GREEN HYDROGEN HUBS

PRODUCTION, STORAGE AND DISTRIBUTION OF GREEN HYDROGEN AND RENEWABLE ENERGY

EUROPEAN CONSORTIUM
H2R HYDROGEN RENEWABLE

AGENDA

- INVESTMENT VISION
- UNIQUE VALUE PROPOSITION
- LOCATION
- PARTNERS
- TECHNOLOGY
- INNOVATION
- MARKET AND END-USERS
- ENVIRONMENTAL IMPACT
- INVESTMENT SCHEDULE
- PHASES
- BUDGET
- EU FINANCING PROGRAMMES

PROJECT GOALS

- Development, deployment and operation of a large-scale system for generation, distribution and consumption of green hydrogen. The model installation will provide a proof of feasibility and will become a basis for expansion of hydrogen usage in the energy management in Europe.
- Sustainable growth through hydrogen technologies and their applications as well as creation of green jobs throughout the hydrogen value chain.
- Improvement of renewable energy storage and distribution technologies through hydrogen compression, storage and delivery to end-users.
- Enhancement of existing hydrogen technologies, incl. fuel cells, electrolysers, storage methods and hydrogen refuelling solutions.
- Diversification of energy supply and creation of new, stable and secure autonomous energy ecosystems in the EU.
- Reduction of greenhouse gas emissions. The deployment of hydrogen technologies is expected to be one of the key factors in achieving the EU decarbonisation targets.

UE ENERGY SECURITY

- EU Energy Security Policy (EU Communication of 8 February 2022 – full independence from Fossil Fuels imported from Russia by 2030 – development acceleration of hydrogen technologies and HydroGenewables i.e., products or services created from the combination of clean hydrogen and renewable energy.

- Hydrogen Strategy for a Climate-Neutral Europe, Brussels, 8.7.2020.COM(2020) 301 final
  Production of green hydrogen
  Hydrogen storage and distribution
  Green hydrogen transport
  European Hydrogen Valleys & Hydrogen Hubs

- Hydrogen Europe – acceleration of solutions of European strategic importance i.e.,
  development of hydrogen technologies under the EU Hydrogen Strategy in new directions:
  REPLACING – replacing outdated technologies towards reducing emissions and introducing modern solutions to the industry based on green hydrogen and Renewable Energy Sources (RES),
  REINVESTING – allocation of revenues from ETS emissions trading for the modernisation and innovation of energy systems.

GREEN HYDROGEN MARKET AND TECHNOLOGY DEVELOPMENT

Development of hydrogen technologies and research towards green hydrogen. Technological scale-up making the solutions accessible to a wider spectrum of end-users in the European market.

Moving away from fossil fuels in favour of secure, autonomous energy supply systems (regional & local ecosystems).

Development of hydrogen markets and regulation-based technological exchange chains for green hydrogen by scaling and merging clean hydrogen-based infrastructure solutions.

Development of highly efficient and integrated energy systems using RES, incl. hydrogen technology for the creation of the energy mix, supply chains and hydrogen-based green economy.

HYDROGEN DEMAND IN POLAND

GREEN HYDROGEN REPORT, 2021

SECTOR	2021	2030	2040	2050	COMMENT
INDUSTRIAL APPLICATIONS	33	33	30	28	The reduction in demand from 33 TWh to 28 TWh will be accompanied by a shift to green or in a limited extent blue hydrogen.
TRANSPORT	0	2	23	33	Experts forecast significant growth in demand for aviation fuel (36 TWh). Given current level of production, the forecast has been limited to 18 TWh.
HEATING	0	2	12	15	Different ways of obtaining thermal energy from hydrogen.
ELECTRICITY GENERATION	0	3	24	36	Balancing the needs of the sector will require effective use of surpluses from RES in hydrogen generation process.
TOTAL	33	46	89	112	Increase in demand associated with green hydrogen generation technology improvement.

Table 7.1. Forecast of hydrogen demand in Poland (in TWh) taking into account all sectors of the economy

TARGET INSTALLATION PARAMETERS

Photovoltaic power plant:	300 MWp
Maximum hourly electricity production:	284 MWh
Annual electricity production:	360 GWh
Power of electrolysers for the production of green hydrogen:	95 MW
Daily average production of green hydrogen:	16 tonnes
Annual production of green hydrogen:	5 820 tonnes
Daily average production of liquid oxygen:	99 tonnes
Annual production of liquid oxygen:	36 160 tonnes
Financing scale:	600 MM EUR
Employment:	100
Reduction of CO2 emissions per day:	600 tonnes
Reduction of CO2 emissions per year:	2 300 000 tonnes
Planted trees equivalent:	8 000 000

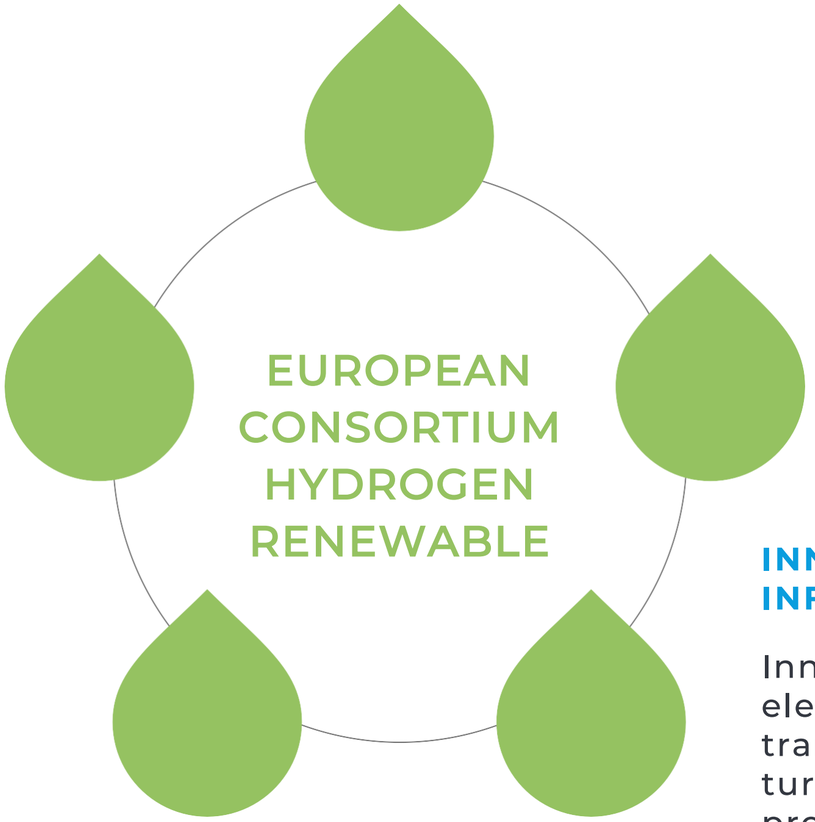
LARGE SCALE EUROPEAN INVESTMENT

GREEN HYDROGEN HUB

The first integrated installation in Poland for the production, storage and distribution of green hydrogen using solar energy in Nowa Dęba and Grębów regions in Podkarpackie Voivodeship.

EUROPEAN SCALE

Consortium Poland – Germany – Slovakia



MODERN PV TECHNOLOGIES

The use of the latest technologies, such as double-sided photovoltaic panels with two active sides minimizing the risk of fire.

INTEGRATION

Integration with the circular economy system of energy generation from RES, storage and distribution of green hydrogen for the needs of powering industry and green transport.

