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IN-SET

BOLETÍN DE VIGILANCIA TECNOLÓGICA

TECHNOLOGICAL INTEGRATION AND ENERGY DIGITALIZATION

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
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El Centro Tecnológico Nacional para la Innovación en Transición Energética Sostenible, **SET-Chile** por sus siglas en inglés, tiene como misión desarrollar, validar y transferir soluciones tecnológicas que respondan a los desafíos de la transición energética. Para ello, impulsa la innovación y promueve la articulación entre la academia, la industria, el Estado y los territorios.

SET-Chile cuenta con un sistema de Vigilancia Tecnológica destinado a monitorear periódicamente el horizonte tecnológico en las áreas críticas de cada una de sus líneas estratégicas de trabajo. Esta primera edición inicia un ciclo de boletines informativos enfocados en los avances tecnológicos clave para la transición energética en **integración tecnológica y digitalización energética**, que abarca ámbitos como inteligencia artificial aplicada a sistemas energéticos, digitalización de procesos, vehículos eléctricos, automatización de procesos y sistemas de monitoreo para operación, gestión y optimización energética.



Mario Toledo
Director científico-tecnológico
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En esta edición, enfocada en **inteligencia artificial**, destacamos desarrollos orientados a la integración de IA, analítica de datos y sistemas inteligentes en redes eléctricas y gestión energética. Entre ellos, se incluyen avances del *Austrian Institute of Technology*, Austria, mediante el proyecto "Voltera", que combina inteligencia artificial y modelado físico para facilitar la integración segura de energías renovables en redes eléctricas. Igualmente, se incorporan iniciativas de Siemens, Alemania; Honeywell, Estados Unidos; y Johnson Controls, Irlanda, orientadas a edificios inteligentes y gestión energética mediante IoT (Internet of Things) e inteligencia artificial. Además, se destaca la patente "*Battery Thermal Management System and Methods of Use*" de QuantumScape Battery, Inc., Estados Unidos, orientada a sistemas predictivos de gestión térmica para baterías.

En operación y resiliencia de redes, se presentan desarrollos impulsados por NVIDIA y EPRI, Estados Unidos, junto con National Grid, Reino Unido, enfocados en infraestructura energética para centros de inteligencia artificial con flexibilidad eléctrica. Complementariamente, se recopilan trabajos sobre *forecasting* probabilístico, gemelos digitales y optimización de sistemas eléctricos mediante arquitecturas *Transformer*, modelos *Mixture of Experts* y enfoques basados en datos aplicados a mercados eléctricos, almacenamiento y gestión de redes inteligentes.

Finalmente, destacamos proyectos europeos como SECURE-RES y SAILING sobre ciberresiliencia y sistemas energéticos inteligentes, acompañados por reportes de la Agencia Internacional de Energía (IEA) sobre inteligencia artificial y energía. Adicionalmente, se incorpora la "*8th International Conference on Smart Energy Systems and Technologies (SEST 2026)*", que se realizará entre el 2 y 4 de septiembre de 2026 en Ciudad Real, España, junto con Expo Energía 2026, el 4 de noviembre de 2026 en Santiago de Chile.

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NOTICIAS

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Innovative grid management system from the AIT Austrian Institute of Technology enables the secure integration of renewable energy

Etiqueta: Machine learning | Publicada el 22/04/2026

A major success for the AIT Austrian Institute of Technology: the “Voltera” research project won the prestigious 2026 Houska Prize in the “Non-university Research” category. The technology developed at AIT demonstrates how artificial intelligence and physical modelling can work together to make power grids fit for the energy transition.

