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Press release

Turning hybrid solar concepts into industrial reality: INDHEAP reaches key mid-term milestone



As industries across Europe face increasing pressure to decarbonise, the INDHEAP project is advancing solutions that combine **innovation with real-world applications**. At month 24, the project showcases progress in integrating solar thermal and photovoltaic technologies into industrial processes, supported by energy efficiency, storage, and optimisation strategies. These developments provide **insights into how hybrid renewable systems can be designed and implemented in practice**, helping to address one of the most challenging areas of the energy transition: industrial heat.



INDHEAP partners at the month 24 progress meeting in Graz, Austria, April 2026

Project milestones and research highlights

WP1 – Understanding impact and decarbonisation potential

WP1 has delivered a comprehensive analysis of energy use across the demonstration and replication sites, establishing **validated thermal load profiles** based on measurements and historical data. Building on this, modelling and techno-economic assessments show that targeted energy efficiency measures, particularly **waste heat recovery**, can reduce heat demand by up to **20%**, while integrating solar technologies and electric heating can lower energy costs by up to **40%**. In addition, the project demonstrates that **demand-side flexibility** can increase renewable energy use and enable cost-effective pathways to full industrial decarbonisation towards 2050.

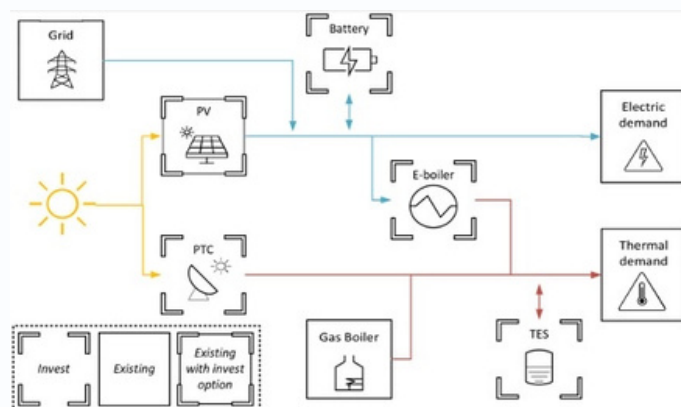
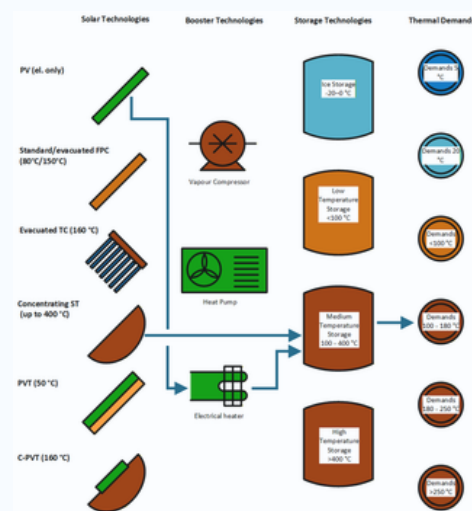


Illustration of a representative energy system for the industrial cases considered in the INDHEAP project

WP2 – Integrating renewable energy into industrial systems

WP2 has made significant progress in developing **integration concepts for hybrid renewable energy systems** in the industry. A strong methodological foundation has been established, enabling the effective combination of solar thermal, photovoltaics, and other technologies with industrial heat and power demand. Building on this, a **comprehensive integration concept for the Valdemoro demonstration site** has been developed, combining solar thermal, PV, a novel e-heating storage, and existing infrastructure into a flexible system. In parallel, integration concepts are being developed for **replication sites in Portugal and Cyprus**, confirming the need for site-specific adaptation. The project is also preparing **guidelines** to support the wider adoption of hybrid renewable solutions across industrial sectors.



Hybrid concept of INDHEAP demonstrator in Valdemoro, Spain [Copyright: AEE INTEC/INDHEAP]

“Following the energy audits carried out as part of the project, measures aimed at improving resource efficiency and energy adaptation were proposed for the demonstration and replication sites. A hybrid ST+PV system has been designed for the demonstration site using the methodology developed by the project and following its integration guidance. The project is now entering its most critical phase, with the implementation of the demonstrator in a restricted industrial environment, with the aim of starting testing in early 2027.” Valéry Vuillerme, Project Coordinator, CEA

WP3 – Optimising performance, costs, and emissions

WP3 focuses on the **optimal design and sizing of hybrid renewable energy systems** for industrial applications. Using the open-source CAIRN software developed by CEA, the project identifies the most effective combination of components, including solar thermal and photovoltaic systems, energy storage, and electric heating, across the demonstration and replication sites. By considering **investment and operational costs alongside CO₂ emissions**, this work determines system configurations that maximise economic performance while delivering environmental benefits, supporting informed decision-making and the scalable deployment of low-carbon solutions in industry.