INNOVATIVE TECHNOLOGY AND INFRASTRUCTURE

Innovations in the field of efficiency of electricity generation, hydrogen storage, transport, and the use of oxygen in gas turbines as a by-product of the electrolysis process to optimize electrolyzer operating times.

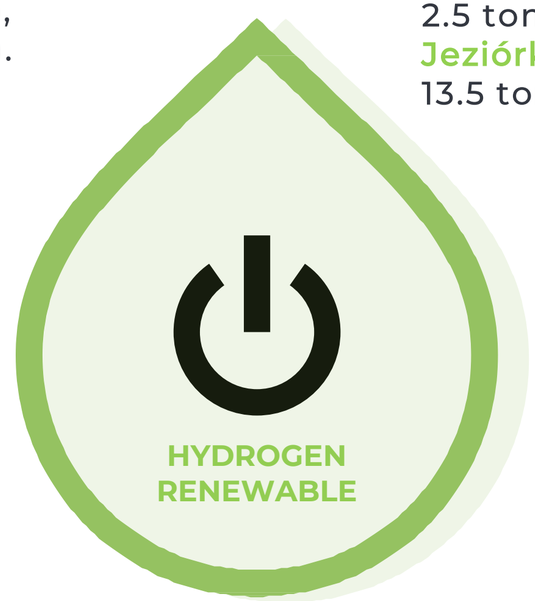
PROJECT ELEMENTS

PV POWER PLANT WITH A TARGET CAPACITY OF 300 MWp

Locations in Poland: Chmielów (PV+H2), Jeziórko (PV+H2), Jeziórko (PV), Grębów Żupawa (PV), Jeziórko Wydrza (PV), Wydrza (PV).

ELECTROLYSERS WITH A TOTAL CAPACITY OF 95 MW

Hydrogen production in two locations:
Chmielów, average hydrogen production:
2.5 tonnes/day → 920 tonnes/year,
Jeziórko, average hydrogen production:
13.5 tonnes/day → 4 900 tonnes/year.



GREEN HYDROGEN TRANSPORT AND DISTRIBUTION

Hydrogen mobility: hydrogen transport in compressed form at a transportation pressure of 350-700 bar. Possibility of using rail transport as well (railway siding in location Chmielów).

GREEN HYDROGEN STORAGE

Hydrogen compression for low-pressure storage (40 bar) and high-pressure transportation (350-700 bar). Steel tanks for low pressure and composite tanks for high pressures.

SALE OF GREEN ELECTRICITY

Surplus electricity bay be sold as part of a local energy cluster given proximity of the local Special Economic Zone.

OXYGEN GENERATED (AS BY-PRODUCT) VIA ELECTROLYSIS

Oxygen generation at two locations:
Chmielów, average oxygen production:
15.5 tonnes/day → 5 710 tonnes/year,
Jeziórko, average oxygen production:
83.5 tonnes/day → 30 450 tonnes/year.

GREEN HYDROGEN PRODUCTION AND CONSUMPTION MODEL

PHOTOVOLTAICS OR OTHER SOURCES OF RENEWABLE ENERGY

ELECTRICAL ENERGY

ELECTROLYSIS

HYDROGEN

COMPRESSION, STORAGE AND DISTRIBUTION OF HYDROGEN

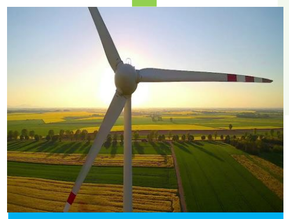
HYDROGEN REFUELLING STATIONS

PUBLIC TRANSPORT

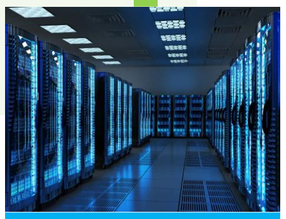
INDUSTRIAL END-USERS

GREEN ENTERPRISES

EV CHARGING STATIONS



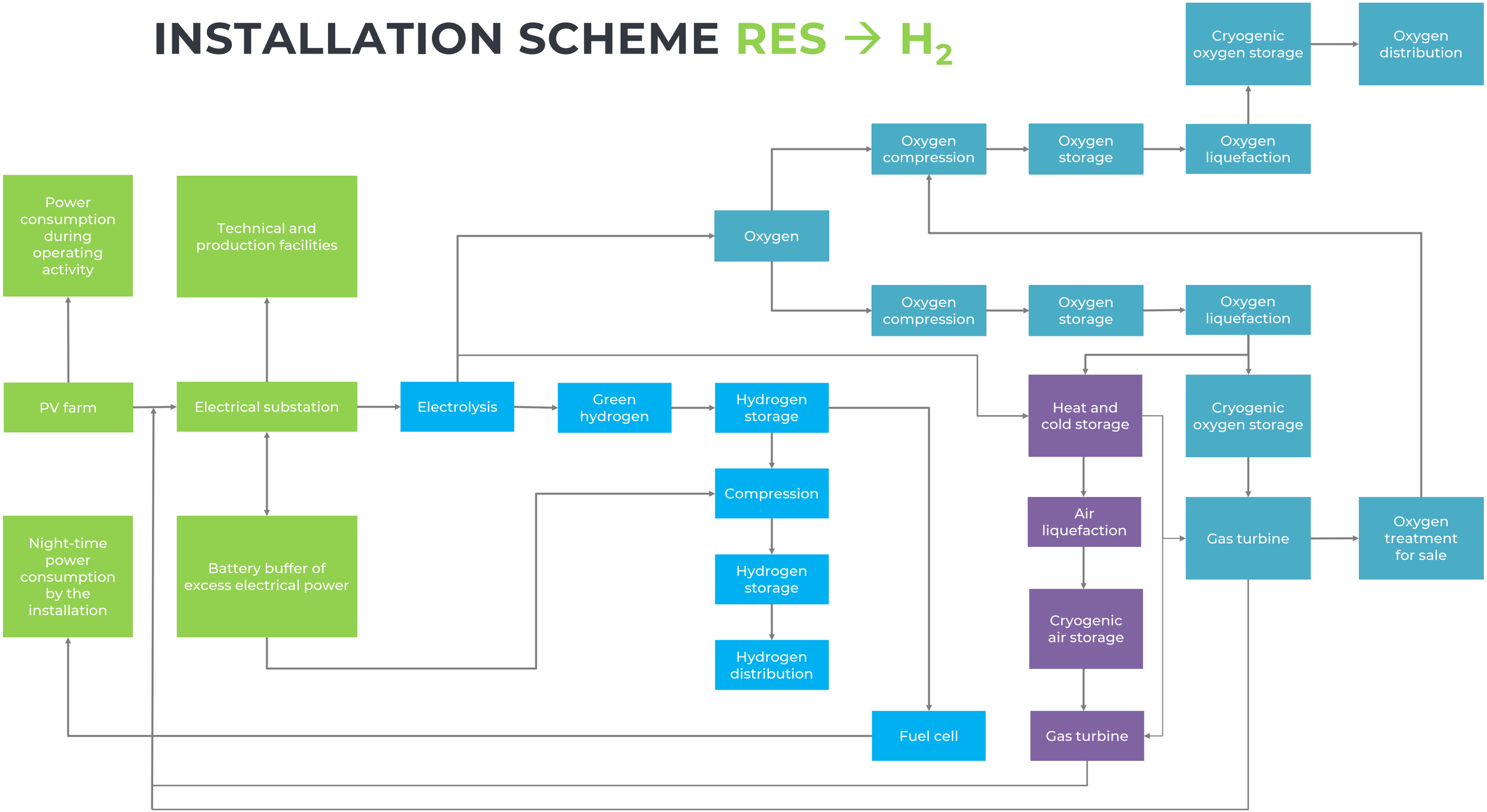
ENERGY CLUSTERS



DATA CENTRES

FUEL CELL SYSTEM

INSTALLATION SCHEME RES → H_2



UNIQUE VALUE PROPOSITION

OPTIMIZED HYDROGEN PRODUCTION

Maximized hydrogen production through the use of innovative solutions, such as powering electrolysers with the use of a gas turbine powered by stored excess energy from PV in the form of compressed oxygen & PV panel mounting systems that allow for continuous optimization of the angle of inclination of the panels relative to the sun.

