Green H2 Uzhgorod

Green Hydrogen from Western Ukraine for Europe - a partnership with GIZ and N1Capital

The challenge

Ukraine's significant potential in solar, wind power, and gas infrastructure could play a key role in hydrogen production. The country's energy strategy aims for carbon-neutral supply by the year 2050. As an accession candidate to the European Union, transforming its energy system is crucial. The full-scael Russian invasion has reinforced the urgency for a secure and sustainable energy supply, leading to increased decentralised renewable energy systems, which are quicker to build and more resilient to war impacts than centralized ones.

National and international stakeholders are interested in cooperating with Ukraine to develop a hydrogen economy, seen as vital for post-war economic development and potential significant hydrogen supply to the European market. In 2021, Ukraine, Slovakia, the Czech Republic, and Germany explored creating a Central Hydrogen Corridor, enabling the delivery of 1.6 million tonnes of hydrogen per year. The Slovak gas company EUstream is constructing an 80 km hydrogen supply pipeline between Veľké Kapušany, near the Ukrainian border, and Košice. This pipeline is expected to supply hydrogen to Germany, Austria, the Czech Republic, and Poland. For its success, the development of green hydrogen projects in the Zakarpattia Oblast to provide the hydrogen for injection into the pipeline. However, as of beginning of 2025, no renewable hydrogen project has been implemented yet, and technical and regulatory details remain to be clarified.

The solution

An example of ongoing initiatives of private businesses to develop the market is the Irish investment firm N1 Capital. The company is developing green hydrogen projects in Mukachevo and Uzhgorod, located in Zakarpattia Oblast, the least war-affected region of Ukraine. The green hydrogen production center is strategically located near a major gas compressor station, operated by Ukraine's gas transmission network, and will have a direct connection to the Central European Hydrogen Corridor.

The Uzh river with the historic city centre of Uzhgorod.

To determine the best approach for implementing hydrogen projects in Ukraine, N1 Capital had already conducted an interconnection study with the Ukrainian grid operator and started negotiations with potential offtakers.

The hydrogen will be produced through electrolysis, a process that splits chemical compounds using electricity. The required electricity will come from renewable energy sources onsite and as well as through power purchase agreements from renewable projects in other regions of Ukraine. The project will be developed and built in a phased approach.

The project will be one of the first industrial-scale projects. As a frontrunner, it provides ample opportunities for learning and clarification of open issues. Thus, N1 Capital and GIZ have joined forces to implement the public private collaboration (**PPP) project "Green H2 Uzhgorod".**

How it will be done

Feasibility Study and Regulatory Analysis

A comprehensive pre-feasibility study will assess technical, financial, and regulatory aspects of green hydrogen production in Ukraine. The study provides key insights into:

- Infrastructure requirements, including grid integration, gas pipeline connections, and energy storage solutions.

- Economic feasibility, with detailed information about initial investments and ongoing costs, including financial modelling.
- Environmental impacts and water sourcing.
- Regulatory challenges, including outdated planning norms, grid connection barriers, and gaps in hydrogen transport regulations.

The project develops templates for gas interconnection templates and a standardised checklist to help other hydrogen developers navigate regulatory and infrastructure requirements including environmental permitting.

Stakeholder Engagement and Knowledge Sharing

The project will engage with key Ukrainian stakeholders, including policymakers, regulators, and industry representatives, to address legal and infrastructure challenges. This will be achieved through:

- Workshops and public dialogues with Ukrainian authorities and private sector representatives.
- Knowledge transfer through publicly available best-practice guidelines and technical templates.
- Community engagement, ensuring local participation and benefits from hydrogen investments.

The project also collaborates with Ukrainian universities and research institutes, helping to build local expertise in hydrogen production and regulatory frameworks.

Expected outcome

- Validation of large-scale hydrogen production feasibility in Ukraine, providing a business case for future investments.
- Attracting financial support from international investors, development banks, and industrial off-takers.
- Strengthening Ukraine's energy security by diversifying energy sources and reducing reliance on fossil fuels.
- Facilitating hydrogen exports to the EU market, supporting Ukraine's economic recovery.
- Decentralising and demonopolising Ukraine's energy sector, fostering a competitive market environment.
- Job creation in renewable energy and hydrogen-related industries, supporting local and national economic growth.
- Increased tax revenues and lease payments to municipalities and local communities.

The project at a glance	
Duration	November 2024 to December 2025
Country	Ukraine
Objectives	Based on a (pre-)feasibility study of a utility scale hydrogen project in Zakarpattia Oblast green hydrogen project development barriers are identified and project development templates created and made available to the market to expedite the growth of the Ukrainian green hydrogen sector.
Partners	N1 Capital
Outputs	• Prove whether there is a business case for large-scale green hydrogen production. • Identify risks at an earlier stage and inform the site selection process. • Provide templates and guidance to reduce costs, complexity and lead time. • Capacity building

The International Hydrogen Ramp-up Programme (H2Uppp) of the German Federal Ministry for Economic Affairs and Energy (BMWE) promotes projects and market development for green hydrogen in selected developing and emerging countries as part of the National Hydrogen Strategy.

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