Polish perspective on hydrogen

Innovation and Technology Development Department

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Poland is one of the largest hydrogen producers in Europe producing megaton of H2 annually; 14% of the demand for this raw material in the EU.

Companies Azoty and Lotos are responsible for over half of H2, but it is used entirely for internal purposes

The possibility of using hydrogen in heating is being considered. A mixture containing up to 10% of hydrogen is possible in some cases.

Poland…

Has the observer status in the International Partnership for Hydrogen and Fuel Cells

Is in the group of over thirty countries that signed the Tokyo Agreement on October 23, 2018.

Wants to reduce its dependence on coal and sees hydrogen as a way to achieve this target

Working Team on Strategic Analysis of the Development of Hydrogen Economy in Poland is tasked with the identification of regulatory acts on hydrogen requiring changes, i.e.

- vehicle approval,
- distribution,
- refueling stations,
- safety regulations.

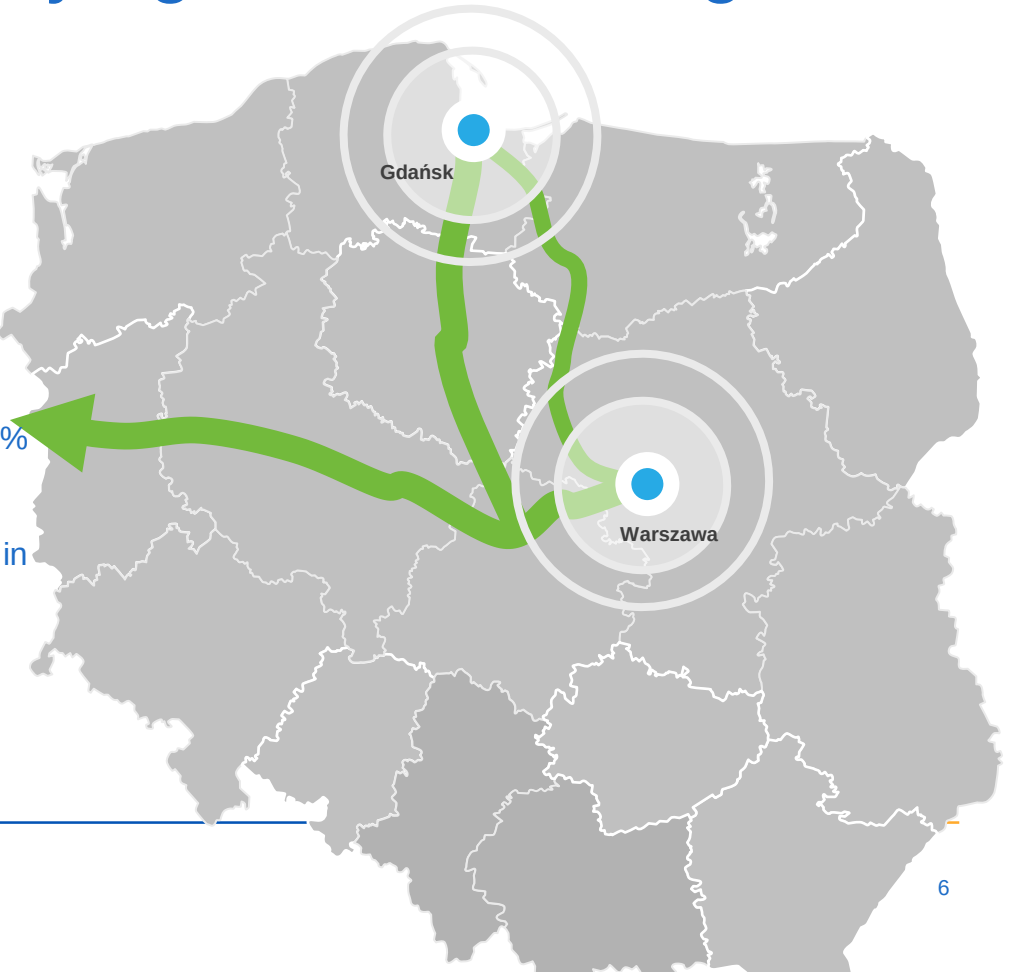
Supporting the creation of a hydrogen society and the implementation of H2 in the field of energy and transport by identifying the right goals, solutions, value chains, etc.