MODEL INSTALLATION

As a result of the project, a model green hydrogen generation, storage and distribution installation will be created that could later be replicated in other locations or serve as a major green hydrogen supply source for multiple end-users.

TECHNOLOGICAL DEVELOPMENT

The technological advancement generated as a result of the R&D works in the project will strengthen the European hydrogen value chain as well as improve accessibility to hydrogen solutions for end-users.

AVAILABLE RESOURCES

Ownership of approx. 400 ha of land where the PV power plant as well as hydrogen production, storage and distribution facilities will be located will significantly expedite the investment process. Currently, the investor is in the process of receiving necessary environmental and construction permits.

LOCATION DESCRIPTION

The investment in Poland will be located in:

Gmina Nowa Dęba, Podkarpackie region,

Gmina Grębów, Podkarpackie region.

List of locations:

Chmielów (PV + H2); 51.1 ha; PV power 45 MWp; electrolyser power 15 MW,

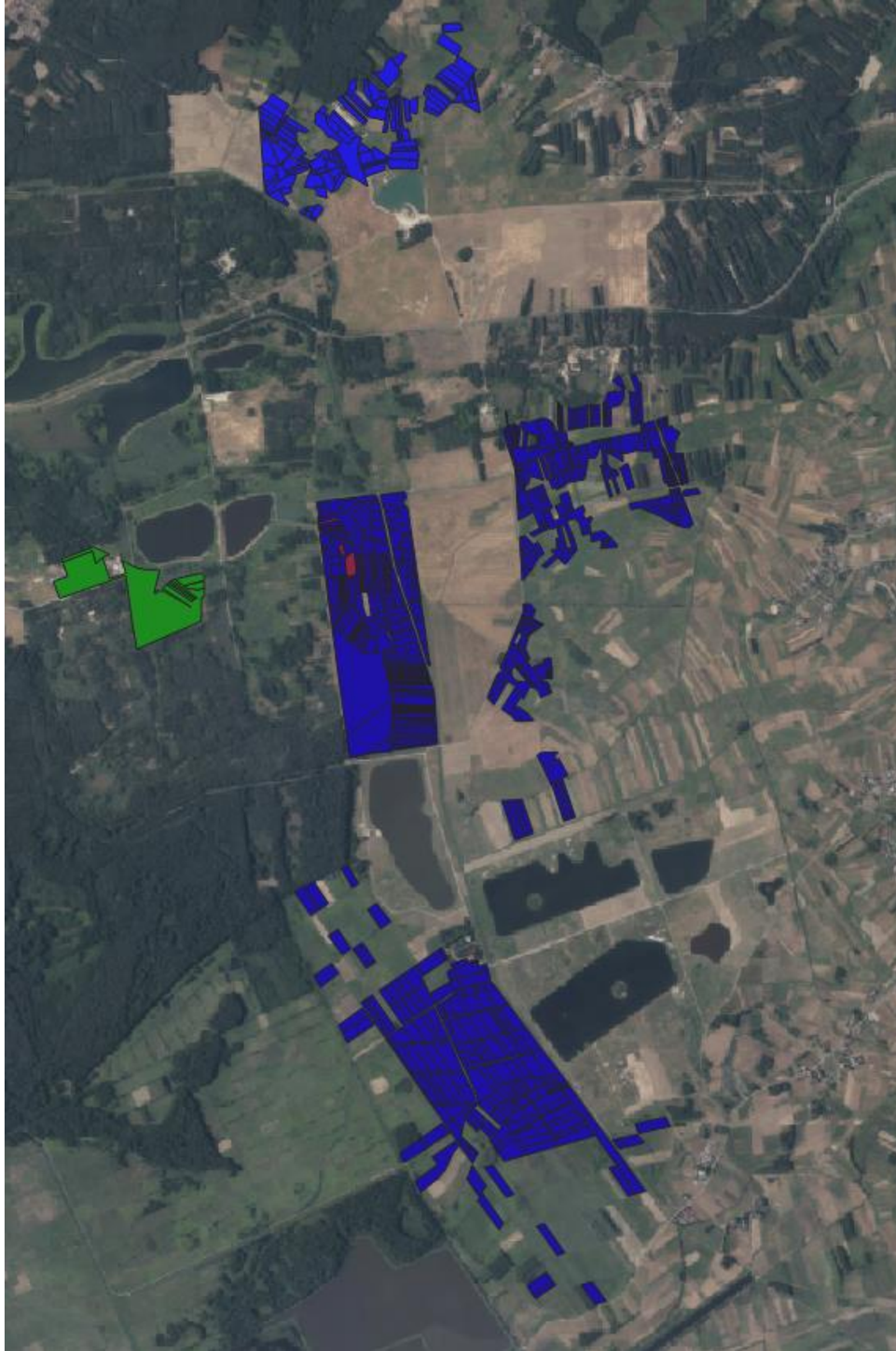
Jeziórko (PV + H2); 22.5 ha; PV power 10 MWp; electrolyser power 80 MW,

Grębów-Żupawa (PV); 59 ha; PV power 40 MWp,

Jeziórko (PV); 80 ha; PV power 75 MWp,

Jeziórko-Wydrza (PV); 75.1 ha; PV power 45 MWp,

Wydrza (PV); 135 ha; PV power 90 MWp.



CHMIELÓW – 50 MWp PV i 15 MW ELECTROLYSER POWER

TECHNICAL PARAMETERS:

area: 51.1 ha,

PV power: 45 MWp,

hydrogen production: YES,

electrolyser power: 15 MW,

oxygen management: YES,

average hydrogen production: 2.5 tonnes/day → 920 tonnes/year,

average oxygen production: 15.5 tonnes/day → 5 710 tonnes/year.

