

Edición n°1 | mayo de 2026 | set.usm.cl

IN-SET

BOLETÍN DE VIGILANCIA TECNOLÓGICA

SUSTAINABLE FUELS

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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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 **combustibles sustentable**, que abarca ámbitos como, reactores catalíticos, utilización y captura de CO_2 , interrelación energía-agua, conversión de biomasa, síntesis de hidrocarburos, craqueo de amoníaco, motores de combustión interna, calderas industriales, bombas de calor, quemadores eficientes.

Esta primera edición enfocada en **combustibles gaseosos y líquidos sostenibles**, destacamos desarrollos orientados a la producción de e-fuels, biocombustibles y combustibles sintéticos para sectores difíciles de electrificar. Entre ellos, se incluyen investigaciones de la University of Surrey, Reino Unido, sobre dispositivos "lab-on-a-chip" para acelerar la conversión de CO_2 en combustibles sostenibles y productos químicos de valor agregado. Por su parte en Francia, la empresa SUBLIME Energie, inauguró el primer sistema capaz de licuar biogás directamente en predios agrícolas sin depender de infraestructura de gasoductos.

En hidrógeno y combustibles derivados, se incorporan análisis sobre el crecimiento global de la demanda de hidrógeno y estudios sobre producción de metanol verde, dimetil éter (DME), e-ammonia y combustibles Power-to-Liquid. También se destacan iniciativas como el proyecto europeo THUNDER para producción integrada de e-metanol y el proyecto SINTETIK, liderado por TecNALIA, España, orientado al desarrollo de combustibles sintéticos renovables y conversión de amoníaco en hidrógeno. Además, se incorpora una patente de Shell International Research, Países Bajos, orientada a la integración de electrólisis de CO_2 de baja temperatura con producción de combustibles sintéticos, incluyendo queroseno y metanol a partir de syngas generado desde CO_2 capturado.

Por su parte, el proyecto germano-chileno Power-to-MEDME-R&D, desarrollado por el Fraunhofer Institute for Energy Economics and Energy System Technology, Alemania, junto a socios internacionales, avanzó en bases tecnológicas y económicas para la producción sostenible de metanol verde y DME en Chile.

Finalmente, destacamos reportes de la Agencia Internacional de Energía (AIE) sobre bioenergía en India y combustibles RFNBO (por sus siglas en inglés, *Renewable Fuels of Non-Biological Origin*) en Europa, junto con la actualización de la Estrategia Nacional de Hidrógeno Verde 2026-2030 presentada por el Ministerio de Energía de Chile. Además, se incorpora el 5th Symposium on Ammonia Energy (SoAE 2026), que se realizará entre el 28 y 30 de septiembre de 2026 en Santiago de Chile, y la conferencia THIESEL 2026, orientada a combustibles sostenibles y descarbonización del transporte, que tendrá lugar entre el 8 y 11 de septiembre de 2026 en Valencia, España.

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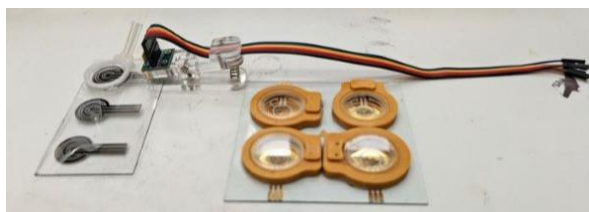
New 'lab-on-a-chip' devices could speed up CO₂ conversion for clean fuels and energy technologies

Etiqueta: Ethanol | Publicada el 30/04/2026

Tiny 'lab-on-a-chip' devices that recreate chemical reactions and allow scientists to observe these previously hidden processes are being developed at the University of Surrey, helping to speed up the development of cleaner fuels and energy technologies.

The miniature systems use renewable electricity to drive reactions, with early applications focused on converting carbon dioxide (CO₂) into useful fuels and chemicals such as sustainable aviation fuels, ethanol and ethylene – a key building block in plastics and other industrial materials.

