

Endesa studies developing 23 green hydrogen projects in Spain with an investment of 2.9 billion euros

- *Endesa has notified the Ministry of Ecological Transition of its interest in developing up to 23 renewable hydrogen projects in Spain in different phases of the value chain of this fuel. The associated investment amounts to more than 2.9 billion euros to start up 340MW of power in electrolysers, powered with 2,000 MW of renewable energy*
- *The peninsular electrolysis projects (As Pontes, Huelva, Teruel, Almería, Tarragona, Valle del Ebro, Compostilla and Seseña) entail an aggregate investment of 2 billion euros to build eight electrolysers with a capacity of 315 MW. The building phase will create 620 jobs and a further 320 jobs in the subsequent operation and maintenance phase for the next 20 years. Even more jobs will be created related to the start-up of the renewable generation that will feed the electrolysers*
- *In the case of non-peninsular projects, which will require another 900 million euros of investment, options are proposed that range from the production of green hydrogen in generation plants (Barranco de Tirajana, Granadilla and Alcudia, with electrolysers that will add 25MW), preparing plants to operate with bi-fuel, and converting other operating plants to work with hydrogen/gas*

Madrid, 01 February 2021. –Endesa has presented the Ministry of Ecological Transition with a letter of interest to develop up to 23 projects related to green hydrogen in Spain, both on the Peninsula and beyond. The volume of investment associated with this portfolio, including the investment earmarked for renewable plants that will power the operation of the electrolysers, is approximately 2.9 billion euros. The projects include different actions within the green hydrogen value chain: from production to consumption.

“ Endesa wants to show its clear commitment to green hydrogen as a key in the energy transition process and the decarbonisation of the economy. These are objectives that we have been working on for years that have marked our strategy of progressive replacement of thermal generation by renewable generation. The 23 green hydrogen projects that we are now presenting are associated with a renewable power capacity of almost 2,000 MW”, said the General Director of Generation of Endesa, Rafael González. This power represents more than half of the 3,900 MW that the company has announced it will start up in Spain between 2021 and 2023, according to the update of its strategic plan announced at the end of last November.

These projects will make a decisive contribution to achieving the objectives set for the first phase (2020-2024) of the Hydrogen Roadmap, launched by the Central Government. All hydrogen production projects



require investment in renewable generation parks dedicated to powering the electrolyzers. They also have the option of injecting the surplus electricity generated into the grid.

In addition, Endesa is committed to developing a national industry for the manufacture of electrolyzers and equipment associated with the start-up of its green hydrogen projects. This is another of the strategic areas of its Hydrogen Roadmap.

Peninsular projects

The most advanced project to date is in As Pontes (A Coruña) and will have a 100 MW electrolyser and six associated wind farms, with a combined capacity of 611 MW. Constructing this project would create around 1,600 jobs during the 18-month process. Building the electrolyser, which would take about 24 months from start to finish, would employ about 120 people. Operation and maintenance, for about 20 years, would require a workforce of about 100 people. The total investment of the As Pontes project will reach 738.2 million euros. Operation of the complex, which would have a production of 10,000 tons of green hydrogen, would employ about 130 people in operation and maintenance tasks (100 in the electrolyser and another 30 in wind farms).

The objective of this first project is to show that a facility of this size can be built, operated and maintained from an economic, technical and environmental point of view.

The other proposals for the Peninsula (see table 1) will be located in Huelva, Teruel, Almería, Tarragona, the Ebro Valley (Hydrogen del Cierzo), Compostilla (León) and Seseña (Toledo). Together they will mean an associated power in electrolyzers of 215 MW, the creation of more than 500 jobs in the construction phase and around 220 more in the subsequent operation and maintenance phases.

In total, the projects to be developed in mainland Spain involve a 2,000 million euro investment and electrolyzers with an aggregate capacity of 315 MW.

Extra-peninsular projects

In the case of non-peninsular projects (see table 2), options are proposed that range from the production of energy with green hydrogen in new generation plants (Barranco de Tirajana, Granadilla and Alcudia, which will add electrolyzers for a total of 25MW), the transition from operating plants to bi-fuel and the replacement of power from other operating plants with hydrogen/gas.

The initiatives presented for the Canary Islands, the Balearic Islands and Melilla entail an investment of 900 million euros.

All together, the 23 projects proposed by Endesa are diversified in locations and end uses of hydrogen such as island power generation systems, applications for the chemical industry, substitution of thermal consumption, and fuel for heavy transport would be developed in decarbonisation and just transition areas. The total production of all of them, once put into operation, would add 26,000 tons of hydrogen per year.