SELECTED INSTALLATION ELEMENTS:

electrolysers (2,5 MW each): 15 MW,

ionic compressors H2 - up to 350 bar & O2 up to 50 bar,

H2 storage 350 bar: 22 tonnes,

O2 storage 50 bar: 200 tonnes,

fuel cell: 1.2 MW,

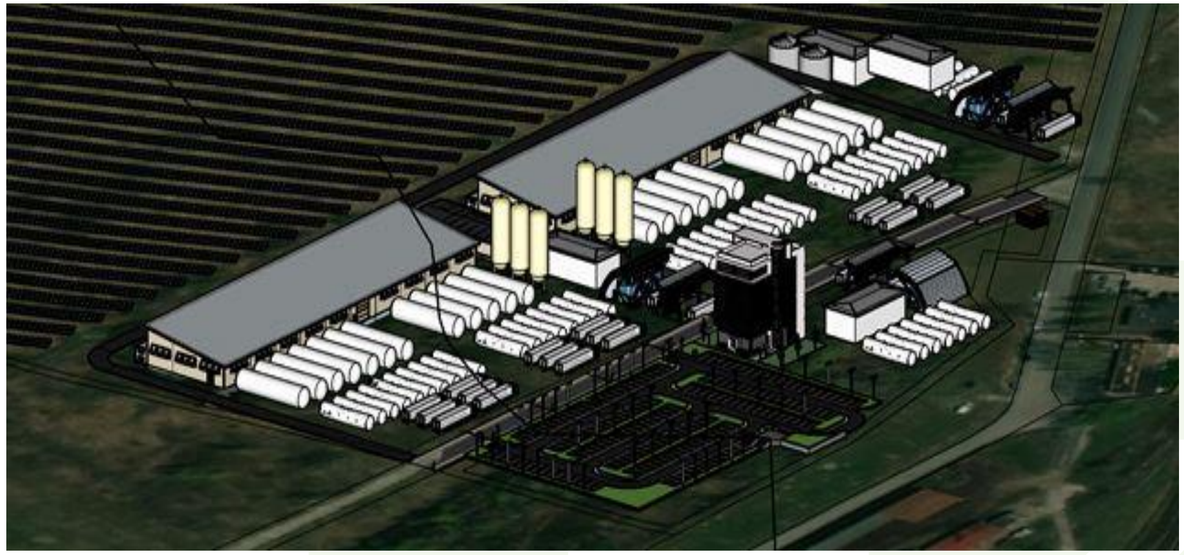
air compression and liquefaction system (LAES): 15 MW,

gas turbines,

LOES storage tanks,

hydrogen distribution and refuelling stations.

CHMIELÓW – INSTALLATION VISUALISATION



JEZIÓRKO – 10 MWp PV i 80 MW ELECTROLYSER POWER

TECHNICAL PARAMETERS:

area: 22.5 ha,

PV power: 10 MWp,

hydrogen production: YES,

electrolyser power: 80 MW,

oxygen management: YES,

average hydrogen production: 13.5 tonnes/day → 4 900 tonnes/year,

average oxygen production: 83.5 tonnes/day → 30 450 tonnes/year.

SELECTED INSTALLATION ELEMENTS:

electrolysers (2,5 MW each): 80 MW,

ionic compressors H2 - up to 350 bar & O2 up to 50 bar,

H2 storage 350 bar: 100 tonnes,

O2 storage 50 bar: 600 tonnes,

fuel cell: 2.4 MW,

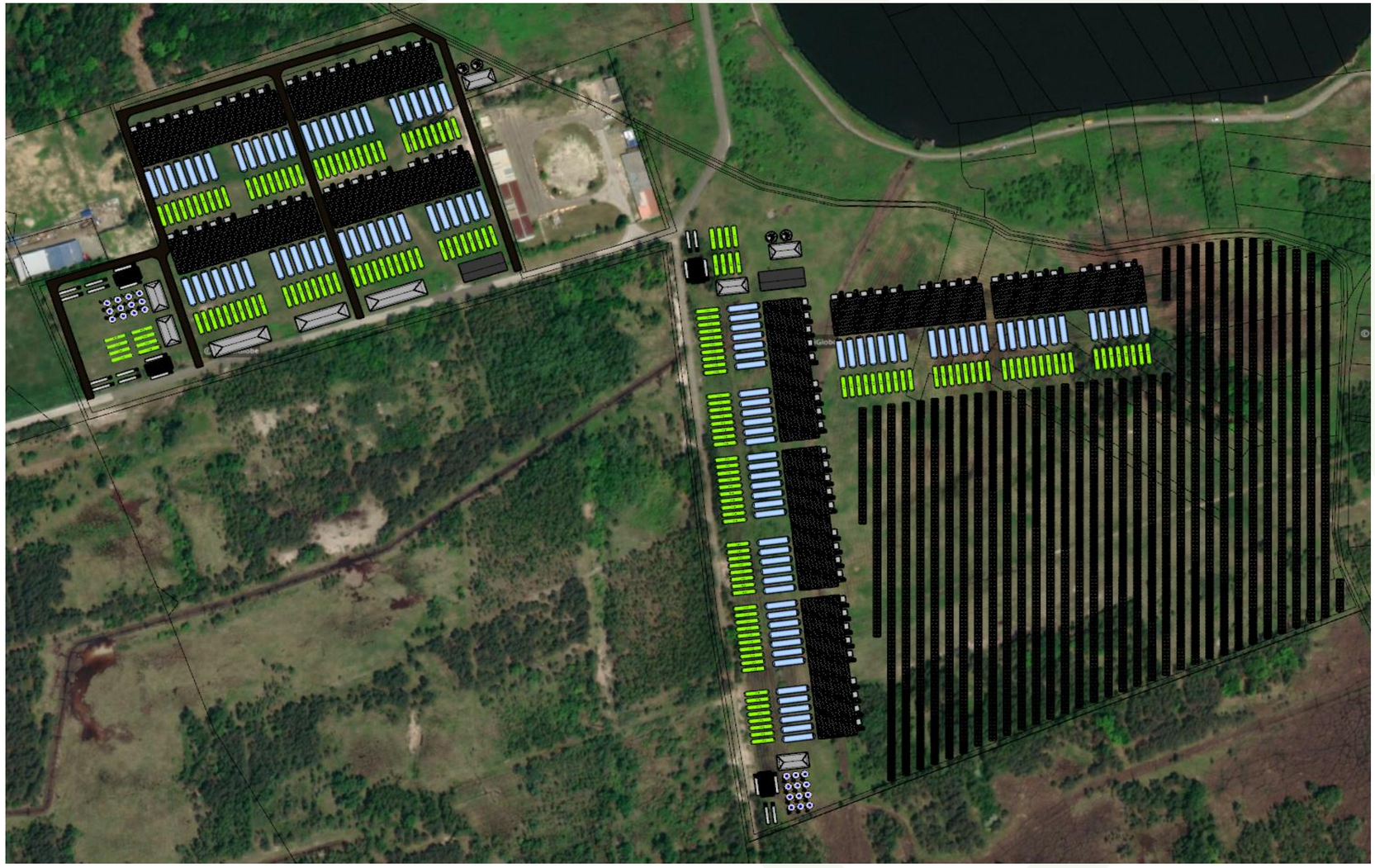
air compression and liquefaction system (LAES): 80 MW,

gas turbines,

LOES storage tanks,

hydrogen distribution and refuelling stations.

JEZIÓRKO – INSTALLATION VISUALISATION



JEZIÓRKO – 72 MWp PV

TECHNICAL PARAMETERS:

area: 80 ha,

PV power: 72 MWp,

hydrogen production: NO,

oxygen management: NO.

SELECTED INSTALLATION ELEMENTS:

supporting structures (with the possibility of changing the angle of the panels) for mounting PV panels,

photovoltaic modules with a unit power of 500 to 700 W each in the amount of up to 80 000 pcs,

power inverters in quantity depending on the technical solution used,

DC cable lines,

medium voltage (MV) substations in the amount of up to 18 pcs,

MV cable lines,

technological roads, manoeuvring area,

monitoring system (infrared barrier, motion sensors, cameras),

fence up to 2.2 m high.

GRĘBÓW-ŻUPAWA – 46 MWp PV

TECHNICAL PARAMETERS:

area: 59 ha,

PV power: 46 MWp,

hydrogen production: NO,

oxygen management: NO.