[ver más...](#)

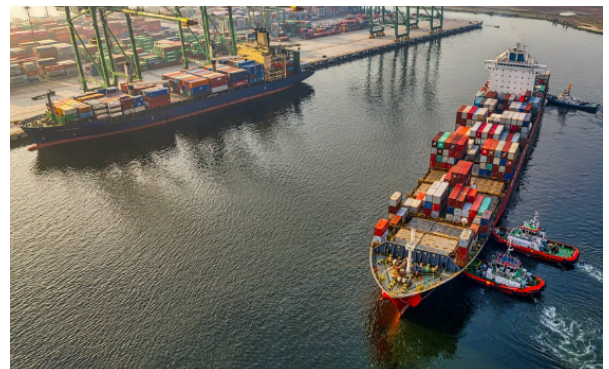


Evidence Pack: AI Optimisation for Decarbonising Freight

Etiqueta: Machine learning | Publicada el 10/04/2026

Road freight accounts for 4.6% of UK emissions, with shipping adding another 3%. While cleaner fuels are essential, operational efficiency remains a critical near-term lever for reducing freight emissions. Our latest Evidence Pack for the AI Energy Council identifies three areas where AI-enabled optimisation can reduce emissions: smarter load allocation, improved routing, and reducing idle time at ports, depots and charging locations.

[ver más...](#)



Blowing Off Steam: How Power-Flexible AI Factories Can Stabilize the Global Energy Grid

Etiqueta: AI for grid operation | Publicada el 25/03/2026

In a recent white paper, Emerald AI — in collaboration with NVIDIA, Nebius, National Grid and EPRI — showcased how “power-flexible” AI factories can autonomously adjust their power usage during peak demand. For AI factories, this could unlock significantly faster grid connections without waiting for massive, years-long infrastructure upgrades. For the public, it helps limit grid build outs by curbing the peak load that the system needs to serve, helping keep electricity rates affordable for everyday bill payers.

[ver más...](#)

The Role Smart Buildings Will Play in the Energy Transition

Etiqueta: Data-driven energy systems | Publicada el 11/02/2026

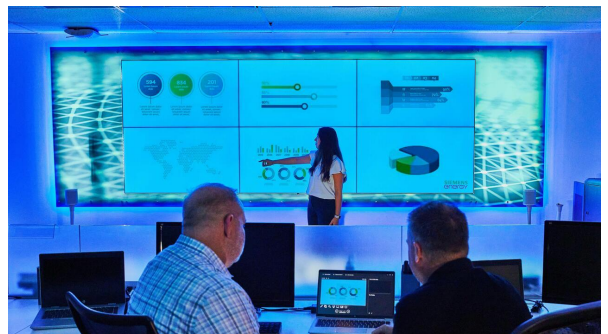
With net zero deadlines fast approaching, Siemens, Honeywell and Johnson Controls are harnessing AI to make buildings active participants in the energy transition. For years, so-called ‘smart’ buildings revolved around motion sensors and timed heating controls. Now, advances in IoT, edge computing and Gen AI have transformed them into responsive, energy-aware systems – able not only to react to occupancy but to learn, adapt and optimise their energy performance.

[ver más...](#)

Transforming power generation with AI

Etiqueta: Data-driven energy systems | Publicada el 21/01/2026

Discover how AI is transforming power generation with smarter operations, increased efficiency, and enhanced security for the power plants of tomorrow. AI and digital solutions can help power producers through optimization, automation, and really simplification of their operations.

[ver más...](#)

PUBLICACIONES CIENTÍFICAS

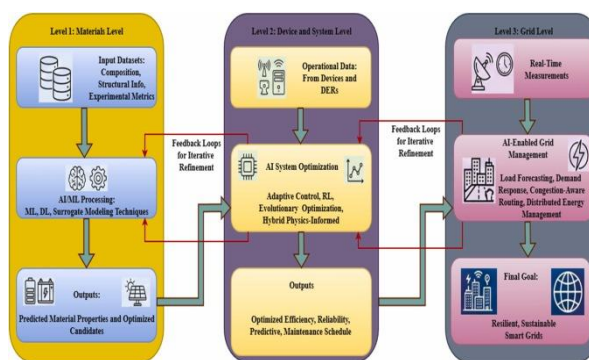
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AI-driven computational approaches for enhancing energy devices and systems: From materials to grid optimization

Etiqueta: Machine learning | Publicada el 23/04/2026

The accelerated movement towards smart and sustainable energy systems has established the need of sophisticated computational procedures to address issues at numerous levels of the energy system as more important. Here the paper gives a comprehensive analysis of AI-based computational methodologies (AI-CMs) to improve energy devices and systems, both at the materials level and grid-level optimization.

