

IN-SET

BOLETÍN DE VIGILANCIA TECNOLÓGICA

RENEWABLE ENERGY

Resumen de la actualidad tecnológica en transición energética, que recoge tendencias en energías renovables, almacenamiento y materiales, combustibles sostenibles, procesos térmicos y de combustión, infraestructura eléctrica e inteligencia artificial, así como su aplicación en los distintos sectores de consumo.

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PREFACIO



Marco Mancilla
Director ejecutivo
Centro SET Chile

Instalar generación renovable requiere superficie, un recurso que la agricultura y la conservación también necesitan, mientras una parte sustantiva de la demanda energética no es eléctrica sino térmica. Esta edición de In-SET aborda los dos ámbitos del eje de energías renovables que responden a esas restricciones: la agrivoltaica, que busca compartir el suelo entre cultivo y generación, y la energía térmica, que apunta al calor que la electrificación directa no cubre.

Los mercados avanzan a ritmos distintos, y la consultora Mordor Intelligence proyecta que la agrivoltaica crecerá de 14.050 millones de dólares en 2026 a 49.440 millones en 2031, con una tasa anual compuesta de 28,6%, impulsada por primas a la inyección en Europa, programas de subsidio en Asia-Pacífico y una caída de 15% en el precio de los módulos bifaciales entre 2024 y 2026. La calefacción distrital solar, más madura y de menor escala, apenas crece de 4.150 millones en 2025 a 4.630 millones en 2026 según Research and Markets, a una tasa de 11,6%.

La investigación trabaja sobre la hibridación, por ejemplo en la optimización que la Universidad de Nueva Gales del Sur, en Australia, publicó en Energy Conversion and Management sobre un sistema que acopla un ciclo Brayton de CO₂ supercrítico, con 900 °C a la entrada de turbina y 25,5 MPa de presión, a un ciclo geotérmico de doble flash, usando el reservorio como batería térmica subterránea que el calor residual del ciclo solar va elevando de temperatura. La propiedad industrial de esta edición sigue la misma lógica de aprovechar dos veces el mismo recurso, con un colector agrivoltaico que divide espectralmente la luz para iluminar plantas y celdas a la vez y un mezclador estático que mejora el intercambio de calor en pozos geotérmicos.

Dos hitos de esta edición abren información y decisiones que antes quedaban en manos de pocos. El primero es la liberación de los datos operacionales de la torre solar experimental de Jülich, por parte del Instituto Tecnológico de Karlsruhe y del Centro Aeroespacial Alemán, ambos centros de investigación. El resultado, publicado en Nature Energy, habilita el desarrollo de gemelos digitales sobre datos reales. El segundo es la apertura, por la Oficina de Geotermia del Departamento de Energía de Estados Unidos, de los District-Scale Geothermal Energy Pilots, instrumento de financiamiento que incorpora a las comunidades en la decisión sobre sus propios sistemas térmicos.

La regulación se mueve en ambos frentes y, en esta edición, en los dos casos desde Estados Unidos, donde la Junta de Servicios Públicos de Nueva Jersey adjudicó 16 proyectos por 52,06 MW en la primera licitación de su programa piloto agrivoltaico de doble uso, creado por la Ley de Energía Solar de Doble Uso de 2021, mientras el proyecto de ley HEATS eximiría del permiso federal de perforación a la exploración geotérmica donde el Estado posee menos de la mitad del recurso del subsuelo. Ambas discusiones son pertinentes para Chile, donde la generación solar y la agricultura compiten por el mismo suelo y el recurso geotérmico sigue siendo abundante y poco explotado.



Mario Toledo
Director científico-
tecnológico
Centro SET Chile

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Global Solar Council Launches AgriPV Taskforce to Unlock the Next Frontier of Solar Growth

Etiqueta: AgriPV | Publicada el 23/06/2026

Global Solar Council Launches AgriPV Taskforce to Unlock the Next Frontier of Solar Growth New initiative, chaired by NextPower, will bring together industry leaders from both the solar and agriculture industry along with policymakers, researchers, developers, and farmers, to advance policies, share best practices, and build the foundations for a scalable global AgriPV market.