SELECTED INSTALLATION ELEMENTS:

supporting structures (with the possibility of changing the angle of the panels) for mounting PV panels,

photovoltaic modules with a unit power of 500 to 700 W each in the amount of up to 80 000 pcs,

power inverters in quantity depending on the technical solution used,

DC cable lines,

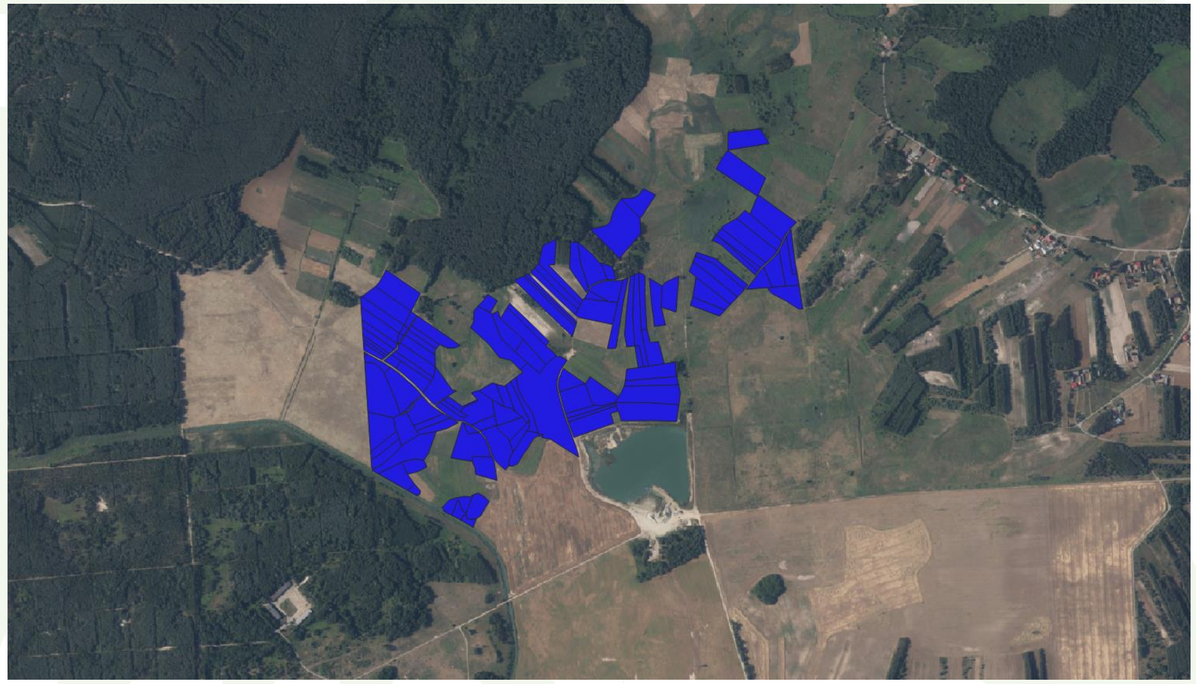
medium voltage (MV) substations in the amount of up to 18 pcs,

MV cable lines,

technological roads, manoeuvring area,

monitoring system (infrared barrier, motion sensors, cameras),

fence up to 2.2 m high.



JEZIÓRKO-WYDRZA – 45 MWp PV

TECHNICAL PARAMETERS:

area: 75.1 ha,

PV power: 45 MWp,

hydrogen production: NO,

oxygen management: NO.

SELECTED INSTALLATION ELEMENTS:

supporting structures (with the possibility of changing the angle of the panels) for mounting PV panels,

photovoltaic modules with a unit power of 500 to 700 W each in the amount of up to 90 000 pcs,

power inverters in quantity depending on the technical solution used,

DC cable lines,

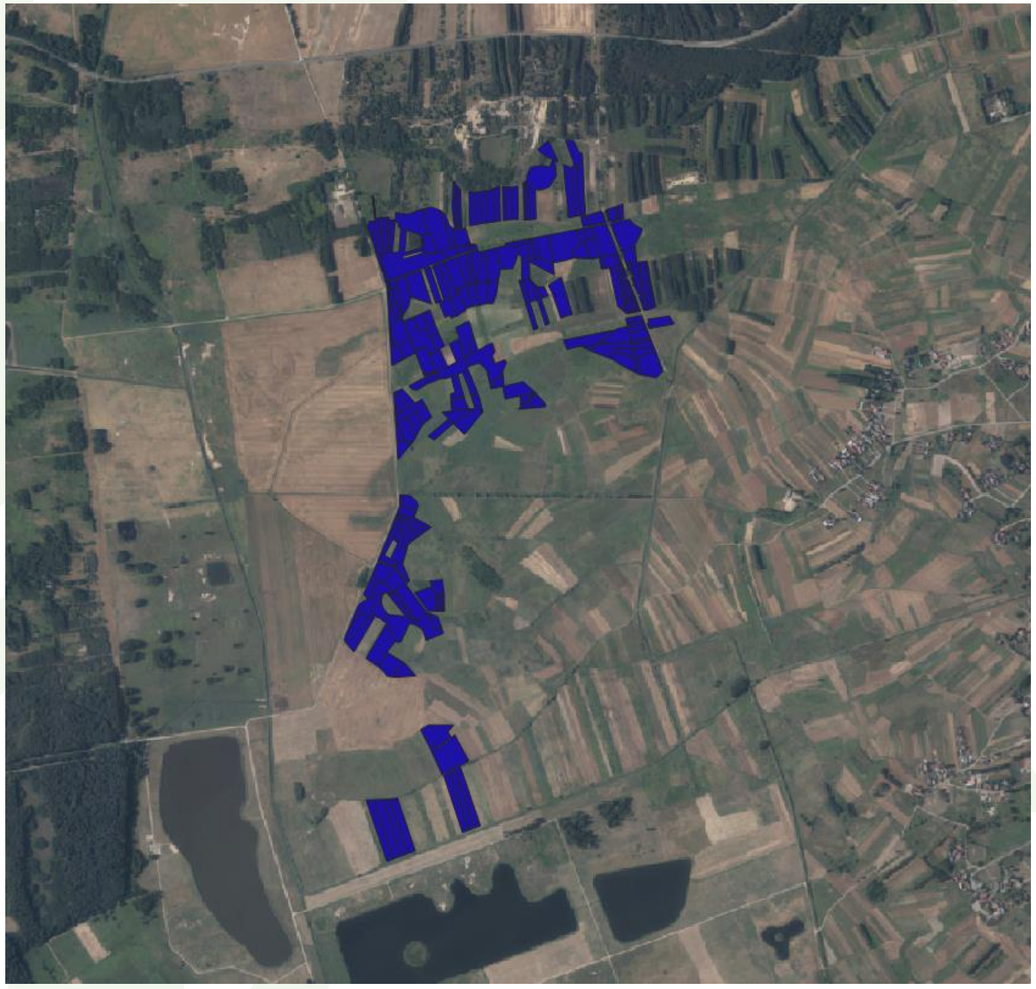
medium voltage (MV) substations in the amount of up to 30 pcs,

MV cable lines,

technological roads, manoeuvring area,

monitoring system (infrared barrier, motion sensors, cameras),

fence up to 2.2 m high.



WYDRZA – 90 MWp PV

TECHNICAL PARAMETERS:

area: 135 ha,

PV power: 90 MWp,

hydrogen production: NO,

oxygen management: NO.