[ver más...](#)

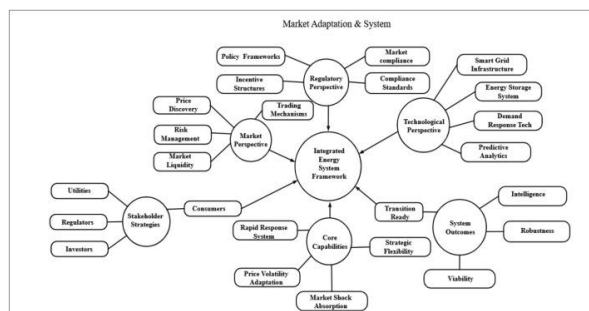


AI and digitalization in electricity markets with renewables and electric vehicles: A review of price volatility, forecasting, and stability approaches

Etiqueta: AI-based forecasting systems | Publicada el 21/04/2026

This study reviews the use of digitalization techniques, such as Artificial Intelligence (AI)-based price forecast algorithms, digital twins, energy markets using blockchain trading, AI algorithms and data analysis of energy price volatility, and Vehicle to Grid (V2G) and price stability.

[ver más...](#)

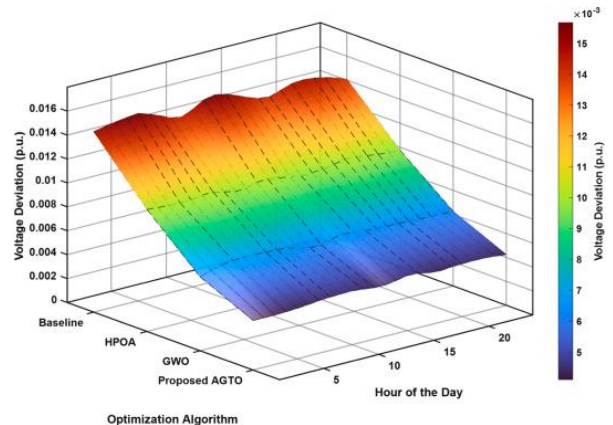


Artificial Intelligence-driven cyber-physical energy resilience framework for secure and sustainable smart distribution networks

Etiqueta: AI for grid operation | Publicada el 03/03/2026

This paper presents an Artificial Intelligence-driven Cyber-Physical Energy Resilience Framework for next-generation smart distribution networks, responding to the critical demand for secure, adaptive, and sustainable grid operation amid complex cyber-physical disruptions.

[ver más...](#)

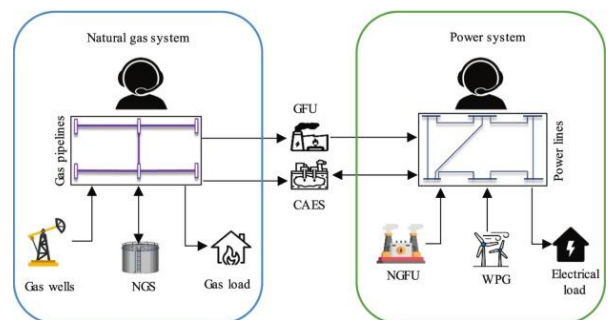


Day-ahead and look-ahead scheduling of gas-power systems through a decentralized data-driven method

Etiqueta: Data-driven energy systems | Publicada el 03/03/2026

This paper presents a decentralized data-driven model for day-ahead and look-ahead scheduling of the gas-power system integrated with storage systems. The proposed model extends the scheduling horizon from one day to two consecutive days with the aim of i) minimizing the operation costs of gas-power systems and ii) optimizing the energy level of storage systems at the last hour of the first day.