Green hydrogen potential

Renewable hydrogen is set to be a key energy vector for the success of the decarbonisation of the energy sector. It will be crucially important in areas where electrification is not the most efficient solution or it is not technically possible in the medium term. Likewise, renewable hydrogen produced by



electrolysis will contribute to the correct regulation of a 100% renewable electricity system, providing greater flexibility and improving supply security.

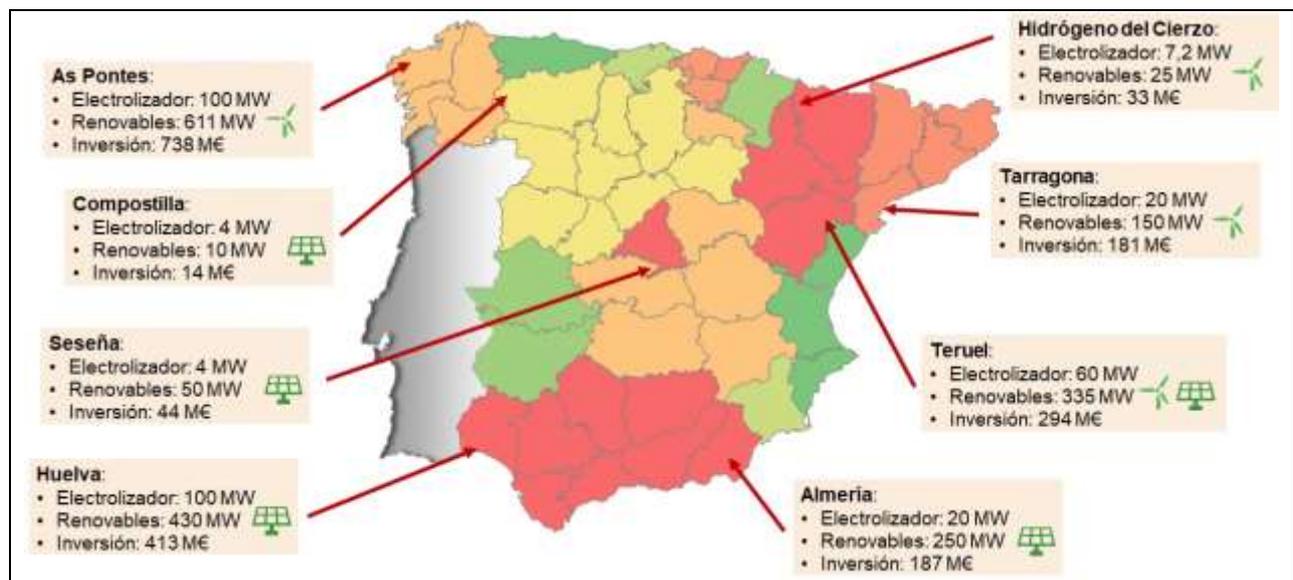
However, production and consumption of renewable hydrogen is a still nascent market, with a low degree of maturity. Currently, only around 500,000 tons of hydrogen are produced and consumed in Spain as a raw material, practically all from fossil fuels, since it has not been a competitive option until now.

In the expected scenario of a reduction in the cost of renewable generation, an increase in CO2 prices and the need for seasonal energy storage, renewable hydrogen production technologies may become competitive in industrial uses in the coming years. In any case, at this time, support mechanisms are still needed to make hydrogen competitive against other alternatives to demonstrate its viability.

About Endesa

Endesa is the leading electricity company in Spain and the second largest in Portugal. It is also the second largest gas operator in the Spanish market. It is an integrated business operation that encompasses everything from generation to marketing, and through Endesa X it provides added value services aimed at decarbonising the energy used in homes, companies, industries and government agencies. Endesa is firmly committed to the United Nations SDGs and as a result strongly promotes the development of renewable energies through Enel Green Power Spain, the electrification of the economy and Corporate Social Responsibility. We also work in the latter area through the Endesa Foundation. We have around 10,000 employees. Endesa is part of Enel, the largest electricity group in Europe.

