Press release
Madrid, October 14, 2021

Communication and Institutional Relations
Executive Managing Division
Tel.+34 91 753 87 87

www.repsol.com
prensa@repsol.com

Repsol will invest €2.549 billion to boost renewable hydrogen

- Repsol today presented **its hydrogen strategy up to 2030,** with the aim of becoming the **market leader in the Iberian Peninsula** and positioning the company as a **relevant producer in Europe.** The strategy was presented by Repsol's new Hydrogen Director, Tomás Malango.

- The company has announced investments in the entire hydrogen value chain that will reach **€2.549 billion by 2030**. By that year, the company aims to have an equivalent installed capacity of **1.9 GW.**

- Renewable hydrogen is one of Repsol's strategic pillars to achieve zero net emissions by 2050. The company will use **different technologies** to reach its renewable hydrogen production targets, including **electrolysis, biogas production, and photoelectrocatalysis,** a proprietary technology being developing with Enagas as partner.

- Repsol is the leading producer and consumer of hydrogen in Spain, having used this gas in its various businesses for decades. Its **extensive experience throughout the entire value chain,** as well as the synergies established between different uses of hydrogen, places the company in a privileged position compared to other players.

- Repsol is promoting the creation of large regional hubs focusing on renewable hydrogen with the aim of coupling the production and demand of this gas and thus achieving efficient ecosystems.

1.9 GW

Equivalent installed capacity by 2030

Repsol will produce renewable hydrogen through a multi-technological approach. It will use electrolysis, and biogas, and it is developing photoelectrocalysis technology

Present through the whole value chain and with clear competitive advantages to lead the market in Spain and Portugal

Championing major regional initiatives to drive the creation of hydrogen clusters

Repsol today presented its renewable hydrogen strategy, a roadmap for the company to become market leader in the Iberian Peninsula and become the third largest producer in Europe. The company's new Hydrogen Director, Tomás Malango, gave an overview of the projects and initiatives that the company will deploy throughout the renewable hydrogen value chain, with an investment of €2.549 billion until 2030. Repsol plans to use different technologies to reach a capacity of 552 MW equivalent in 2025 and 1.9 GW in 2030.

Communication and Institutional Relations
Executive Managing Division
Tel.+34 91 753 87 87

www.repsol.com
prensa@repsol.com

Firm commitment and technology leadership

Renewable hydrogen is one of the key pillars in Repsol's decarbonization strategy. It is currently the leading producer and consumer of hydrogen in Spain, having for decades used this gas as a raw material in its industrial processes, to manufacture a multitude of essential products for mobility, construction, healthcare, and agriculture, among others.

Repsol is undergoing a transformation process, moving forward in the evolution of its industrial complexes into multi-energy hubs capable of manufacturing products with a low, zero, or even a negative carbon footprint thanks to the use of sustainable raw materials, such as different types of waste, as well as the application of more efficient and decarbonized processes. To achieve this, Repsol will employ all available technologies and develop those that allow for an accelerated energy transition at the lowest possible cost.

Repsol will use electrolysis, biogas, and photoelectrocatalysis to produce renewable hydrogen. The first electrolyzer, with a capacity of 2.5 MW, will start operating in Bilbao in 2022

Repsol has already announced that it will install electrolyzer plants at its industrial complexes. On September 20, Repsol announced that it will install the first electrolyzer at its Petronor refinery in Bilbao. With a capacity of 2.5 MW, the plant will enter into operation in the second half of 2022, and it will supply both the refinery and facilities at the Left Bank Technology Park, located in the nearby municipality of Abanto y Zierbena.

The company has also announced the installation of other electrolyzer plants in the vicinity of its industrial sites. Among the projects already announced are the 100 MW electrolyzers to be located at the Cartagena, Tarragona, and Petronor refineries. The company will also build a 10 MW electrolyzer, together with Enagas and the regional Basque Energy Agency (EVE), to produce renewable hydrogen for the synthetic fuels plant to be installed in the port of Bilbao.