[ver más...](#)

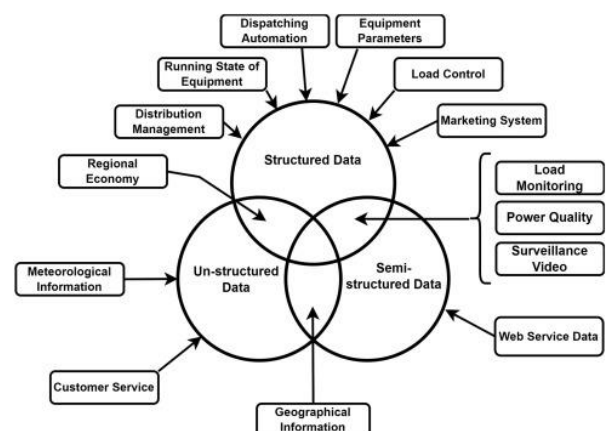


Big data energy systems: A survey of practices and associated challenges

Etiqueta: Big data | Publicada el 05/02/2026

This review explores the research trends in big data management for energy systems, highlighting the practices, opportunities and challenges. Additionally, the regulatory data requirements are highlighted using the chosen reference architectures.

[ver más...](#)



PATENTES

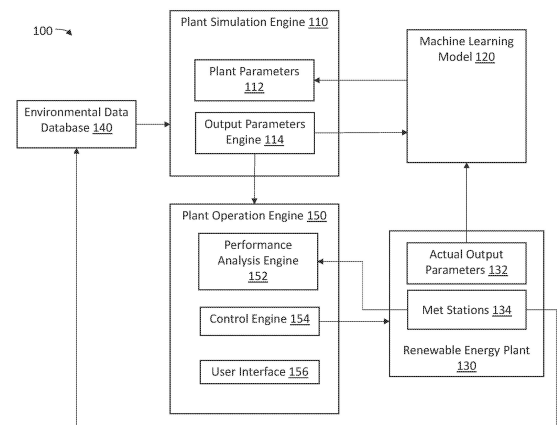
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Using a machine-learning model to refine a digital twin of a renewable energy system

Etiqueta: Machine learning | Publicada el 02/04/2026

A method may include initializing a simulation of a renewable energy plant with an initial set of plant parameters, simulating a first output of the renewable energy plant based on first environmental factors and the initial set of plant parameters, executing a machine-learning model.

[ver más...](#)

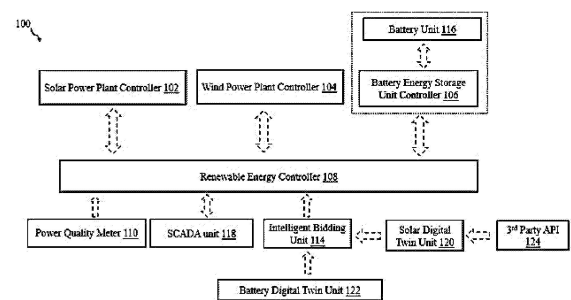


System and method for optimizing energy distribution in renewable energy plants

Etiqueta: AI for grid operation | Publicada el 19/03/2026

The present invention discloses a system and method for optimizing energy distribution in renewable energy plants. The system comprises a solar power plant or a wind power plant to generate electrical energy. A renewable energy controller monitors real-time energy output and manages energy flow to a grid.