Support for the construction of flagship installations based on fuel cell technology to promote cogeneration systems powered by hydrogen

Ongoing hydrogen research and demonstration projects

Pure H2 - Hydrogen Purifying Unit and Filling Infrastructure

- Project co-financed by CEF Blending Facility
- Currently: 4 hydrogen-producing installations:
  - 3 installations for natural gas steam reforming
  - 1 hydrogen recovery installation
  - 15.5 tons of hydrogen per hour
- Goal: purification, distribution and fueling of 99.999% hydrogen:
  - purification installation in Gdańsk, refueling stations in Gdańsk and Warsaw
  - Value of the Project – 9 917 500 EUR
  - co-financing from CEF 1 983 500 EUR
- Hydrogen availability - December 2021



The cogeneration system based on SOFC fuel cells

- The first Polish micro-combined heat and power unit
- Cogeneration microcircuit with an electrical and thermal power of approx. 2 kWe based on SOFC fuel cells.
- The installation uses purified biogas, but it is possible to use alternative fuels, including natural gas, hydrogen and synthetic fuels such as dimethyl ether (DME)
- Powered by various fuels, including those of low-quality.
- Unique Polish solutions, in particular the patented technology of waste-free SOC cell production (ceramic injection method)
- Fits well into the needs of small households and SMEs

NewSOFC. New structures, materials and technologies for the production of advanced solid-oxide fuel cells

- The development of new material, constructional and technological solutions for the production of SOFC
- Aimed at improving the performance of cells, increasing their reliability and reducing the cost of manufacturing
- The material scope is to check the impact of the additives
- The refining of the technology of making anodic cell carriers has been taken into account, using the inexpensive high-pressure thermoplastic injection method.

System for distributed hydrogen production from biogas

- Innovative microwave system for dispersed production of hydrogen.
- This is the first installation of this type in Poland, enabling the production of approx. 7 kg H2/h.
- Hydrogen production in conventional reforming processes (pyrolysis), dry reforming, steam and catalytic reforming, methane and biogas steam reforming.

International projects

- BALANCE. Increasing penetration of renewable power, alternative fuels and grid flexibility by cross-vector electrochemical processes
- HyLAW. Identification of legal rules and administrative processes applicable to Fuel Cell and Hydrogen technologies' deployment, identification of legal barriers and advocacy towards their removal
- BIO-CCHP. Modern installations based on gasification of biomass, fuel cells and absorption refrigerators
- ONSITE. Operation of a Novel SOFC-battery Integrated hybrid for Telecommunication Energy systems
- SOFCOM. SOFC CCHP with poly-fuel: operation and maintenance

Planned hydrogen research and demonstration projects

- Project that involves the modernization and replacement of the internal combustion engine of a locomotive with hydrogen fuel cells and a lithium-ion battery. Planned completion in 2021.

- Construction of offshore wind farms in the Baltic Sea, and the implementation of a pilot project for hydrogen production using the water electrolysis process.

- Adapting the hydrogen separation technology from coke oven gas, which allows obtaining a high purity hydrogen for electromobility

- Prototype device for hydrogen attestation. The project assumes the use of an optical method for testing the purity of hydrogen and the construction of a device capable of measuring all hydrogen pollution (in accordance with ISO). The planned completion of the project is 2021.

- PEM electrolizer with storage infrastructure with the capacity of at least 1 MW to create hydrogen from electrolysis using renewable energy resources for the production of green hydrogen.

Summary

Poland notices the huge untapped potential of hydrogen as a:

- source of energy and heating
- clean alternative for public and private transport
- new branch of economy
- raw material for export
- chance to improve the quality of life in large urban agglomerations

Poland supports all international initiatives aimed at promoting the use of hydrogen and is interested in the development of various methods of obtaining hydrogen, giving positive economic and environmental effects in the future.

Poland is convinced that the large scale use of hydrogen would ease our transition into a modern, prosperous and clean economy.

Thank You

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