Additionally, the company is adapting its conventional hydrogen production infrastructures to obtain renewable hydrogen from biogas, using different circular economy technologies, among others. In this way, it will be able to produce hydrogen from organic waste from different sources, such as urban solid waste, biomass, or by-products from the agricultural and livestock industries. Repsol has recently carried out the first tests in this regard at its Cartagena refinery, where it has manufactured low carbon footprint fuels using renewable hydrogen.

Repsol has also been working on photoelectrocatalysis technology for more than a decade. The main advantage of this technology over current solutions is that only water and sunlight are needed as raw materials to produce 100% renewable hydrogen. In 2018, Repsol incorporated Enagas into the project with the aim of accelerating the development and the scaling up of the technology. Together, the companies are running a pilot plant that is already generating renewable hydrogen at the Repsol Technology Lab research center in the outskirts of Madrid. The novel design allows the water molecule to be broken down into hydrogen and oxygen in a single step using only solar radiation, without the need to connect the devices to an electrical power source. This significantly reduces the costs of the process since it is not conditioned by the price of electricity, thus, increasing the competitiveness of the technology.

Tomás Malango said: "Our ambition is to bring this technology to commercial scale before 2030, starting with the Puertollano demonstration plant that is scheduled for 2025. If successful, this technology will give Spain a leading technological position in the new hydrogen value chain."

Communication and Institutional Relations
Executive Managing Division
Tel.+34 91 753 87 87

www.repsol.com
prensa@repsol.com

Present throughout the entire hydrogen value chain

Renewable hydrogen will be one of the main energy vectors for achieving the decarbonization of the economy mainly due to its versatility. As an integrated multi-energy company, Repsol will deploy projects throughout the renewable hydrogen value chain to take advantage of the synergies provided by its privileged situation.

Currently, 90% of all hydrogen produced is used in the industrial sector, as a raw material in refining and ammonia production as well as in the steel industry and the chemical industry, among others. For this reason, the EU first and foremost envisions the deployment of renewable hydrogen in industry and in the sectors where electrification is not an alternative to achieve decarbonization in the short and medium term.

The deployment of renewable hydrogen will occur first in industry and in the sectors where there is no current alternative for decarbonization

In the mobility sector, hydrogen is one of the main components in fuel production. It is used to eliminate sulfur in traditional fuels, but it is also essential in the production of liquid fuels with a low carbon footprint, such as biofuels and synthetic fuels. The advantage of these products over other options is that their performance is similar to traditional fuels. They can be used in current car, truck, aircraft, and ship engines without the need for modifications and be distributed through the logistics networks that are already in place.

Repsol believes that combustion engines will continue to be part of mobility solutions thanks to the development of liquid fuels with a low carbon footprint. For aviation and maritime transport, these products are also the most efficient and lowest-cost solutions. From 2030 onwards, hydrogen could be an alternative for heavy transport while, for light vehicles, electrification can become a competitive opportunity as hydrogen fuel cell technologies develop. Repsol has the objective of installing at least 12 hydrogen refueling stations by 2025, providing a complete offer of sustainable energy solutions for mobility, is present in all these segments, giving the company competitive advantages and a unique value proposition for its customers.

According to Tomás Malango, "the combination of advanced biofuels, synthetic fuels, and renewable hydrogen is the most competitive technological option to overcome the challenges of decarbonization in sectors where electrification is currently not viable".

On the other hand, the production of liquid fuels with a low carbon footprint, especially synthetic fuels, is also a way to store energy for later use or transport in a simple and efficient way. This conversion takes full advantage of renewable energy production to store the surplus that is produced when supply exceeds demand. It is also an efficient way to export energy to new markets and boost a new hydrogen economy, promoting industry, and generating quality employment, investments, and wealth.

In Bilbao, Repsol together with Saudi Aramco, will build one of the world's largest synthetic fuel plants, using renewable hydrogen and CO_2 as the only raw materials. The plant will be commissioned in 2024 with a starting capacity of more than 2,100 tons per year.

