Advantages

SHR-STIRLING vs Photovoltaic PV

GENERATION OF ENERGY AND HYDROGEN FROM INDUSTRIAL PROCESSES

The search for new processes to produce energy is a challenge we must address in the face of the increasing global energy demand. From existing industrial processes, sources of residual energy have been identified that can be harnessed for low-cost electrical energy generation.

The **SHR-STIRLING** solution, designed by Ambar S.A., generates electrical energy by recovering residual heat from industrial processes, primarily foundries. This energy can be incorporated into the industrial process or, alternatively, reused within the Ambar SHR-STIRLING-H2 system for hydrogen generation.

The generation of hydrogen from recyclable and/or renewable processes is becoming a necessity to reduce costs. Producing hydrogen from photovoltaic energy is an alternative to consider; however, our system offers better efficiency and performance at a lower cost.

The Ambar **SHR-STIRLING-H2** system features:

- A patent granted in the USA in 2020 (US 10,539,045 B2).
- PCT with a positive report (May 2022, PCT/CL2021/050084). Patents in progress.

Comparative	Stirling-H2 Solution	PV-H2 Solution
Energy Source	**Available 24/7**	Heat Sun (intermittent)
Capacity Factor	**100% (24/7 Generation)**	25-32%
Hydrogen Transportation Cost to Mining Operations	**Lower: On-site generation**	Higher
Lifespan	**Stirling Engine Lifespan > 30 years**	Module Lifespan in Atacama Desert < 10 years
Carbon Footprint	**~ 50 kgCO2eq/kWp**	~ 670 kgCO2éq/kWp
Levelized cost of hydrogen (LCOH)	**20% lower than PV-H2**	

AMBAR S.A.
INVESTIGACION Y DESARROLLO

Av. Paraguay 8935, La Florida, Santiago, Chile Phone +562 2428 9300 Mail: ambar@ambarchile.cl

Advantages

CES-STIRLING

LOW-COST ENERGY

	CES-STIRLING	Photovoltaic panels (PV)	Unit
Levelized cost of electricity (LCOE)	60 - 80	32,76 – 115,61	USD/MWh

Advantages:

1. **Efficiency:** The system has a high energy conversion efficiency, delivering AC power with a 25% conversion efficiency.
2. **Versatility:** It can be installed easily on various types of surfaces, adapting to different situations and environments.
3. **Scalable:** The energy production is scalable, making it suitable for a wide range of applications and power needs.
4. **Low Carbon Footprint:** The technology has a significantly lower carbon footprint compared to traditional photovoltaic panels, contributing to environmental sustainability (13 times lower)
5. **Reliability:** The Stirling engine, a key component, requires minimal maintenance, ensuring a longer lifespan and higher reliability.
6. **Extreme Conditions:** Designed to operate in extreme conditions, making it suitable for challenging environments.
7. **Proven Technology:** The system is built on proven high-performance technology, ensuring its effectiveness.
8. Proposed solution improves system performance, lowers LCOE, and reduces system cost through more efficient structural design

Features:

1. **PCT with Positive Report:** The technology is backed by a positive report from the PCT (Patent Cooperation Treaty) in May 2022, indicating its innovation and viability (PCT/CL2021/050084).
2. **Dual-Axis Solar Concentrator:** It incorporates a dual-axis solar concentrator for sun tracking, enhancing energy capture and efficiency.
3. **No Transmission Lines:** It doesn't require additional transmission lines, simplifying installation and reducing infrastructure costs.
4. **Low-Cost Scalable Production:** The system allows for cost-effective scalable energy production, making it economically attractive.
5. **Longevity:** It offers a longer operational lifespan compared to some traditional energy systems.

In summary, this technology offers a range of advantages, including efficiency, scalability, low environmental impact, and reliability, while its features highlight its innovative and practical aspects, such as the dual-axis solar concentrator and the PCT support.

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