WP4 – Advancing key technologies for industrial applications

WP4 has achieved key technological milestones supporting the INDHEAP system. The **design of the thermal energy storage (e-TES)** has been finalised, including a thermocline tank for the demonstration site, while new studies identified **refined rapeseed oil as a promising heat transfer fluid and thermal storage medium**. A methodology for **optimising PV integration** has been developed and applied to the demo site, enabling systematic site selection. In parallel, improved **solar thermal collectors** are being tested to operate at higher temperatures, and advanced **control strategies** are being validated to ensure safe, efficient, and cost-effective system operation.

WP5 – Preparing and implementing the demonstration site

WP5 is making steady progress toward the **deployment of the INDHEAP demonstration system** at the TotalEnergies industrial site. Initial work focused on design studies, system integration, and addressing regulatory, environmental, and technical constraints. Key milestones have already been reached, including site preparation activities and the start of construction works. The project is now advancing detailed engineering, covering all major components, from solar systems and storage to control and monitoring infrastructure.

Upcoming steps include finalising agreements between partners and launching procurement for key equipment, bringing the project closer to the **demonstration and validation in real industrial conditions**.



Progress of construction work and site preparation activities at the INDHEAP demonstration site

WP6 – Market replicability and exploitation

WP6 has successfully advanced the **market uptake strategy of INDHEAP solutions**, through the identification and validation of key exploitable results (KERs). An initial set of Characterization Tables was delivered in D6.1, based on the contributions and data provided by all responsible KER partners. Building on this foundation, the project is defining the pathway to deployment, including the development of **TRL-9 roadmaps**, business models, and a replication strategy. These activities will support the **commercialisation and adoption** of INDHEAP solutions across industrial sectors.

Dissemination and outreach

Strengthening collaboration beyond the consortium, INDHEAP joined forces with the **SOLINDARITY project** to organise the **workshop** “Hybrid Solar Systems for Industrial Process Heat & Power: From Concepts to Implementation” in April 2026 in Graz. Bringing together participants from industry, research, and policy, the event created a platform to exchange on hybrid solar concepts, thermal storage, and the transition from pilot projects to large-scale deployment. The discussions highlighted both the potential of integrated solar solutions and the need for **practical approaches, real-world experience, and continued collaboration** to support their uptake in industrial settings.

INDHEAP continues its outreach through participation in key international events, including ESCAPE36, Smart Energy Systems, and EuroSun conferences, where project results and insights will be further shared with the wider community.

Why this progress matters

Decarbonising industrial heat remains a complex challenge, particularly for low- and medium-temperature processes that still depend heavily on fossil fuels. The progress achieved in INDHEAP shows that combining **energy efficiency, waste heat recovery, and hybrid solar technologies** can provide **tangible improvements in both energy use and emissions** under realistic industrial conditions.

By focusing on **integrated and flexible system approaches**, the project contributes to addressing practical challenges such as system design, operational constraints, and investment considerations. The results generated so far offer useful insights and tested approaches that can inform future projects and decision-making.

As INDHEAP moves forward with demonstration and further development, these outcomes will help better understand how such solutions can be implemented and potentially **replicated**, supporting ongoing efforts toward industrial decarbonisation.



About INDHEAP

INDHEAP (Optimal Solar Systems for Industrial Heat and Power) is a Horizon Europe Innovation Action project running from 2024 to 2027, with an EU contribution of around €7 million. The project aims to develop and demonstrate integrated solar thermal and photovoltaic solutions for industrial heat and power, helping industries reduce energy use, costs, and emissions.

Consortium partners: Commissariat à l'énergie atomique et aux énergies alternatives (CEA) – Coordinator, Newheat, SINTEF Energy Research, Absolicon Solar Collector AB, RINA Consulting SPA, AEE – Institut für Nachhaltige Technologien (AEE INTEC), HeliosLite SAS, The Cyprus Institute, TotalEnergies Marketing España SA, HEADGY HELMETS S.A., Adelfoi Petrou Limited, Pirobloc S.A., AMIRES (The Business Innovation Management Institute).

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Project Information and Media Channels
More information and regular updates are available at: <https://indheap.eu/>



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