PENINSULAR GREEN HYDROGEN PROJECTS PRESENTED BY ENDESA (Table 1)



As Pontes:	As Pontes:
Electrolizador: 100 MW	Electrolyser: 100 MW
Renovables: 611 MW	Renewables: 611 MW
Inversión: 738 M€	Investment: € 738 M
Compostilla:	Compostilla:
Electrolizador: 4 MW	Electrolyser: 4 MW
Renovables: 10 MW	Renewables: 10 MW
Inversión: 14 M€	Investment: € 14 M
Seseña:	Seseña:

Electrolizador: 4 MW	Electrolyser: 4 MW
Renovables: 50 MW	Renewables: 50 MW
Inversión: 44 M€	Investment: € 44 M
Huelva:	Huelva:
Electrolizador: 100 MW	Electrolyser: 100 MW
Renovables: 430 MW	Renewables: 430 MW
Inversión: 413 M€	Investment: € 413 M
Hidrógeno del Cierzo:	Hydrogen from Cierzo:
Electrolizador: 7,2 MW	Electrolyser: 7.2 MW
Renovables: 25 MW	Renewables: 25 MW
Inversión: 33 M€	Investment: € 33 M
Tarragona:	Tarragona:
Electrolizador: 20 MW	Electrolyser: 20 MW
Renovables: 150 MW	Renewables: 150 MW
Inversión: 181 M€	Investment: € 181 M
Teruel:	Teruel:
Electrolizador: 60 MW	Electrolyser: 60 MW
Renovables: 335 MW	Renewables: 335 MW
Inversión: 294 M€	Investment: € 294 M
Almería:	Almeria:
Electrolizador: 20 MW	Electrolyser: 20 MW
Renovables: 250 MW	Renewables: 250 MW
Inversión: 187 M€	Investment: € 187 M

EXTRAPENINSULAR GREEN HYDROGEN PROJECTS PRESENTED BY ENDESA (Table 2)

3. Proyectos de hidrógeno de Endesa

Presentados a la call for interest de hidrógeno del Ministerio de Transición Ecológica

Producción de hidrógeno	Paso a bi-combustible
Barranco de Tirajana: <ul style="list-style-type: none"> • Electrolizador: 7 MW • Renovables: 13 MW • Inversión: 30 M€ 	<ul style="list-style-type: none"> • Barranco de Tirajana (Gran Canaria) • Granadilla (Tenerife) • Punta Grande (Lanzarote) • Salinas (Fuerteventura) • Los Guinchos (La Palma) • Jinámar (Gran Canaria) • Candelaria (Tenerife) <p style="text-align: right;">780 M€</p>
Granadilla: <ul style="list-style-type: none"> • Electrolizador: 10 MW • Renovables: 16,5 MW • Inversión: 40 M€ 	
Alcudia: <ul style="list-style-type: none"> • Electrolizador: 8 MW • Renovables: 30 MW • Inversión: 52 M€ 	<ul style="list-style-type: none"> • Mahón (Menorca) 42 M€
	<ul style="list-style-type: none"> • Melilla 56 M€

3. Proyectos de hidrógeno de Endesa	3. Endesa hydrogen projects
Presentados a la call for interest de hidrógeno del Ministerio de Transición Ecológica	Presented to the hydrogen call for interest of the Ministry of Ecological Transition
Producción de hidrógeno	Hydrogen production
Barranco de Tirajana:	Barranco de Tirajana:
Electrolizador: 7 MW	Electrolyser: 7 MW
Renovables: 13 MW	Renewables: 13 MW
Inversión: 30 M€	Investment: € 30 M
Granadilla:	Granadilla:
Electrolizador: 10 MW	Electrolyser: 10 MW
Renovables: 16,5 MW	Renewables: 16.5 MW
Inversión: 40 M€	Investment: € 40 M
Alcudia:	Alcudia:
Electrolizador: 8 MW	Electrolyser: 8 MW
Renovables: 30 MW	Renewables: 30 MW
Inversión: 52 M€	Investment: € 52 M
Paso a bi-combustible	Switch to bi-fuel
Barranco de Tirajana (Gran Canaria)	Barranco de Tirajana (Gran Canaria)
Granadilla (Tenerife)	Granadilla (Tenerife)
Punta Grande (Lanzarote)	Punta Grande (Lanzarote)
Salinas (Fuerteventura)	Salinas (Fuerteventura)
Los Guinchos (La Palma)	Los Guinchos (La Palma)



Jinámar (Gran Canaria)	Jinámar (Gran Canaria)
Candelaria (Tenerife)	Candelaria (Tenerife)
780 M€	€ 780 M
Mahón (Menorca)	Mahón (Menorca)
42 M€	€ 42 M
Melilla	Melilla
56 M€	€ 56 M