Transforming renewable hydrogen into synthetic fuels is a simple and efficient way to store energy

Communication and Institutional Relations
Executive Managing Division
Tel.+34 91 753 87 87

www.repsol.com
prensa@repsol.com

In other mobility segments, such as rail transport, hydrogen will also play a leading role, as it is seen as a low-carbon solution, particularly for lines in the secondary network that have not yet been electrified. In this sense, Repsol has recently signed an agreement with Talgo to collaborate in the promotion of hydrogen trains in the Iberian Peninsula. Through this agreement, the company will provide its logistics infrastructure to supply renewable hydrogen to the railway network.

The renewable hydrogen economy

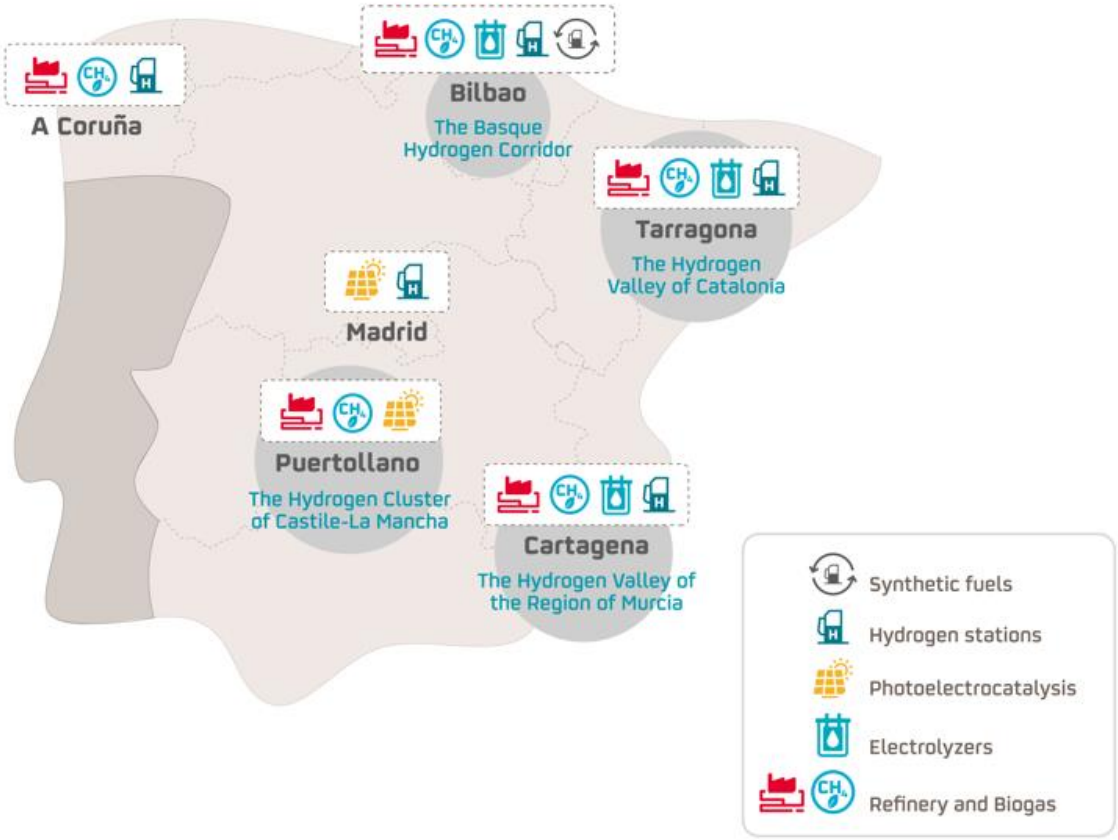
Spain is in a privileged position compared to other countries when it comes to capturing the opportunities offered by the new renewable hydrogen economy. The country has a great abundance of solar and wind resources, and its industry has the capacity to adapt to a new economy centered around the hydrogen value chain.

