Ministry of Foreign Affairs

Factsheet

Hydrogen in Croatia

North Adriatic cross border Hydrogen ValleyPhoto by Tradeyep

Potential for new developments

NL Embassy in Zagreb, Croatia

Croatia, a Mediterranean country with an extensive coastline, has abundant natural resources for hydrogen production. Electrolysis systems using renewable sources, primarily water, wind, solar, and geothermal energy, are suitable for hydrogen production, along with hydrogen that could be produced from waste by pyrolysis or gasification. In 2022, Croatia adopted the Hydrogen Energy Strategy until 2050. The strategy aims to achieve climate neutrality by 2050 and includes developing the green hydrogen market as one of its pillars. Private and public companies, institutes, and hydrogen associations are already developing technology and hydrogen projects in Croatia. About sixty projects are ready for implementation. Financing projects for hydrogen-based energy transition in Croatia is available via different national and European programs, creating opportunities for business partnerships and investors to consider connecting to hydrogen projects in Croatia or introducing technological solutions currently lacking in the market.

Hydrogen industry plans in Croatia

Hydrogen is currently not used as a source of energy in Croatia, but the country has ambitious plans to change that in the coming decades.

Croatia's hydrogen strategy outlines two scenarios for incorporating hydrogen into the country's energy mix. The first scenario is more conservative, planning to connect 70 megawatts (MW) of hydrogen production facilities by 2030, which is 0.2% of total energy consumption. By 2050, Croatia aims to increase this share to 11% by installing 2,750 MW of hydrogen production facilities and 70 MW of electrolysers. The second scenario is more optimistic, foreseeing the installation of electrolysers with a capacity of 1,270 MW by 2030 and 7,330 MW by 2050. In such a scenario, the share of hydrogen in energy consumption would rise to 3.75% by 2030 and 15% by 2050. Depending on the actual scenario, the required investments would amount to EUR 3.1 billion by 2050 or EUR 9.3 billion in the second scenario.

To assess the readiness of the domestic market players for hydrogen technologies, the Croatian Chamber of Economy conducted a mapping exercise

of 115 companies and several institutes in Croatia. Preliminary data showed that 43% of companies incorporate hydrogen or hydrogen technology in their work. These are mainly engineering and technical consultancies, electricity distribution companies, parts producers and non-specialized wholesale companies. Some examples:

- *ACI Marina Opatija to become the first Croatian marina with a fully developed hydrogen value chain;*
- *Vukovar and Zadar with potential to become "hydrogen ports" for exporting hydrogen outside Croatia);*
- *The oil company INA uses green hydrogen from PV to decrease their carbon emissions;*
- *Two innovative Croatian companies, DOK-ING and Active Solera explore potential of waste to produce green hydrogen (a pilot project on the island of Cres).*
- *The tile factory Dilj from Vinkovci (NEXE Grupa), wants to produce and use hydrogen as a partial substitute for natural gas inside the furnace of the tile factory.*

The transportation and industrial sectors are leading the way in transitioning to hydrogen fuel. To promote clean transportation, several cities have already begun procuring eco-friendly vehicles for their public transportation fleets and are installing hydrogen refuelling stations. The National Recovery Plan envisions installing 10 refuelling hydrogen stations by 2024, stationed along highways, on some islands, and in seaports to cater to Croatia's tourism industry. These stations may also be used for shipping sector in the future.

In the industrial sector, refineries and petrochemical plants are expected to be among the first to use renewable hydrogen. Croatia plans to produce one million tons of green hydrogen by 2025 in sites where renewable electricity is produced. It also plans to increase production by using electrolyzers connected to the power grid. Funding is already available for the procurement of electrolyzers. Croatia's hydrogen market is mainly focused on developing systems for water electrolysis, pyrolysis, and waste gasification. To reduce the strain on the energy system, production sites are planned to become consumption sites as well. Existing gas pipelines will be repurposed for storage and transport. In the long run, Croatia aims to construct a new pipeline system to become an entry point for transshipment and hydrogen delivery to other EU countries.

Significant funds for the development of infrastructure for the decarbonization of the energy sector for the use of hydrogen in transport and electrolysers are planned in the NPOO, but also in the new EU multi-year financial framework. Through the EU funded programs, (Horizon, Innovation Fund, CEF, Just Transition Fund, IPCEI, RePower) grants will be available for various purposes.

Challenges in developing hydrogen sector

Croatia currently has neither production nor demand for renewable hydrogen. The main challenges in developing the hydrogen economy will specifically be linked to setting up the production, building a distribution system and creating greater demand for hydrogen. The whole process from idea to realization of energy projects in Croatia can still be a long, expensive and complicated. Approaching right partners and carefully planning market approach is worth an effort.

Government initiatives for development

The North Adriatic Hydrogen Valley initiative is important starting point for the deployment of hydrogen in Croatia. This regional project brings together Croatia, Slovenia and Italy around an ambitious goals: a production of 5.000 tons of hydrogen annually; 45.000 new workplaces, 3,6 billion euros added value generated every year until 2030. The Croatian part of the consortium comprises six companies, three scientific and research institutions, and The Ministry of Economy and Sustainable Development. Of totally available 25 million euros for development of the North Adriatic Hydrogen Valley, Croatia is eligible to receive a grant of 7.4 million euros in total.

Six projects in Croatia are in high stage of readiness for implementation by the end of 2026. The EU provided them funding of 45 million euros, of which 13.5 million euros was co-financed by Croatia.

- *Refitting five diesel locomotives to run on hydrogen, enabling the implementation of the clean fuel technology in railway transportation and decarbonizing routes within Croatia. This is*

specifically important for not-yet-electrified railway lines Koprivnica-Osijek and Karlovac-Split.

- *A hydrogen production, storage, and distribution testing and demonstration centre will be established to support the development of hydrogen technologies. The centre will serve as a testing ground for the use of hydrogen and natural gas mixtures in the energy, industrial, and transport sectors.*

Opportunities for Dutch companies

Advanced technologies and solutions are currently lacking on the market, and hydrogen has the potential to be a game-changer in numerous areas. For instance, the shift to hydrogen could reduce carbon emissions from ferries and transportation, as is being developed on the island of Cres, a part of the ISLANDER Project. Furthermore, opportunities lie in producing hydrogen from organic waste via pyrolysis. No doubt, introducing new technologies such as electrolyzers, compressors, and hydrogen tanks to the market could expedite the adoption of hydrogen as a clean energy source.

What can the Embassy do for you?

The Embassy in Zagreb could facilitate your company in a number of ways:

- Answer first-line questions regarding doing business in Croatia;
- Provide where possible more detailed market information based on your specific questions and needs;
- Facilitate contacts with local and regional authorities.
- Provide introductions to Croatian and Dutch companies active in Croatia.

More information

You can find general information about doing business in Croatia, available subsidies and financing for entrepreneurs on the Embassy's website and on the website of the Netherlands Enterprise Agency (in Dutch).

For further information, you can contact the economic section of the Embassy via zag-ea@minbuza.nl

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