[ver más...](#)



SUBLIME Energie inaugurates world's first system capable of liquefying biogas into a renewable fuel

Etiqueta: Bio-based gaseous fuels | Publicada el 16/04/2026

SUBLIME Energie has inaugurated in Plélo (Côtes-d'Armor, Brittany, France) its demonstrator “Charlie,” the world’s first system capable of liquefying biogas directly on the farm. For the first time, on-farm anaerobic digestion can produce a renewable fuel without relying on gas grid infrastructure. By densifying and enabling the transport of biogas produced on-site—using a model inspired by the traditional milk collection system—the startup is deploying a decentralized industrial model.

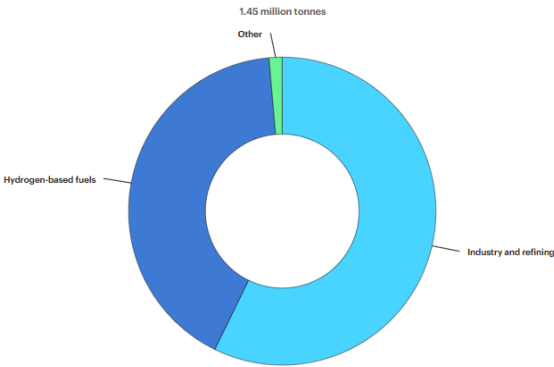


[ver más...](#)

What it would take to unlock the next phase of hydrogen growth

Etiqueta: Hydrogen transport | Publicada el 10/02/2026

Global hydrogen demand reached 100 Mt in 2024, mainly from refineries, the production of chemicals and the iron and steel sector. Demand grew by almost 2% from 2023, in line with overall energy demand growth. This consumption was almost completely met with hydrogen produced from unabated fossil fuels, using 290 billion cubic metres of natural gas and 90 million tonnes of coal equivalent. However, alternative technologies that can produce low-emissions hydrogen have attracted a lot of interest from governments given their potential to reduce greenhouse gas emissions and diversify energy supply, particularly in countries that have a large dependence on fossil fuel imports.



[ver más...](#)

India's bioenergy sector set for strong growth, driven by effective policy support

Etiqueta: Biofuels | Publicada el 29/01/2026

New IEA report shows production of liquid and gaseous biofuels in India could double by 2030 through enhanced policy actions

India's bioenergy sector is set to play an important role underpinning the country's rapidly growing energy markets as robust policy frameworks boost ethanol and compressed biogas production and open new opportunities for biodiesel and sustainable aviation fuels, according to new report from the International Energy Agency.

[ver más...](#)



PUBLICACIONES CIENTÍFICAS

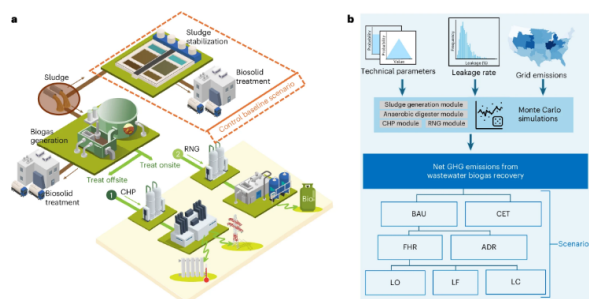
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Methane leakage thresholds for net climate benefits of wastewater biogas recovery

Etiqueta: Bio-based gaseous fuels | Publicada el 27/04/2026

Biogas recovery is crucial for decarbonizing water resource recovery facilities (WRRFs), offering renewable energy production alongside waste treatment. However, methane (CH₄) leakage during digestion and biogas handling can largely compromise their climate benefits, yet this risk remains uncharacterized. This study presents a US national-scale assessment of CH₄ leakage thresholds beyond which WRRF biogas systems lose net climate benefits.