[ver más...](#)



Agrivoltaics can both power AI data centers and increase food production

Etiqueta: AgriPV | Publicada el 17/06/2026

Artificial intelligence (AI) use is exploding. More than 50 percent of new internet content was generated by AI in 2025, according to an industry report. We even train AI on AI-generated content now, and although this can degrade performance, it continues at breakneck pace. All this AI is consuming a lot of energy. It's straining the electrical system, raising consumer electricity costs and disrupting large-scale electrical grid planning.

[ver más...](#)



Solar tower plants gain open operational database, aiming to boost storage-friendly renewable power

Etiqueta: Solar | Publicada el 16/06/2026

Solar power towers can play an important role in the energy transition. They convert sunlight into heat that can be stored or used to generate electricity. Until now, however, data to test new methods for more efficient and reliable systems have been lacking. In a world first, researchers from the Karlsruhe Institute of Technology (KIT) and the German Aerospace Center (DLR) are now publishing freely accessible operational data from the Jülich Solar Tower test power plant. This provides a foundation for developing new AI methods and digital twins. The results are published in Nature Energy.

[ver más...](#)

Vertical farming emissions could be offset if spared farmland is used for solar power

Etiqueta: Solar-agriculture co-location | Publicada el 10/06/2026

Vertical farming could free up thousands of hectares of UK farmland, but the environmental benefits depend on how that land is reused, according to new research led by the University of Surrey. The study, published in Cleaner Food Systems, is the first UK-wide study to look at not only the environmental impact of vertical farming itself but also what happens if the land no longer needed for conventional farming is repurposed for climate and environmental goals, such as renewable energy generation, woodland creation and ecosystem restoration.

[ver más...](#)

Building more renewable energy sources means rethinking land use for agriculture and conservation

Etiqueta: Socio-technical integration | Publicada el 08/06/2026

The state of New York could meet its goal of building 46 gigawatts of large-scale solar by midcentury, but not without making difficult choices in how land is used across the state. That's the overall finding of an analysis several colleagues and I have made in that state. It's an issue that other states, and the U.S. as a whole, are facing as they seek to shift electricity generation from fossil fuels to renewable sources, such as wind and solar.

[ver más...](#)

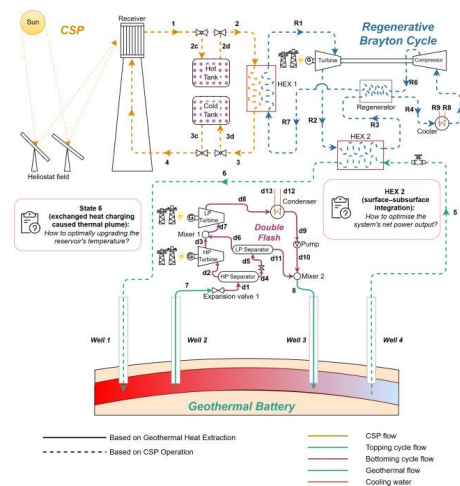
PUBLICACIONES CIENTÍFICAS

Edición n°3 | septiembre de 2026 | set.usm.cl

Dynamic optimisation of a novel integrated CSP-brayton and geothermal battery system

Etiqueta: Solar | Publicada el 18/08/2026

Existing CSP-geothermal hybrid systems treat the subsurface reservoir as a fixed-temperature heat source. How waste heat from a solar-driven power cycle can progressively upgrade reservoir temperature, and how such a system should be operated transiently under realistic solar forcing, has not been examined. A supercritical CO₂ regenerative Brayton topping cycle (turbine inlet 900 °C, high-side pressure 25.5 MPa) is coupled with a double-flash geothermal bottoming cycle through a novel underground thermal energy storage mechanism, termed the geothermal battery.