SELECTED INSTALLATION ELEMENTS:

supporting structures (with the possibility of changing the angle of the panels) for mounting PV panels,

photovoltaic modules with a unit power of 500 to 700 W each in the amount of up to 180 000 pcs,

power inverters in quantity depending on the technical solution used,

DC cable lines,

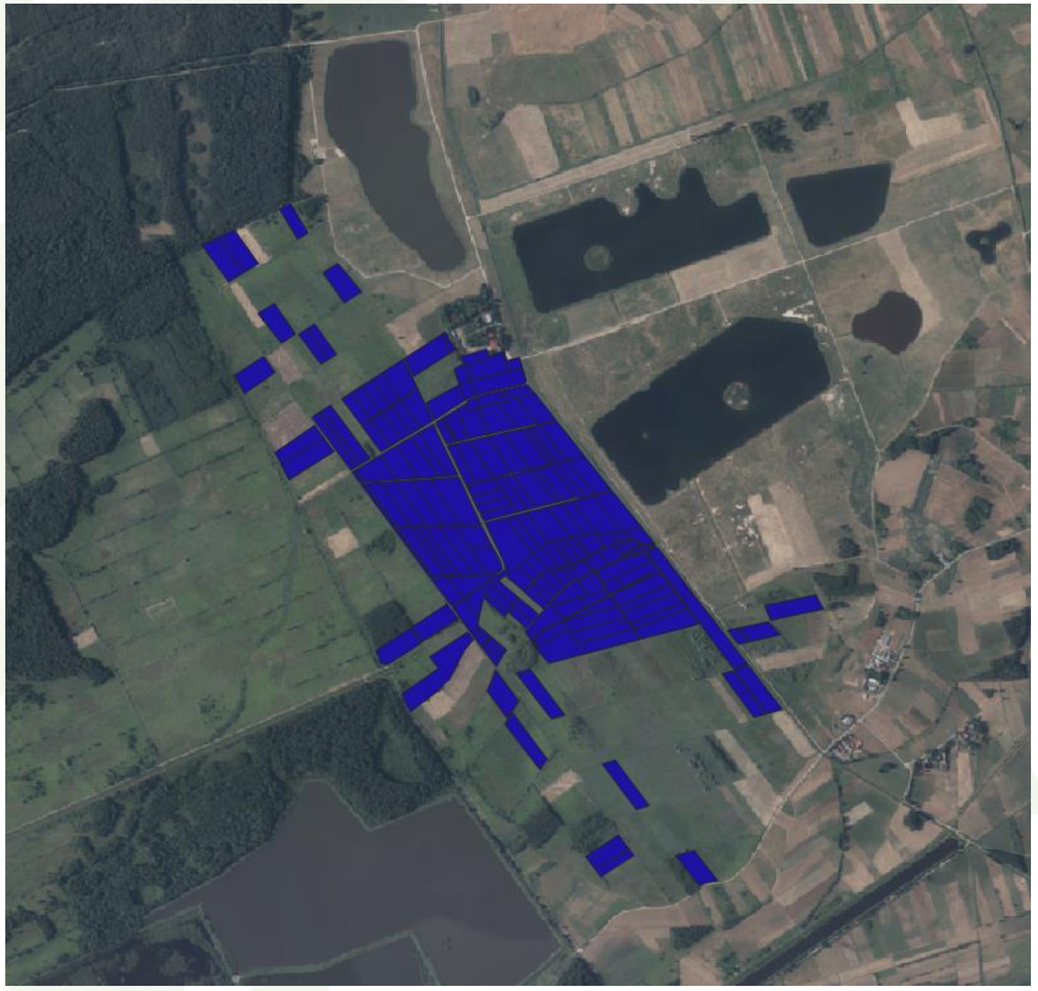
medium voltage (MV) substations in the amount of up to 50 pcs,

MV cable lines,

technological roads, manoeuvring area,

monitoring system (infrared barrier, motion sensors, cameras),

fence up to 2.2 m high.



CONSORTIUM

POLAND

Hydrogen Hub – Production, Storage & Distribution

Efficient and technologically innovative production of green hydrogen from RES. Energy security of the hydrogen ecosystem on the industrial scale of the installation together with the management model (location of the infrastructure of the Podkarpackie Hydrogen Valley). Model installation to be replicated in other locations across Europe.

GERMANY

Hydrogen Hub – Industrial & Business Hydrogen End-users

Implementation of the model solution on the German market. Scaling-up. Hydrogen supply to industrial and business users. Technology testing with various industrial partners and certification.

SLOVAKIA

Transportation Hub – Green Public Transport Based on Hydrogen

Hydrogen storage and distribution to refuelling stations for public transport vehicles.

TECHNOLOGY

Cooperation with leading manufacturers of modern solutions in the field of photovoltaic cells and equipment for the production, storage and transport of green hydrogen.

Ensuring plant safety through collaboration with global leaders in hydrogen technology.

SELECTED SOLUTIONS:

PV: bifacial photovoltaic modules reducing the risk of fire, installation of a movable structure of the so-called "trackers".

Hydrogen production: PEM and SOEC electrolysers; stability of the hydrogen production process during electrolysis and innovation in the form of electrochemical cells enabling the production of hydrogen from water electrolysis (PEM) or from water vapor (SOEC).

Hydrogen storage: low (steel) and high-pressure (composite) storage tanks; hydrogen compression using ion compressors.

Transport: composite tanks for the transport of hydrogen at pressures from 350 to 700 bar.

PLANNED INNOVATIVE SOLUTIONS

Optimization of PV installations energy efficiency::

PV panel mounting system that allows continuous optimization of the angle of inclination of the panels relative to the sun,

automation of the control process optimizing the efficiency of the hydrogen production process from electricity from PV installations,

use of double-sided photovoltaic panels,

an innovative way of cleaning PV installations, e.g. from residual snow.

Optimization of the use of energy from RES for the production of hydrogen:

powering electrolysers with a gas turbine powered by stored excess energy from PV in the form of compressed oxygen,

improvement of the electrolysis process,

new types of electrolysers,

improving the quality and purity of hydrogen,

system for storing excess electric energy from RES in the form of compressed oxygen,

using the heat generated by electrolysers to improve the efficiency of oxygen expansion,

readiness of the system to the use of external energy from RES purchased from other entities in order to produce green hydrogen.

PLANNED INNOVATIVE SOLUTIONS

Hydrogen storage:

storage of significant hydrogen production directly in transport tanks,

optimization of the pressure of stored hydrogen in terms of logistics and customer power supply,

storage of excess electric energy in liquified air – LAES (Liquid Air Energy Storage),

technologically advanced storage tanks .

Hydrogen applications:

supplying zero-emission industrial plants with electric and thermal energy using generators adapted to the green hydrogen supply.

AI system for process optimization management:

AI system managing all processes of creation, storage, distribution and consumption of energy focused on maximizing the energy efficiency of an energy cluster based on hydrogen produced from RES.

GREEN HYDROGEN END-USERS

GREEN AMONIA PRODUCTION

More environmentally friendly production process of ammonia. In EU countries, in 2018, ammonia production accounted for 34% of total hydrogen demand, i.e. 2.8 million tonnes.

GREEN INDUSTRIAL PRODUCTION

More environmentally friendly industrial producers currently not using green hydrogen. The use of hydrogen in the EU by industrial end-users in 2019 was 3.7 million tonnes/year, which gives 45% coverage of the total hydrogen demand.

GREEN TRANSPORT

Urban & public (buses), road (heavy and long-distance transport), light fleet vehicles (forklifts, vans, taxis) and rail (railway vehicles equipped with fuel cells).

OTHER APPLICATIONS

Amongst others: electricity generation and heating.