[ver más...](#)

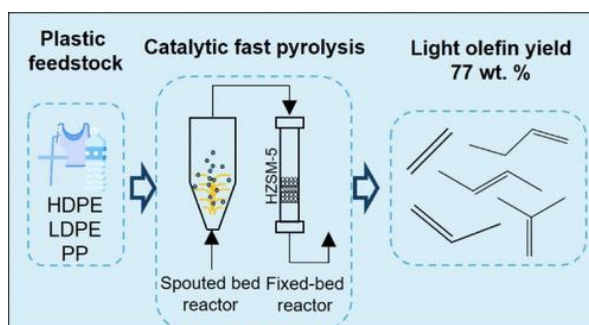


Conversion of a Polyolefin Mixture into Light Olefins by Fast Pyrolysis and In-Line Catalytic Cracking on HZSM-5

Etiqueta: Synthetic chemicals and olefins | Publicada el 20/04/2026

A model polyolefin mixture—composed of 50% HDPE, 40% LDPE, and 10% PP—has been converted into valuable light olefins on an HZSM-5-based catalyst in a two-step continuous process: fast pyrolysis in a conical spouted bed reactor followed by upgrading in a catalytic fixed-bed reactor. The effect of the operating conditions in the catalytic step (space-time of 10 and 15 g catalyst min g plastic⁻¹ and temperature of 450 and 500 °C) on product yields and catalyst stability has been investigated up to a time on stream (TOS) of 4 h.

[ver más...](#)

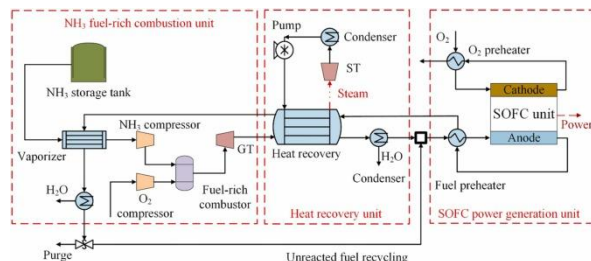


Thermodynamic analysis of a novel hybrid gas turbine – Solid oxide fuel cell power generation system using ammonia as a zero-carbon fuel

Etiqueta: Ammonia | Publicada el 17/03/2026

Ammonia has emerged as a promising hydrogen carrier and carbon-free fuel. This study designs a novel gas turbine-solid oxide fuel cell (GT-SOFC) hybrid energy system, distinct from traditional SOFC-GT configurations, utilising ammonia as the primary fuel. In this hybrid system, ammonia is combusted with oxygen under fuel-rich conditions in the GT, generating both electricity and hydrogen.

[ver más...](#)

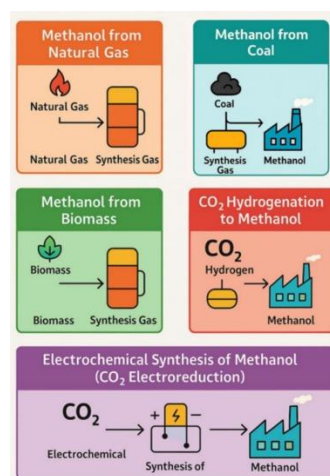


Green methanol production using green hydrogen and oceanic carbon dioxide: an experimental study

Etiqueta: Methanol | Publicada el 13/03/2026

Utilizing the substantial amount of CO₂ dissolved in oceans is recognized as a critical boundary for achieving carbon neutrality. This study introduces a novel, integrated three-compartment electrolytic cation exchange membrane (E-CEM) reactor with an H-cell for the direct capture of CO₂ from ocean water and its subsequent conversion into methanol.

[ver más...](#)

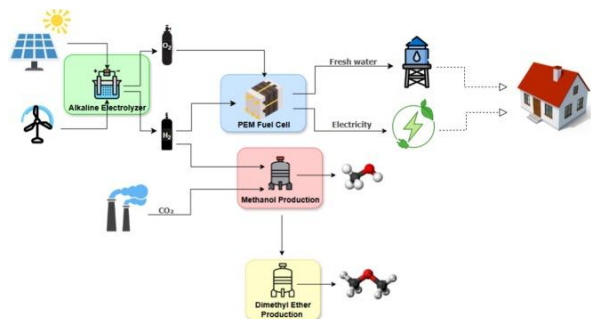


Assessment of an integrated renewable-based hydrogen, methanol and dimethyl ether production system for sustainable fuels

Etiqueta: Oxygenated fuels | Publicada el 12/01/2026

This work proposes and analyzes the performance of a combined power-to-liquid system powered by solar and wind electricity. The carbon dioxide used is captured from refinery flue gas through the post-combustion capture process utilizing the monoethanolamine (MEA) solvent, and the purified carbon dioxide and green hydrogen are used to synthesize methanol, and subsequently produce dimethyl ether (DME).