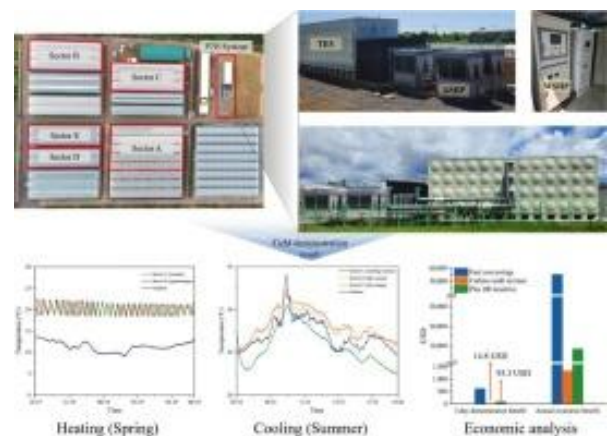


[ver más...](#)

Sustainable heating and cooling for agriculture using power-to-heat (P2H) system

Etiqueta: Agro-energy optimization | Publicada el 03/08/2026

This study assesses the applicability of a full-scale P2H system to greenhouse heating and cooling under actual agricultural operating conditions on Jeju Island, South Korea, where renewable energy curtailment and fossil-fueled heating coexist. The system integrates air-source and water-source heat pumps with a 200-ton stratified thermal energy storage (TES) tank and was operated under two seasonal strategies: spring heating using surplus electricity and summer cooling using off-peak nighttime power.



[ver más...](#)

Drivers of renewable energy adoption and agricultural sustainability

Etiqueta: Energy access for rural productivity | Publicada el 29/07/2026

This study examines the key drivers shaping the willingness of rural farmers to use renewable energy technologies in their farming operations and assesses the impact on productivity and the financial health of rural farmers. Main focus of the research is the renewable energy use such as a solar-powered irrigation system for agricultural use. The study, rooted in the concepts of sustainable development and rural energy transition, looks at government support, barriers to adoption and social engagement in driving up adoption of renewable energy by farmers.

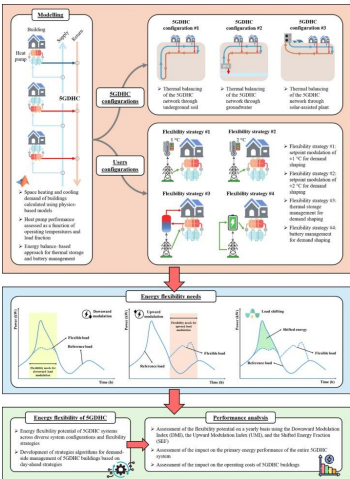


[ver más...](#)

Unlocking the grid flexibility potential of fifth-generation district heating and cooling systems through user-level demand-side strategies

Etiqueta: District Heating | Publicada el 21/07/2026

This work investigates the potential of 5GDHC systems to provide energy flexibility services through demand-side management strategies implemented at building-user level. A physics-based dynamic modelling framework is developed, integrating building thermal demand calculation, heat pump performance modelling, and the representation of thermal energy storage and electrical batteries.



[ver más...](#)

Phase change material-integrated solar heliostat field-driven methane and power cogeneration

Etiqueta: Solar | Publicada el 08/07/2026

This study proposes an integrated solar-thermal hybrid plant combining a Brayton cycle, Organic Rankine cycle-Thermoelectric generator unit, vanadium-chloride thermochemical hydrogen production loop, three-stage methanation process, and a dual thermal-energy storage system (molten salt/phase change material). This setup enables high-temperature power generation, renewable hydrogen production, and continuous synthetic-methane synthesis under varying solar conditions.

[ver más...](#)

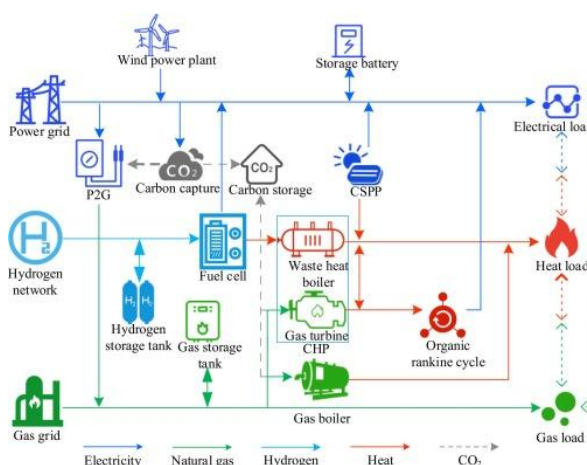


Optimal operation of integrated energy systems with concentrating solar power plants

Etiqueta: Solar | Publicada el 01/07/2026

This study introduces an optimization model for such systems. The model incorporates a green-carbon interaction mechanism and integrates a Concentrating Solar Power Plant (CSPP) as a core component. Firstly, for the same emission reduction value inherent in green certificate-carbon trading, a green certificate-ladder carbon trading interaction mechanism is proposed, under which green certificates not covered by system's quotas can be converted into free carbon quotas.

