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CHALLENGE TITLE
E2: Sustainable and Resilient Energy Supply for Isolated Industries in Chile
MACRO-AREA
Renewable Energy
PROBLEM/GAP
Industries located in isolated areas or with weak electrical grids in Chile lack access to a stable, affordable, and sustainable energy supply. The main gap is technological and operational: there are no decentralized renewable energy solutions, adapted to the scale, geography, and operating conditions of these sectors, capable of fully or partially replacing dependence on diesel and other imported fossil fuels.
CHALLENGE DESCRIPTION
Isolated industries in Chile, such as small-scale mining, agro-industry, industrial fishing, astronomy, logistics operations, or tourism, mostly operate outside the limits of the National Electric System (SEN) or in weak grid "border" zones. This condition generates critical barriers such as: 1) Extreme dependence on imported fossil fuels, with costs higher than the electric grid and greater volatility due to international prices. 2) Insufficient or non-existent electrical infrastructure. 3) Lack of access to stable and affordable supply, resulting in frequent outages, voltage sags, restricted operating hours, and cost overruns due to inefficient backup systems. Consequently, productive capacity is limited, local CO_2 and NOx emissions increase, industrial investment in extreme regions of the country is stalled, and the territorial development gap widens.
GENERAL OBJECTIVE
To design and implement decentralized energy solutions, based on renewable sources (solar, wind, storage) and intelligent hybrid systems, to guarantee a stable, affordable, and low-carbon electricity supply for isolated industries in remote areas of Chile, reducing their dependence on fossil fuels.

SPECIFIC OBJECTIVES	
1.	Design, adapt, integrate, and/or implement energy solutions that provide a stable energy supply through renewable energy sources for the decarbonization of isolated industries in the country.
2.	Reduce energy supply costs and increase industrial competitiveness.
3.	Develop management and operation models, using algorithms and intelligent systems, to optimize and stabilize energy supply.
4.	Implement pilot projects to validate technologies in a real environment.
5.	Train technical and operational personnel in the operation, maintenance, and safety of hybrid renewable systems.

EXPECTED RESULTS
1. Creation of industrial pilots in relevant environments. 2. Design, development, and field validation of technologies. 3. Proven reduction in fossil fuel consumption in pilot industries and increase in industrial competitiveness. 4. Increase in energy availability. 5. Reduction in operational costs. 6. Development and optimization of energy management systems.

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SCOPE	
Includes: • Demonstrations in controlled relevant environments, piloting, and semi-industrial and operational validation. • Prototypes expected to work in relevant isolated industries in the country. **Excludes:** • Proofs of concept and/or laboratory-scale tests (TRL ≤ 4). • Solutions that pose risks to worker safety, equipment, or the environment. • Technologies that increase the consumption of energy resources. • Interventions that alter or interfere with the continuity of production processes.	
KEY PERFORMANCE INDICATORS (KPIs)	
1.	Levelized cost of energy and operational costs of the productive sector.
2.	Reliability and autonomy of the energy supply.
3.	Reduction of the industry's carbon emissions.
4.	Productivity of the involved industry.
DESIRABLE CONTRIBUTION TO ITL CAPACITY BUILDING	
• Pilot infrastructure for the generated technology. • Creation of algorithms and intelligent systems for energy management. • Human capital development in the area of energy design, operation, maintenance, and management.	
INDUSTRY AFFECTED BY THE CHALLENGE	
Small-scale mining, agro-industry, fishing, tourism, astronomy, logistics, among others.	