Green hydrogen → CO2 emissions reduction →

OUR ABILITY TO FUEL PUBLIC TRANSPORT

Alstom Coradia iLint

VEHICLE SPECIFICATIONS

Compressed H2 storage tanks: 350 MPa
Storage tank capacity: 180 kg
H2 consumption: 25 kg/100 km
Travel range at single fuelling: 720 km

OUR READINESS TO PRODUCE GREEN H2

2024: 1 500 kg/day → 8 trains*
2026: 6 500 kg/day → 36
2027: 13 500 kg/day → 75
2028: 16 000 kg/day → 89

**Assuming daily travel range of 720 km per train*

VEHICLE SPECIFICATIONS

Compressed H2 storage tanks: 350 MPa
Storage tank capacity: 38,5 kg
H2 consumption: approx. 10 kg/100 km
Travel range at single fuelling: 385 km

OUR READINESS TO PRODUCE GREEN H2

2024: 1 500 kg/day → 39 buses*
2026: 6 500 kg/day → 169
2027: 13 500 kg/day → 351
2028: 16 000 kg/day → 416

**Assuming daily travel range of 385 km per bus*

Solaris Urbino 12 Hydrogen

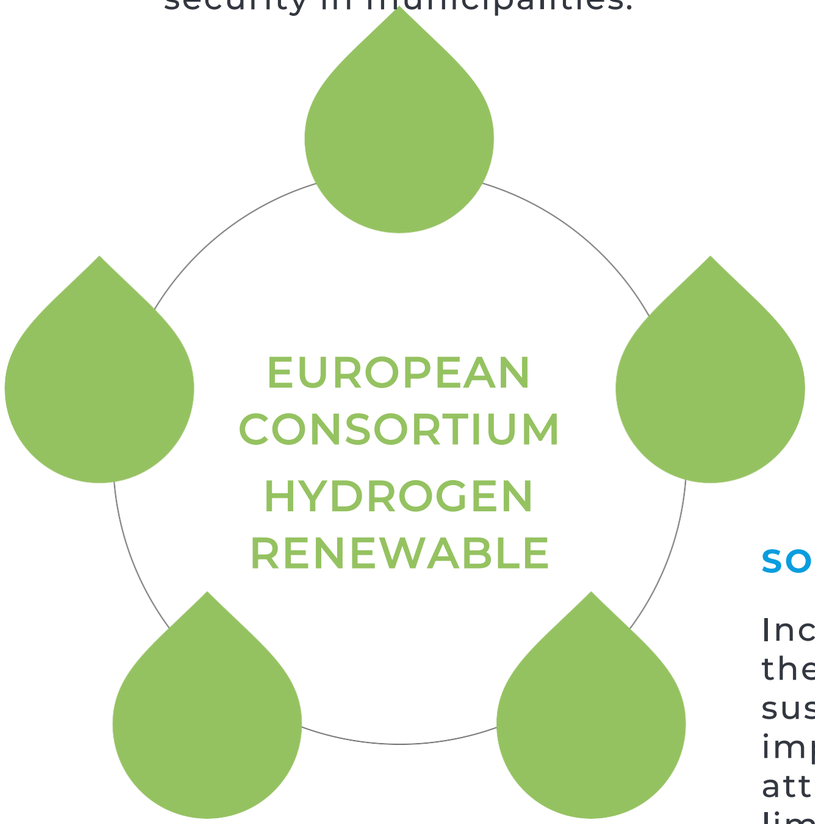
BENEFITS FOR THE REGION

FINANCIAL

Property taxes, inflow of capital to the municipality, including EU funds from the European Commission programs, investment development of the municipality and the Special Economic Zone, reduction of energy prices and energy security in municipalities.

ENVIRONMENTAL

Development of the green economy in the region, improvement of the quality of life of residents as a result of environmental protection, development of green transport, environmental protection as a result of moving away from fossil-based energy to RES..



ECONOMIC

Development of attractive jobs, attracting investors in economically attractive areas of development, the creation of independent and autonomous energy systems and clusters, faster economic development as a result of providing energy to enterprises in the region.

SYSTEMIC

Development of the Podkarpackie Hydrogen Valley, increase in energy efficiency and energy independence as well as energy security of the area, increase in the economic competitiveness of the municipality, promotion of the region.

SOCIAL

Increasing the professional competences of the inhabitants of the municipality, sustainable development of the region, improving the education of staff in attractive and future-oriented professions, limiting the migration of young people to larger cities.

ENVIRONMENTAL IMPACT

- Hydrogen does not pollute the environment in any way. It is an emission-free, non-toxic and odourless substance.
- Hydrogen is a very high-energy gas (33 kWh/kg) and is currently a direct competitor to other technologies (especially battery technologies).
- Hydrogen is widely used in transport, energy and industry. In the future, hydrogen is expected to serve as one of the energy carriers for the use of the so-called sector coupling, i.e. the concept of sector integration – full decarbonization through the use of electricity from renewable energy sources. Hydrogen has a significant role to play in this strategy as an energy carrier in all the sectors mentioned above.
- 96% of all hydrogen currently produced comes from fossil fuels (only 4% is produced by electrolysis of water). However, in the next decade, this ratio should change in favour of emission-free production using the water electrolysis.
- In the future, the most supported method of hydrogen production in the European Union will be the production of hydrogen by electrolysis of water using electricity from renewable energy sources..

ENVIRONMENTAL AND SOCIAL BENEFITS

SOCIETY

QUALITY OF LIFE

Improving the quality of life by significantly reducing carbon dioxide emissions in the region.

ENVIRONMENTAL EDUCATION

Building knowledge and education focused on sustainable development and environmental protection.

GREEN JOBS

Green jobs in the RES sector and green hydrogen technologies as well as eco-innovative solutions, production of equipment and services.

ENVIRONMENTAL AND SOCIAL BENEFITS

ENVIRONMENT

ENERGY TRANSITION

Gradual departure from conventional fuels. Meeting greenhouse gas emission reduction targets.

ENERGY SECURITY

Moving away from systemic energy dependencies and fossil fuels in favour of energy autonomy infrastructure. Creating energetically independent areas.

GREEN TRANSPORT

Decarbonisation of transport including development of hydrogen-powered buses and charging station infrastructure.

INVESTMENT SCHEDULE

PHASE II

Development and optimization of the green hydrogen production, storage and distribution ecosystem.

PHASE IV

Target Hydrogen Hub consisting of comprehensive & integrated hydrogen hubs in various locations in the EU.