[ver más...](#)



PATENTES

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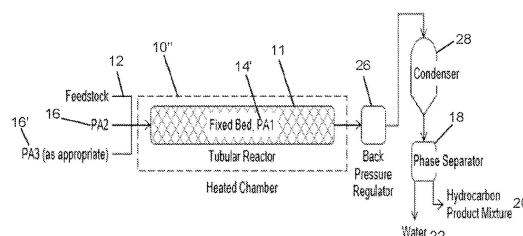
System and method for converting waste polyolefins, renewable oils, and paraffinic crudes to aromatic compounds

Etiqueta: Hydrocarbon fuels | Publicada el 05/03/2026

Feedstocks containing aliphatic moieties and at least 12 carbon atoms are contacted with a metallic process agent disposed on a substrate consisting of oxides of: aluminum; silica; titanium; zirconium; and/or aluminum and silica. The feedstocks and first process agent are maintained in a reactor at temperatures from about 325 °C to 450 °C for a duration of up to about 5 hours, to generate products containing aromatic compounds. The aromatic compounds are generated independently of any requirement for adding molecular hydrogen to the process system or for configuring the process system to deliberately accumulate and/or maintain a partial pressure of molecular hydrogen, and are recovered from the process mixture.

[ver más...](#)

Figure 11

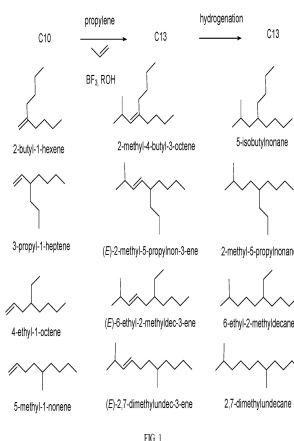


Methods for producing aviation fuels

Etiqueta: Synthetic liquid fuels | Publicada el 26/02/2026

Processes for making aviation fuels include a step of forming a C16- olefin stream by oligomerizing a mixture of decenes with a C6- alpha-olefin or by subjecting the mixture of decenes and a C8- alpha-olefin to metathesis. The C16- olefin stream is then hydrogenated to form C16- paraffins, and these C16- paraffins can be used to form an aviation fuel. Particular C11-C16 olefin compositions and paraffin compositions prepared by these processes also are described.

[ver más...](#)



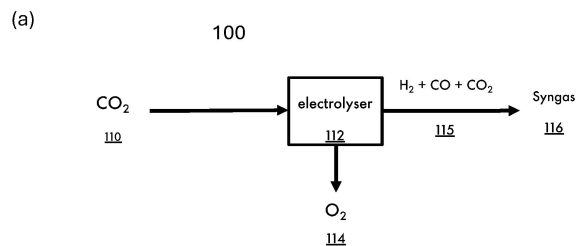
Systems and process for integration of low temperature electrolysis of carbon dioxide with fuel production

Etiqueta: Biofuels | Publicada el 14/01/2026

This invention provides systems and processes for the production of a hydrocarbon fuel. A gaseous feed comprised of a carbon dioxide rich feedstock, suitably derived from waste exhaust or from direct air capture, is used as an input for a carbon dioxide electrolysis unit. The carbon dioxide electrolysis unit comprises a bipolar membrane and operates under ambient temperature and elevated pressure. The electrolysis unit comprises at least first and second outputs, wherein the first output comprises a first effluent line that comprises a synthesis gas (syngas) product and the second output comprises a second effluent line that comprises a gaseous oxygen byproduct. The first effluent line is coupled to a synthetic production unit that can produce hydrocarbon fuels, such as kerosene or methanol.

[ver más...](#)

Figure 1



PROYECTOS

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THUNDER – Innovation in e-MeOH Production by One-Pot Tandem Process

Etiqueta: Synthetic chemicals and olefins | Publicada el 30/04/2026

Building on advanced technologies, THUNDER will enhance efficiency with multifunctional membranes for CO₂ capture, advanced electrocatalysts for CO and H₂ production, and thermochemical catalysts for hydrogenating CO₂ and CO into e-MeOH. Using renewable energy and recovering surplus heat, THUNDER will reduce energy consumption compared to benchmark technologies.