[ver más...](#)



PATENTES

Edición n°3 | septiembre de 2026 | set.usm.cl

Hybrid solar energy plant with heat-powered cooling

Etiqueta: Solar | Publicada el 27/08/2026

A system may include a solar collector including a photovoltaic (PV) module, wherein the solar collector is configured to convert a first portion of sunlight to solar thermal energy and a second portion of the sunlight to solar electrical energy. A system may include a thermal cycle generator configured to generate electrical energy from a temperature difference between a hot working fluid and a cold working fluid, wherein the hot working fluid receives solar thermal energy from the solar collector.

[ver más...](#)

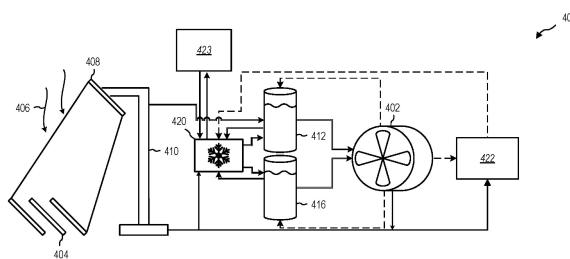


FIG. 4-2

Solar farm supporting wide swath farming

Etiqueta: Solar-agriculture co-location | Publicada el 27/08/2026

A solar farm includes a field suitable for growing crops and a plurality of rows of aligned racking support structures with farmable swaths extending between adjacent rows. Each row of racking support structures has a plurality of swing arm racks with solar panels thereon. The swing arm racks are movable from a solar collection position where they extend over the farmable swath, and a retracted or folded-in position where they are out of the farmable swath and retracted to or folded along the row of racking support structures.

[ver más...](#)

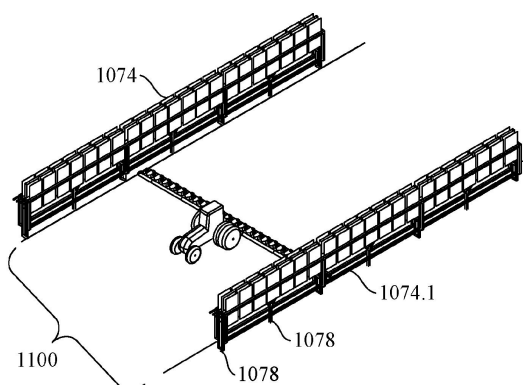


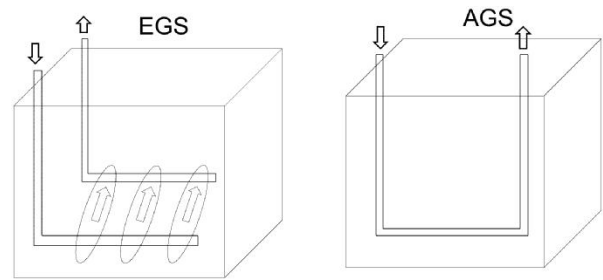
FIG. 65

Static mixer as heat exchange enhancer for enhanced and advanced geothermal application

Etiqueta: District Heating | Publicada el 23/07/2026

Embodiments presented provide for an arrangement and method of using a static mixer in heat exchanging wellbores. In embodiments, a high-efficiency geothermal system is created that allows a static mixer to be used in conjunction with a power production system that creates an efficient power production cycle with reduced maintenance and efficiency greater than conventional systems.

