

INP Reference

Feasibility study electrolysis plant KW Lausward

LOCATION: Düsseldorf, Germany

SYSTEM/TECHNOLOGY: Hydrogen production

SERVICES: Solution development / Feasibility studies

INDUSTRY BRANCH/TYPE OF PLANT: Green Energy

CLIENT: Stadtwerke Düsseldorf

ACTIVITY PERIOD: 2023

Project description

Stadtwerke Düsseldorf (SWD) has planned to decarbonize its electricity and heat generation by 2035 in line with the city of Düsseldorf's targets. In addition to electricity generated from renewable sources, primarily wind power and PV systems, conventional power plants are only to be used to generate balancing energy.

The main political approach for this balancing power generation is that surplus electricity generated from renewable sources in particular will be used to generate hydrogen as a renewable fuel that can be temporarily stored in salt caverns and made available from the storage facilities via a hydrogen network (European backbone) that is currently being developed.

Hydrogen will be used in new high-hydrogen-capable power generation plants that can be converted to 100% hydrogen. The use of hydrogen to cover peak heat demand is being examined. In addition, the hydrogen requirements of customers in the urban area are being determined for various applications.

The political plan is to source the primarily green hydrogen both internationally and to produce it nationally by electrolysis. According to the current expansion plans for the hydrogen network, it can be assumed that this will be usable at the Lausward power plant site from 2030. Due to its location and diverse connections, the Lausward power plant site is in principle able to play a role in national hydrogen production and in meeting the hydrogen requirements of SWD and other customers in Düsseldorf.

The aim of this feasibility study was to investigate the technical and economic feasibility of electrolyzers of different sizes at the Lausward power plant site. Sizes of 5, 20 and 100 MW_{el} were examined.

INP Services

The following focal points were considered in the feasibility study:

- Technology comparison (in the field of PEM and alkaline electrolysis) of manufacturers with evaluation and recommendation

POINTS OF CONTACT



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- Consideration of 3 different sizes each in coordination for outdoor open space and use of existing buildings (maximum 100 MW, container solution (e.g. 2-5 MW_{el}) and medium size (e.g. 10 - 20 MW_{el}))
- Consideration of waste heat utilization with temperature increase to district heating temperature level
- Consideration of the required hydrogen pressure increase to up to 70 bar for feeding into the hydrogen grid
- Consideration and recommendation for hydrogen storage and other buffers (e.g. demineralized water, oxygen)
- Determination of the installation space requirements of the different sizes (5, 20 and 100 MW_{el})
- Presentation of significant jump fixed costs (e.g. electricity grid connection, amount of hydrogen in the building)
- Determination of the basic data for an economic feasibility study
- Recommendation for further investigations and procedures with intermediate stages
- Determination of measures with costs, durations and performance data