[ver más...](#)



Tecnalia leads the SINTETIK project for research into new technologies for the production and conversion of renewable fuels.

Etiqueta: Synthetic gaseous fuels | Publicada el 13/02/2026

The aim of the SINTETIK project is to research into new processes for producing renewable synthetic fuels (syngas, methane and methanol) and converting ammonia into hydrogen at a competitive cost.

The project envisages the development of four laboratory-scale prototypes, based on electrochemical, electrified membrane, thermal plasma and photocatalytic reactor technologies.

[ver más...](#)



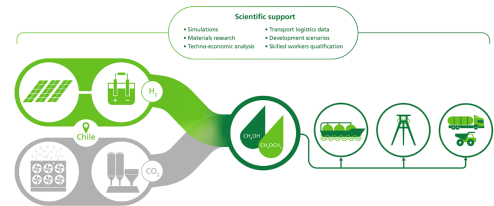
Power-to-MEDME-R&D research project demonstrates: Green methanol and DME competitive in the medium term

Etiqueta: Methanol | Publicada el 19/01/2026

After two years of research and development work, the German-Chilean Power-to-MEDME-R&D project has been successfully completed. The Fraunhofer Institute for Energy Economics and Energy System Technology IEE and its project partners have developed key technological, economic, and systemic foundations for the sustainable production of green hydrogen and its derivatives methanol and dimethyl ether (DME) in Chile.

[ver más...](#)

POWER-TO-MEDME



MERCADO

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Global Ethanol Market 2026-2036: Ethanol Has Emerged As a Strategic Commodity Amid the Rapid Rise of Sustainable Aviation Fuel

Etiqueta: Ethanol | Publicada el 16/04/2026

The global ethanol market is rapidly evolving, positioning itself as a strategic player in energy transition and industrial chemistry. The Alcohol-to-Jet pathway fuels the rise of Sustainable Aviation Fuel, driving investment from U.S. and Brazilian ethanol producers. Meanwhile, the semiconductor, pharmaceutical, and cosmetics industries are expanding ethanol's industrial use.

[ver más...](#)



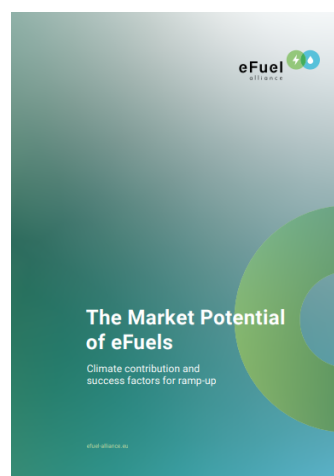
The Market Potential of eFuels

Etiqueta: Synthetic liquid fuels | Publicada el 17/03/2026

eFuels offer the potential for significant carbon savings in mobility fleets if their adoption accelerates. Despite numerous projects preparing for eFuel market entry, financing challenges persist and must be addressed.

This analysis provides a quantitative assessment of the eFuel market potential in the EU and outlines the actions required to unlock project financing and enable stakeholders to scale up production.

[ver más...](#)



EVENTOS

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5th Symposium on Ammonia Energy (SoAE 2026)

Etiqueta: Ammonia | Publicada el 24/03/2026

Santiago de Chile será la sede del 5th Symposium on Ammonia Energy (SoAE 2026), uno de los encuentros científicos más relevantes a nivel mundial en investigación, desarrollo y aplicaciones del amoníaco como vector energético. 28 - 30 de septiembre de 2026 Santiago, Chile.

[ver más...](#)



THIESEL Conference

Etiqueta: Hydrocarbon fuels | Publicada el 13/01/2026

The THIESEL 2026 Conference addresses thermo- and fluid-dynamic phenomena in propulsion systems aimed at enabling cleaner and more sustainable transportation. The automotive sector is undergoing significant challenges driven by the shift toward electrification and the imperative of decarbonisation.