[ver más...](#)

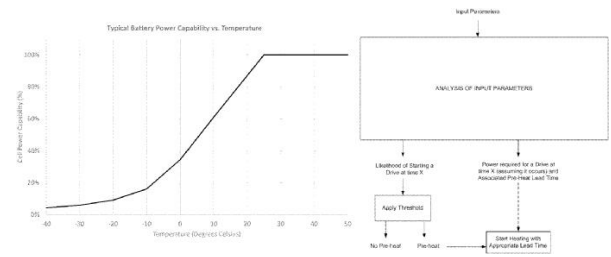


Battery thermal management system and methods of use

Etiqueta: Big data | Publicada el 01/01/2026

Set forth herein are systems and methods for determining battery heating conditions and preheating lead times of at least a minute or more, based on input parameters and sets of input parameters, to predictively and dynamically heat a secondary battery so that the battery has a specific power output and performance level when used in an electric or hybrid vehicle application.

[ver más...](#)



PROYECTOS

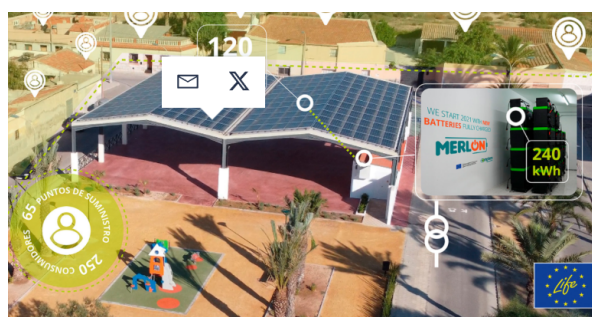
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LIFE: using blockchain to drive greater energy efficiency

Etiqueta: Intelligent systems | Publicada el 28/04/2026

Blockchain is best known as the technology that underpins many cryptocurrencies, but it may also help Europe's transition to a more energy efficient future. The SMARTSERV-InEEsS project, funded by the LIFE programme, has developed a way of using blockchain to reward energy efficiency by businesses and consumers.

[ver más...](#)



Secure Energy through Cyber-Resilient Unified Control and Embedded Intelligence for Renewable Systems

Etiqueta: Intelligent systems | Publicada el 20/03/2026

SECURE-RES proposes an innovative and unified framework that empowers power electronic converters to act not just as energy interfaces but as intelligent, resilient agents capable of detecting, classifying, and mitigating both cyber and technical disturbances in real time. This project aims to develop a converter-centric control system equipped with embedded intelligence and adaptive algorithms that ensure secure, grid-compliant operation.

[ver más...](#)



Secure AI and Digital Twin Empowered Smart Internet-of-Energy

Etiqueta: Data-driven energy systems | Publicada el 01/01/2026

The SAILING project unites leading academic and industrial partners to create smart energy management and fault-diagnosis systems powered by advanced digital twin technology and secure AI. Key innovations include AI-driven, high-fidelity digital twins, blockchain-secured AI, predictive energy optimisation, and deep learning for rapid fault detection.

[ver más...](#)

MERCADO

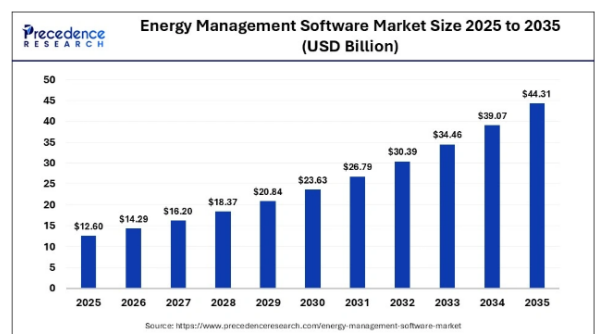
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Energy Management Software Market

Etiqueta: Data-driven energy systems | Publicada el 28/04/2026

The global energy management software market size accounted for USD 12.60 billion in 2025 and is predicted to increase from USD 14.29 billion in 2026 to approximately USD 44.31 billion by 2035, expanding at a CAGR of 13.40% from 2026 to 2035. The market growth is attributed to rising energy efficiency mandates, rapid digitalization of power systems, and increasing integration of AI-driven optimization technologies across industries.

