surveillance system composed of a primary STAR NG radar, combined with a secondary Mode S radar, the RSM 970S, as well as an ADS-B ground station enabling the surveillance of the air traffic in the Calama region. The radar station is installed on a site that had neither existing infrastructure, nor nearby commercial electrical power. The station will satisfy the operational surveillance requirements of both civil and military air traffic control and can detect both slow and fast-moving targets such as helicopters, commercial planes, and jets. The system also delivers windfarm mitigation filters. The proposed system is therefore a complete, turnkey solution based on a power system using photovoltaic panels and back-up generators. In the proposed design, this system, made up of 330 photovoltaic panels installed on a surface measuring over 6330m² and delivering 191.5 kWc, will be the main power source of the surveillance system. Associated with advanced battery technology, it will allow the Chilean DGAC (*Dirección General de Aeronáutica Civil*) to have a certain level of autonomy, thus largely reducing the use of power generators compared to standard use on this type of installation, whilst securing the running of the radar station against power cuts or limited availability of regular sources.

Main project's drivers for reducing the greenhouse gas emissions

Enter the information in the appropriate boxes

Drivers for reduction	Details of aspects of the project
☐ Energy and resource efficiency (including behaviour)	
☒ Energy Decarbonisation	Generating and using only solar power
☐ Energy efficiency improvements	
☐ Improving efficiency in non-energy resources	
☐ Emissions absorption: creation of carbon sinks, negative emissions (BECCS, CCU/S, ...)	
☐ Financing low-carbon producers or disinvestment from carbon assets	
☐ Reduction of other greenhouse gases emission	

Emission scope(s) on which the project has a significant impact and quantification of GHG emission reductions per emission scope

	Aspects of the project contributing to the reduction of emissions by emission category	Quantification of associated GHG emissions by emission category

Indicate the aspects of the project that contribute to the reduction of emissions per category of emissions considered (left-hand column) and the quantification of associated emissions.

Indicate the main hypotheses and calculation steps in the intended section (below the table)

For further details, please refer to the methodology guidelines.

		Please follow the quantification methodology used in the Afep guidelines.
Reduction of the company's carbon dependency		
Scope 1 *Direct emissions generated by the company's activity.*		
Scope 2 *Indirect emissions associated with the company's electricity and heat consumption.*		
Scope 3 *Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.*		
Increase of carbon sinks		
Emissions Absorption *Carbon sinks creation, (BECCS, CCU/S, …)*		
GHG emissions avoided by the company at third parties		
Avoided Emissions *Emissions avoided by the activities, products and/or services in charge of the project, or by the financing of emission reduction projects.*	Cease to use energy from the main network, replace it by solar power produced on site	146 tCO_2e/an

Clarification on the calculation or other remarks:
The station consumes 415 MWh/year. The emission factor of the life cycle analysis of solar panels is considered to be around 48 $kgCO_2e$/MWh. The average yearly emission factor of the Chilean network is around 400 $kgCO_2e$/MWh. The solar energy power supply therefore creates a saving of around 146 tCO2e/year.

Modality of verification of the quantification

Calculation standard used (ADEME base, GHG protocol, etc.): GHG Protocol – IEA (International Energy Agency) emission factors

Verification of the calculation (internal or external):

Other environmental and social benefits of the project

If possible, list the impacts and Sustainable Development Objectives concerned

By producing green energy that is directly used by the radar station, the project contributes to the following United Nations sustainable development goals (SDG):
- SDG 7 Affordable and clean energy
- SDG 13 Climate action

Project maturity level

Tick the corresponding current maturity level

☐ Prototype laboratory test (TRL 7)
☐ Real life testing (TRL 7-8)
☐ Pre-commercial prototype (TRL 9)
☒ Small-scale implementation
☐ Medium to large scale implementation

Remarks:

Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential

This type of structure can be installed on isolated sites that have a high levels of sunshine all year round

Amount of investment made (in €)

Confidential data

Economic profitability of the project (ROI)

☒ ST (0-3 years)
☐ MT (4-10 years)
☐ LT (> 10 years)

Remarks: According to a study carried out by COMWAT (January 2021) based on data provided by Bloomberg, given the high level of sunlight in Chile, it is the country with the lowest costs for producing solar power. A fast ROI can probably be expected.

Committed partnerships

Project carried out in collaboration with CLEMAR Engenharia, in charge of installing civil and electrical infrastructures.

Open comments from the project owner	N/A
More about the project	
Contact the company carrying the project Please specify an ad hoc e-mail address that will allow the reader to contact the project company directly	Alice Pruvot, Group and Innovation alice.pruvot@thalesgroup.com
Project URL links	https://www.thalesgroup.com/en/worldwide/aerospace/press_release/thales-deploy-worlds-first-fully-sustainable-solar-powered-air
Titre SEO	Air traffic control radar station entirely powered by solar energy.
Méta Description	Thales to deploy the world's first fully solar-powered air traffic control radar station in Calama, Chile
Illustrations of the project 3 photos/videos minimum (in HD format to be attached)