
25th IERE General Meeting and RWE TI Germany Forum
Düsseldorf, Germany
December 2–5, 2025

RWE light house project case study: Moerdijk high hydrogen conversion

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Keywords: *CCGT Hydrogen Conversion Retrofitting Decarbonisation Feasibility*

Abstract

This paper has been presented at the ETN 12th 12th International Gas Turbine Conference Advancing turbomachinery innovations and strategies for net-zero pathways, 14-15 October 2025, Bruxelles. **Paper ID number ###-IGTC25**

Hydrogen is considered a key technological solution to decarbonise many heavy industries, including in the power sector to fuel Gas turbines (GT). Typically, GTs operate on carbonaceous fuels such as natural gas, which produce CO₂ emissions. To avoid further emission of CO₂ into the atmosphere and avoid stranded assets, conversion of in-the-field assets is a key aspect for the low-cost attainment of low-carbon operation. This paper highlights the feasibility work on-going at RWE's Moerdijk GE Vernova 9F.04 (9F.02) F-class 420 Mwe CCGT Power Station, located in the Netherlands. It presents a case study of the hydrogen conversion to 80+ vol-% outlining the technical, operational and environmental considerations involved. This study outlines the fuel supply chain integration undertaken to ensure a secure supply of hydrogen can be delivered to site through either leveraging existing or new infrastructure and an overview of the technical developments to convert the asset (GE 9F.04) to operate on hydrogen containing fuels, involving retrofitting with the latest OEM combustion technology. An overview of the lifecycle emissions reduction and operational cost implications are also included.