

Fossil free hydrogen

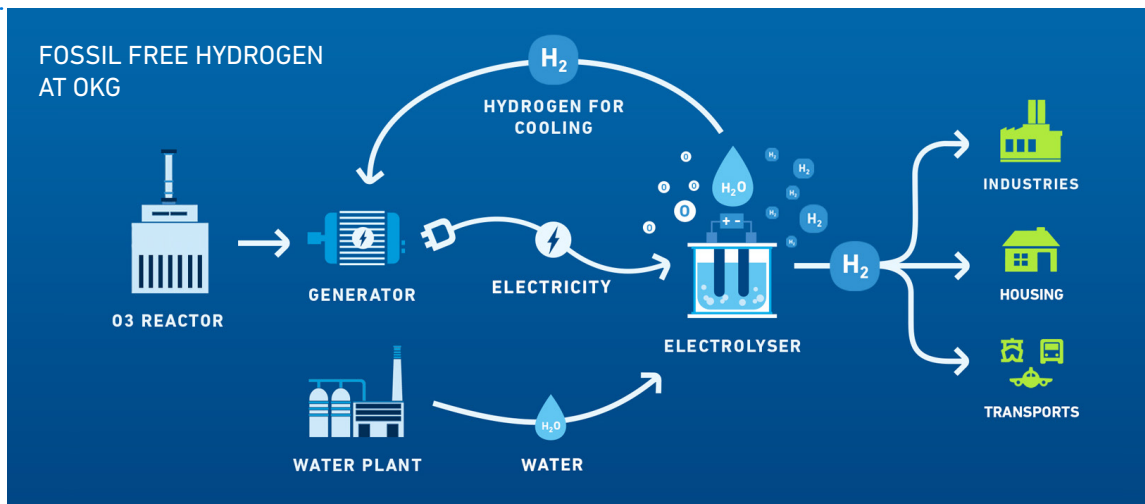
Development of fossil free hydrogen at OKG

At the OKG site, outside of Oskarshamn in the south of Sweden, you can find a hydrogen factory. This factory has been producing hydrogen since 1992. The hydrogen is produced with electricity from the nuclear power plant which can be found on site, and water from the nuclear power plant's own water plant.

USING HYDROGEN is a good way to cool down large generators, who convert the kinetic energy in the turbines into electrical energy at the power plants. To avoid buying expensive hydrogen from external suppliers, and to increase safety, OKG built its own hydrogen plant in the early 1990s. The closure of the nuclear reactors O1 and O2 led to a review of all operations at OKG's site to identify untapped business opportunities.

Early in this process, hydrogen production was identified as such an opportunity with the help of a degree project from Linköping University.

Since the hydrogen plant was developed to meet the needs of three operational reactors at OKG, there is now a surplus in its capacity. The electrolyser itself has an output of 0.7 MW, but only a small part of this capacity is needed to supply O3 with hydrogen.



The plant is operated and serviced by employees at OKG. Several of the engineers who were involved in building the hydrogen plant in the 90's are still working on site. This means that OKG holds significant internal expertise within the hydrogen area, which is now used when the site is being modernised through activities such as installing a new compressor and a new control system.

There are several permits required to be able to sell hydrogen on the market. The current plant needs to be adapted as well before this can happen. When hydrogen is used in an industrial environment, there are very different requirements when it comes to purity. Several other gases are often developed when producing hydrogen gas, one of these is nitrogen gas. These gases need to be removed from the hydrogen production process. Therefore, OKG has invested in a new treatment plant, a so-called scrubber, which "washes" the hydrogen from other gases.

OKG has signed an agreement with a customer who will buy the surplus production of hydrogen on a completely commercial basis. This is a milestone which shows a beginning of a functioning market for hydrogen in Sweden. In a next step, production could be further increased through running the plant on weekends and outside of normal working hours.

FACTS:

- Electrolyser of 0.7 MW
- Installed in 1992 by then Norsk Hydro (current NEL)
- Electricity consumption: 4 kWh per m³ hydrogen
- Production capacity: 143 Nm³/h
- Hydrogen is used at OKG for cooling of generators
- The production surplus is sold on a commercial basis
- In a first step, greater production can be achieved through utilizing the facility to a greater degree. In a second step, a larger electrolyser can be installed.