[ver más...](#)

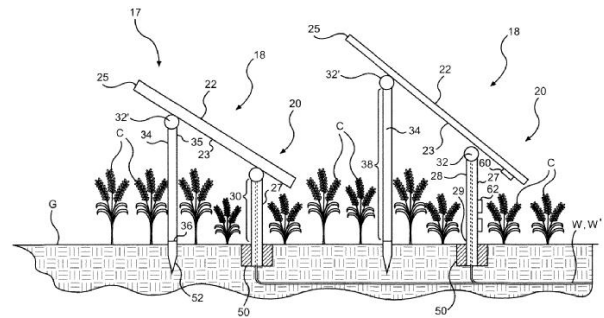


Agrisolar and agrivoltaic mechanisms, systems, and methods

Etiqueta: AgriPV | Publicada el 09/07/2026

An agrisolar or agrivoltaic system mounts solar panels so that they capture energy from the sun and crops can be grown underneath and adjacent the panels. Each panel is mounted by front and rear support structures which at a lower end of each are supported by or in the ground and at an upper end of each are mounted by pivotal connections to the back of the solar panel.

[ver más...](#)

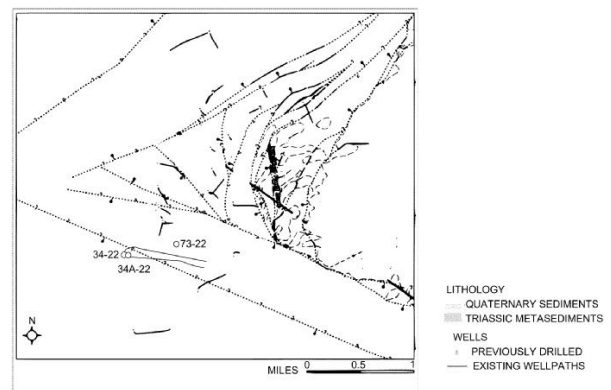


Enhanced geothermal system

Etiqueta: District Heating | Publicada el 02/07/2026

Systems and techniques may be used to operate an enhanced geothermal system (EGS). An example technique may include applying a stimulation treatment including a proppant to generate a distributed network of fractures along wellbores between a horizontal geothermal injection well and a horizontal geothermal production well. The horizontal geothermal injection well and the horizontal geothermal production well may be positioned within a mixed metasedimentary and igneous formation.

[ver más...](#)



Collector for agrivoltaics

Etiqueta: AgriPV | Publicada el 11/06/2026

A collector for use in agrivoltaics that carries out spectral splitting of sunlight to illuminate plants and solar cells simultaneously, is made up of a collector with an upper surface to the sun and a lower surface to the plants. Multiple bifacial solar cells are placed alongside one another in parallel along the collector, each solar cell oriented such that the cell plane extends between and is orthogonal to the upper and lower surfaces.

[ver más...](#)

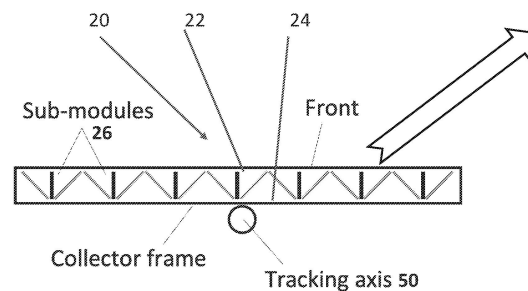


Fig. 2

PROYECTOS

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Big Lake agrivoltaics project shows promise of mixing farming, solar power

Etiqueta: Solar-agriculture co-location | Publicada el 17/09/2026

The Big Lake Farm is an example of agrivoltaics, a technique of mixing farming and solar power generation. The two interests are often pitted against each other in rural areas, but the rows of flourishing crops between rows of solar panels shows there's enough sun to go around.

[ver más...](#)

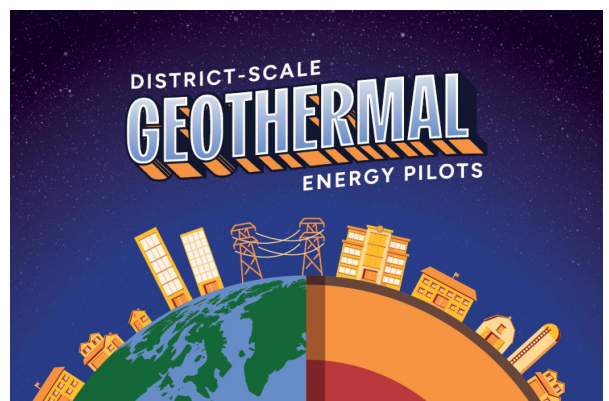


District-Scale Geothermal Energy Pilots

Etiqueta: District Heating | Publicada el 14/08/2026

The District-Scale Geothermal Energy Pilots initiative, formerly the Community Geothermal Heating and Cooling (CommGeo) initiative, is a first-of-its-kind funding opportunity within the Office of Geothermal that focuses on empowering communities to make decisions about their energy futures, with input from those affected by those decisions. With the community coalition approach, the Office of Geothermal endeavored to give voice to a range of stakeholders—not just zoning boards, public utility commissions, and other conventional decision-making bodies, but actual communities, installers, and others as well.