Repsol is aware of this and of its own strengths as a large multi-energy industrial company and as a driver of employment and investment. It is, therefore, spearheading major regional initiatives to promote the creation of hydrogen clusters. The aim is to match production capacity to the needs of the surrounding industry, including that which will be newly created, in addition to diversifying the uses of renewable hydrogen so that the ecosystem becomes as efficient as possible, both in terms of production, transformation, and logistics costs.

Repsol is promoting the creation of large regional clusters focused on renewable hydrogen, with the aim of coupling production and demand for this gas and, thereby, promoting efficient ecosystems

In February of this year, Petronor and Repsol promoted the creation of the Basque Hydrogen Corridor (BH2C) to boost the economic recovery of the Basque Country and Spain, as a whole, by means of the hydrogen economy, while, at the same time, advancing in decarbonization and the promotion of strategic sectors such as energy, mobility, industry, and services. The consortium has already brought together 80 companies, institutions, and research centers. They plan to mobilize €1.431 billion through 2026 for the execution of 40 projects throughout the hydrogen value chain, with the aim of creating more than 1,300 jobs and positioning the region as an international player in renewable hydrogen.

On May 14, the constitution of the Hydrogen Valley of Catalonia was announced, promoted by Repsol and Enagas and coordinated by the Universitat Rovira i Virgili. More than a hundred companies and organizations have already joined the initiative. Repsol is also one of the driving forces in the Hydrogen Valley of the Region of Murcia. Finally, Repsol participates in the Hydrogen Cluster of Castilla-La Mancha, which will place the Puertollano Industrial Complex at the technological forefront with the installation of a renewable hydrogen production plant based on photoelectrocatalysis, the technology that Repsol is developing together with Enagas.



Moreover, Repsol and EDP have just signed an agreement to, as a first step, evaluate three joint investment opportunities in renewable hydrogen projects in different locations in the Iberian Peninsula. Repsol will lead the project located in the Basque Country region, which aims to install a large-scale electrolyzer, as part of the Basque Hydrogen Corridor initiative. EDP will lead a project in Asturias, which aims to create a Hydrogen Valley in this Spanish region, as well as a project in Sines in Portugal. The latter aims to promote the production of renewable hydrogen by taking advantage of the synergies between Repsol's operations at its industrial complex in Sines - as a potential user of renewable gas - and EDP's role as an energy supplier.

According to Tomás Malango, "we conceptualize decarbonization not only as an environmental lever, but also as a financial and a business-oriented one. The hydrogen valleys are clear business opportunities for Spain."

Communication and Institutional Relations
Executive Managing Division
Tel.+34 91 753 87 87

www.repsol.com
prensa@repsol.com

A new strategy aligned with European and national targets

Repsol's strategy presented today is perfectly aligned with the objectives set forth by both the European Union and the Spanish government.

The Fuel Cells and Hydrogen Joint Undertaking, a public-private initiative that is a means for the European Commission to promote research and development of hydrogen and fuel cell technologies in Europe, has set a 2050 target of 40 GW capacity and a sevenfold increase in its current presence in the energy mix to 13%.

The recent regulatory package proposed by the EU Commission, "Fit for 55", also supports the deployment of renewable hydrogen with measures including the establishment of minimum quotas for use in 2030 (at least 50% in industry, 2.6% quota in renewable fuels of non-biological origin, and 0.7% in synthetic fuels for aviation), among others.

In Spain, the objectives outlined in the Hydrogen Roadmap, published by the Ministry for Ecological Transition and the Demographic Challenge in October 2020, aim for 4 GW of installed capacity by 2030. The Government will finance the development with €1.55 billion from the Next Generation funds through 2024.

However, to achieve these objectives, the public incentives will increase the competitiveness of renewable hydrogen, but the promotion of public-private collaborations as well as a stable and favorable legal framework for the development of capital-intensive initiatives will also be needed to implement large industrial projects throughout the hydrogen value chain, such as those proposed by Repsol.