[ver más...](#)



AI-enabled smart grid to accelerate power sector's shift to clean energy

Etiqueta: AI for grid operation | Publicada el 27/04/2026

GlobalData's latest report, 'Smart Grid', is among the latest strategic intelligence reports from the industry analysis specialist. The report provides an industry analysis on the smart grid market, its growing demand and how it is disrupting power utilities and the power sector. The report focuses on the trends related to smart grid as a theme in technology, macroeconomic and regulatory trends. The report briefs on detailed analysis of the smart grid value chain.

[ver más...](#)



EVENTOS

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8th International Conference on Smart Energy Systems and Technologies

Etiqueta: Intelligent systems | Publicada el 01/04/2026

The SEST 2026 conference intends to offer a meeting point for scientists and operators working in universities, research institutions, industry and public bodies, to exchange ideas and knowledge on new technologies and applications and discuss the latest developments in the electrical energy system field. September 2-4, 2026 | Ciudad Real, Spain

[ver más...](#)



Expo Energía 2026

Etiqueta: Data-driven energy systems | Publicada el 01/04/2026

El Encuentro profesional más destacado para profesionales en búsqueda de tecnologías energéticas, soluciones, servicios y equipamientos para la eficiencia, calidad, seguridad y sostenibilidad de la energía en la industria. 4 Noviembre 2026 Santiago - Chile

[ver más...](#)



REPORTES

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Key Questions on Energy and AI

Etiqueta: Data-driven energy systems | Publicada el 16/04/2026

This report from the International Energy Agency (IEA) aims to fill this gap based on new global and regional modelling and datasets, as well as extensive consultation with governments and regulators, the tech sector, the energy industry and international experts. It includes projections for how much electricity AI could consume over the next decade, as well as which energy sources are set to help meet it.

[ver más...](#)



Innovation landscape for sustainable development powered by renewables

Etiqueta: Intelligent systems | Publicada el 01/01/2026

This report maps the innovation landscape for sustainable development powered by renewables in a systemic way and identifies 40 innovations that policymakers can strategically combine to build solutions for two urgent goals: building resilient power systems that can integrate high shares of renewables and withstand extreme climate events; and expanding energy access and driving inclusive local development through decentralised productive uses.

[ver más...](#)



NORMATIVAS

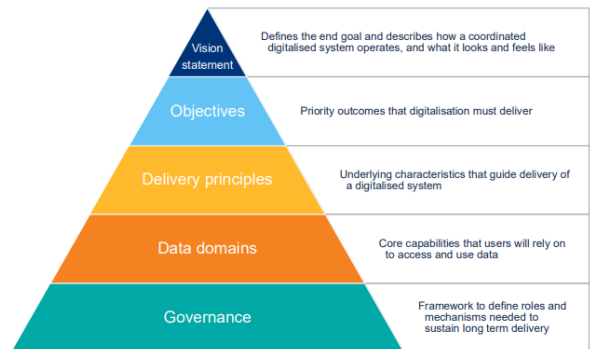
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Energy digitalisation framework: a vision for a coordinated and connected energy system

Etiqueta: Data-driven energy systems | Publicada el 23/03/2026

The energy digitalisation framework is a joint publication by the government and Ofgem, delivering a commitment set out in the clean flexibility roadmap. It provides clarity, coherence and direction to an energy digitalisation landscape characterised by high levels of activity but limited system-wide alignment, leading to fragmentation and duplication.

[ver más...](#)



Proyecto de ley que regula integralmente la Inteligencia Artificial en Chile prosigue su tramitación en el Senado

Etiqueta: Data-driven energy systems | Publicada el 23/02/2026

La iniciativa, iniciada por mensaje presidencial en 2024, establece principios obligatorios, prohíbe usos de riesgo inaceptable, fija exigencias para sistemas de alto riesgo y contempla multas de hasta 20 mil UTM, además de un régimen de responsabilidad civil y deberes de confidencialidad.

[ver más...](#)