[ver más...](#)





MERCADO

Edición n°3 | septiembre de 2026 | set.usm.cl

European Solar Thermal Market Report and Outlook 2026

Etiqueta: Solar | Publicada el 14/09/2026

Every year, Solar Heat Europe publishes a report with the latest figures on the solar thermal market in Europe. This report aims to produce all the necessary elements to capture the full picture of the European solar thermal market for the industry, decision-makers, investors, and all professionals interested in Solar Heat markets.

[ver más...](#)

Decarbonising heat with solar thermal

European Solar Thermal Market Report and Outlook 2026

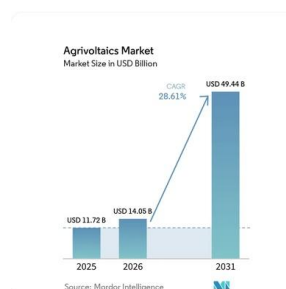


Agrivoltaics Market Report 2026-2031

Etiqueta: AgriPV | Publicada el 01/09/2026

The Agrivoltaics Market size is expected to grow from USD 11.72 billion in 2025 to USD 14.05 billion in 2026 and is forecast to reach USD 49.44 billion by 2031 at 28.61% CAGR over 2026-2031. Rising feed-in-tariff premiums in Europe, sustained subsidy programs across the Asia-Pacific, and a 15% decline in bifacial module prices between 2024 and 2026 continue to narrow the levelized-cost gap with conventional solar.

[ver más...](#)



Market Overview

Study Period	2021 - 2031
Market Size (2026)	USD 14.05 Billion
Market Size (2031)	USD 49.44 Billion
Growth Rate (2026 - 2031)	28.61 %
Fastest Growing Market	Asia Pacific
Largest Market	Europe
Market Concentration	Low

Major Players



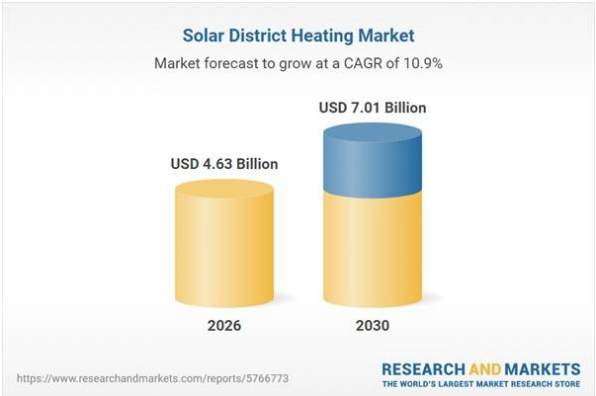
*Disclaimer: Major Players sorted in no particular order

Solar District Heating Market Report 2026

Etiqueta: District Heating | Publicada el 01/07/2026

The solar district heating market size has grown rapidly in recent years. It will grow from \$4.15 billion in 2025 to \$4.63 billion in 2026 at a compound annual growth rate (CAGR) of 11.6%. The growth in the historic period can be attributed to early adoption of centralized heating infrastructure, expansion of urban district heating networks, availability of solar thermal collector technologies, rising fossil fuel heating costs, public sector renewable heating initiatives.

ver más...



EVENTOS

Edición n°3 | septiembre de 2026 | set.usm.cl

European Geothermal Energy Summit 2026

Etiqueta: District Heating | Publicada el 10/08/2026

Join senior leaders from across the geothermal value chain at the European Geothermal Energy Summit 2026, in Cologne, Germany. This event will bring together developers, utilities, investors, policymakers, municipalities, industrial heat users, and technical experts to examine the conditions needed to accelerate geothermal deployment across Europe. Through two days of high-level discussion, the summit will explore where policy is turning into market traction, how projects become bankable, and what is needed to scale geothermal heat and power in practical terms.



