

## **Use of hydrogen as a fuel towards the decarbonization of gas turbines**

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Hydrogen combustion in gas turbines and combined cycle power plants is emerging as the preferred technology to cover the residual load during longer periods of “dark doldrums” (unavailability of both wind and solar energy) in a fully decarbonized power system. This applies as well for gas turbines used for mechanical drive (like in pipelines), where -in addition to a trend towards electrification of compression stations- we will continue to see the use of turbo compressor sets, which will need to be decarbonized in the next 10-20 years.

However, it needs to be noted that there are some locations in the world where it must be assumed that a connection to a hydrogen backbone network will not be possible or the required amounts of carbon-neutral hydrogen molecules at an acceptable price for re-electrification will not be made possible at the power plant fence.

As a consequence, and in addition to hydrogen, other fully or partially carbon-neutral fuels are also moving into the focus of gas turbine designers: Apart from various fuels of biogenic origin, hydrogen derivatives such as e-ammonia and e-methanol should also be mentioned here.

The presentation will show the current development situation of hydrogen combustion in gas turbines at Siemens Energy and will also present the first operating experiences from pilot plants. In addition, an outlook on other greenhouse gas-neutral fuels will be given. Finally, an update on reference plants and the latest status on "H2 readiness" (preparation for subsequent conversion to hydrogen) will be shown.