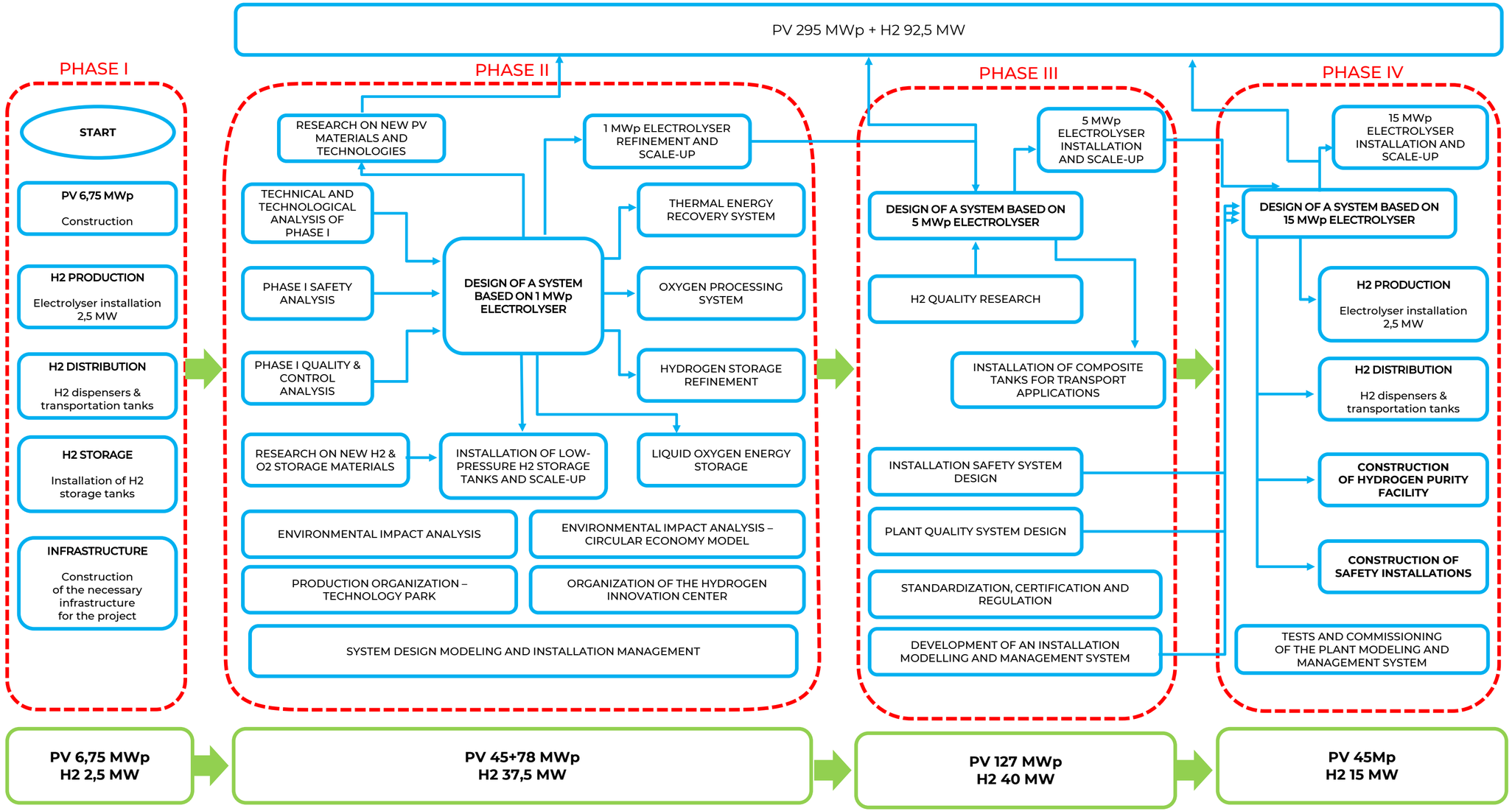
PHASE I

Test installation of PV power plant as well as green hydrogen production, storage and distribution infrastructure.

PHASE III

Scaling up and implementation of the ecosystem model across various hydrogen hubs in the EU.

DEVELOPMENT PHASES OF THE HYDROGEN ECOSYSTEM INVESTMENT IN POLAND



DEVELOPMENT OF AN ECOSYSTEM FOR THE PRODUCTION, STORAGE AND DISTRIBUTION OF GREEN HYDROGEN FROM RES

Phase I: Model installation of RES and H2 generation for powering industrial infrastructure, located in the Podkarpackie Voivodeship, Poland (ownership of land for installations).

designing and building the infrastructure of an integrated energy ecosystem: PV power plant, generation, storage and distribution of green hydrogen, power supply to the model industrial plant in the circular economy system.

Phase II: Ecosystem of production and distribution of green hydrogen (Podkarpackie Voivodeship, Poland).

Ecosystem development and implementation of efficient technologies for the production of clean hydrogen: integration of many innovations (Hydrogen Innovation Centre, Technology Park): new products, improvement and optimization of the method of production and energy use of H2, stabilization of the H2 system and storage methods, improvement of the quality and purity of green hydrogen.

Strengthening the hydrogen economy chain (manufacturers of equipment, services and technology providers and development of green jobs and new technologies based on R&D).

DEVELOPMENT OF AN ECOSYSTEM FOR THE PRODUCTION, STORAGE AND DISTRIBUTION OF GREEN HYDROGEN FROM RES

Phase III: Scaling up and implementation of the ecosystem model – production and storage of green hydrogen in various hydrogen hubs in the EU.

Implementation of large-scale technological solutions – commercialization and launch of autonomous, safe hydrogen energy hubs on the industrial scale of the European economy, in accordance with the needs of end-users.

Phase IV: Target Hydrogen Hub consisting of comprehensive & integrated hydrogen hubs in various locations in the EU.

Integrated large-scale, hydrogen generation, storage and distribution infrastructure along with a system of management, safety and quality of ecosystem operation.

FINANCING REQUIREMENTS

PV POWER PLANT
300 MWp

230 MM EUR

ELECTROLYSERS
95 MW

130 MM EUR

HYDROGEN STORAGE

45 MM EUR

INFRASTRUCTURE
QUALITY AND SAFETY

20 MM EUR

INNOVATION
AND PRODUCTION

20 MM EUR

TRANSPORT

45 MM EUR

USE OF OXYGEN

50 MM EUR

INFRASTRUCUTRE

45 MM EUR

INFRASTRUCTURE
MANAGEMENT AND
MODELLING

10 MM EUR

CERTIFICATION
AND LEGAL EXPENSES

10 MM EUR

AVAILABLE FINANCING INSTRUMENTS

- PRIVATE INVESTOR CONTRIBUTION
- IPCEI
- EIB
- INNOVATION FUND
- CEF
- NATIONAL FUNDING PROGRAMMES

FINANCING OPTIONS FOR THE DEVELOPMENT OF GREEN HYDROGEN ECOSYSTEM

- European Innovation Procurement Partenrship - implementation of innovative investments from the European Commission funds - innovation partnership - identification and selection of key innovative technologies for investments and ecosystem (parameterization and solution providers, technologies, model ecosystem, testing).
- ETV (Environmental Technology Verification) instrument – assessment and verification of environmental and innovative technologies of the Institute of Ecology of Industrial Areas (IETU).
- Innovation Fund, European Commission Programme - financing of large innovative investments, implementation of selected innovations as part of the Innovation Procurement Partnership in the form of the investment.
- IPCEI – European scale, Green Hydrogen Hub – European Consortium, EU state aid.
- In parallel, funding from the EU and national programmes for the planned investment:
  - NFOŚiGW – New Energy Programme – Phase 0 – PV power plant and hydrogen storage
  - NFOŚiGW – production of green hydrogen production and storage
  - Ministry of Climate – Polish Hydrogen Strategy until 2040
  - EU Just Transition Fund

STRENGTHENING THE GREEN HYDROGEN PRODUCTION ECOSYSTEM:

POLISH HYDROGEN STRATEGY UNTIL 2040

FINANCING UNDER THE POLISH HYDROGEN STRATEGY

- OBJECTIVE: Production of hydrogen from low-carbon sources, processes and technologies, incl. in particular electrolysers
- Development of centres of excellence in the process of implementing the hydrogen economy (Podkarpackie Hydrogen Valley)
- NCBR Hydrogen Technology Support Programme
- NFOŚiGW New Energy Programme
- Green Public Transport Programme
- National Recovery Plan – investments in the development of renewable and low-carbon hydrogen generation capacities

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