Future thermal engines demand new approaches to injection and combustion, including the use of hydrogen, ammonia, renewable fuels, and e-fuels, alongside strategies to minimize heat losses and enhance efficiency.

8th -11th September 2026, Valencia, Spain.

[ver más...](#)



3rd Edition of Global Conference on Biofuels & Bioenergy (Biofuels 2026)

Etiqueta: Biofuels | Publicada el 01/01/2026

The 3rd Edition of Global Conference on Biofuels & Bioenergy (Biofuels 2026) will be held in Rome, Italy on September 17-19, 2026 as a Hybrid event (in-person & online) under the theme "Biofuels & Bioenergy: Progress, Prospects, and Practice."

The conference brings together a diverse audience, including researchers, academicians, industry leaders, policymakers, and innovators, all united by their interest in renewable energy solutions.

[ver más...](#)

REPORTES

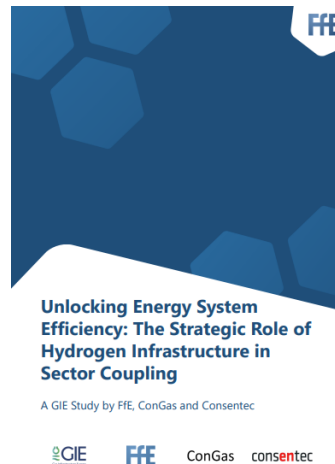
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Unlocking Energy System Efficiency: The Strategic Role of Hydrogen Infrastructure in Sector Coupling

Etiqueta: Hydrogen transport | Publicada el 14/04/2026

This study focuses on implementation questions rather than revisiting the level of Europe's climate ambition. Therefore, it assesses how different degrees of sector coupling – especially between hydrogen, natural gas, and electricity – affect system operation, robustness, and infrastructure needs in a future European energy system. To support infrastructure and policy decisions, the analysis combines high-resolution energy system modeling with physically detailed network simulations for hydrogen, natural gas, and electricity, using scenario inputs aligned with European planning processes, most notably the joint TYNDP scenarios.

[ver más...](#)



Renewable Fuels of Non-Biological Origin in the European Union - 2025 Status Report on Technology Development, Trends, Value Chains and Markets

Etiqueta: Synthetic gaseous fuels | Publicada el 14/01/2026

Renewable fuels of non-biological origin (RFNBO) are pure renewable hydrogen or synthetic fuels produced from renewable hydrogen and captured carbon dioxide (CO₂) or nitrogen (N₂). They represent a key solution to decarbonise transport and industry, where direct electrification is not viable. RFNBO can deliver over 70% greenhouse gas savings compared to fossil fuels, while using part of the existing energy infrastructure. Currently, the best market options, such as e-methanol, e-kerosene, e-ammonia, and e-methane, have reached Technology Readiness Levels 6–8, with early commercial projects operating in Germany and Denmark.

[ver más...](#)



NORMATIVAS

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ASTM Approves Updated Heating Oil Specification to Include Biodiesel Blends Up to B50

Etiqueta: Biofuels | Publicada el 22/04/2026

Clean Fuels Alliance America welcomes the approval of the latest revision to ASTM D396, the standard specification for fuel oils, which now includes new grades for biodiesel blends containing 21% to 50% biodiesel by volume (B21-B50). The updated specification, ASTM D396-26a, marks a major milestone for the clean fuels industry and supports expanded use of higher biodiesel blends in heating applications.

[ver más...](#)



ASTM INTERNATIONAL

Ministerio de Energía presenta la Actualización de la Estrategia Nacional de Hidrógeno Verde 2026-2030

Etiqueta: Hydrogen transport | Publicada el 03/03/2026

El Ministerio de Energía, junto a los integrantes del Comité Estratégico de Hidrógeno Verde, integrado, entre otros, por la expresidenta Michelle Bachelet, y el exministro de Energía, Juan Carlos Jobet, lanzaron hoy la Actualización de la Estrategia Nacional de Hidrógeno Verde 2026-2030, que entrega orientaciones para una industria competitiva, que aporte a la descarbonización, al crecimiento económico y a la seguridad energética.

[ver más...](#)