EGICS'26

Munich October 6 - 8 2026

[ver más...](#)

AgriVoltaics World Conference 2026

Etiqueta: AgriPV | Publicada el 01/07/2026

The AgriVoltaics World Conference provides high-level scientific exchange and great networking opportunities for researchers from PV and agriculture (including biology and hydrology) and those working "in between"; companies such as PV module, mounting system and tracker manufacturers, EPC companies, renewable energy producers, as well as those providing agricultural machinery equipment and seed producers; organic farming associations, agricultural federations and similar stakeholder groups; and policy and finance experts open to innovative and forward-looking ideas!



AGRIVOLTAICS

WORLD CONFERENCE

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REPORTES

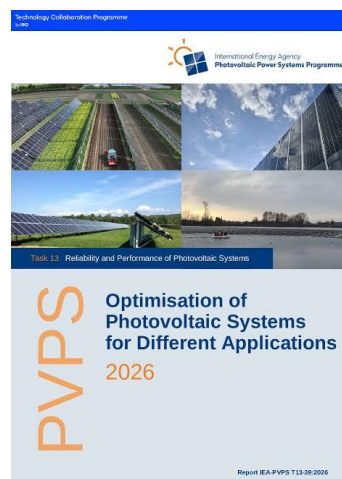
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Optimisation of Photovoltaic Systems for Different Applications

Etiqueta: AgriPV | Publicada el 10/08/2026

This report examines building-integrated photovoltaics (BIPV), floating photovoltaics (FPV) and agrivoltaics (AV), focusing on how application-specific environmental conditions and functional requirements affect PV performance, reliability and lifetime. The report argues that conventional design approaches developed primarily for ground-mounted PV are not sufficient for these applications, which require a broader, multidimensional approach to performance assessment.

[ver más...](#)

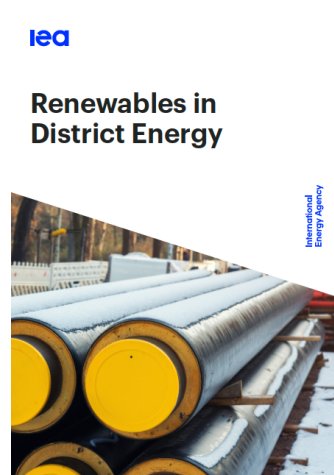


IEA publishes new Renewables in District Energy report – relevant role for bioenergy

Etiqueta: District Heating | Publicada el 30/06/2026

The International Energy Agency recently released its Renewables in District Energy report. While the report covers various renewable energy, the report also highlights the contribution of bioenergy for district heating. Bioenergy, primarily from solid biofuels, is currently the largest renewable energy source in district energy systems globally. While its contribution varies across regions, in some countries it makes up more than 60% of total energy supply in district heating networks, the reports states.

[ver más...](#)



NORMATIVAS

Edición n°3 | septiembre de 2026 | set.usm.cl

Dual-Use Pilot Agrivoltaics Program

Etiqueta: AgriPV | Publicada el 17/08/2026

On 17 August 2026 the New Jersey Board of Public Utilities voted to award 16 projects totalling 52.06 MW in the first solicitation of its Dual-Use Pilot Agrivoltaics program, established under the Dual-Use Solar Energy Act of 2021 and implemented with the Department of Agriculture, the Department of Environmental Protection, the State Agriculture Development Committee and Rutgers University's Agrivoltaics Program.



HEATS Act – Harnessing Energy At Thermal Sources Act of 2026 (S. 4975), EE.UU.

Etiqueta: District Heating | Publicada el 14/07/2026

Sponsored by Senator John Hoeven on 14 July 2026, the bill amends the Geothermal Steam Act of 1970 to waive the requirement for a federal drilling permit for geothermal exploration and production where the United States owns less than 50 percent of the subsurface geothermal estate and the operator holds a state permit. Such activities would not be treated as a major federal action under the National Environmental Policy Act and would be exempt from Endangered Species Act section 7 review.

