Hydrogen & other alternative fuels WG Meeting

Chairs: Peter Kutne, Geert Laagland

10 October 2024

Agenda of the Meeting

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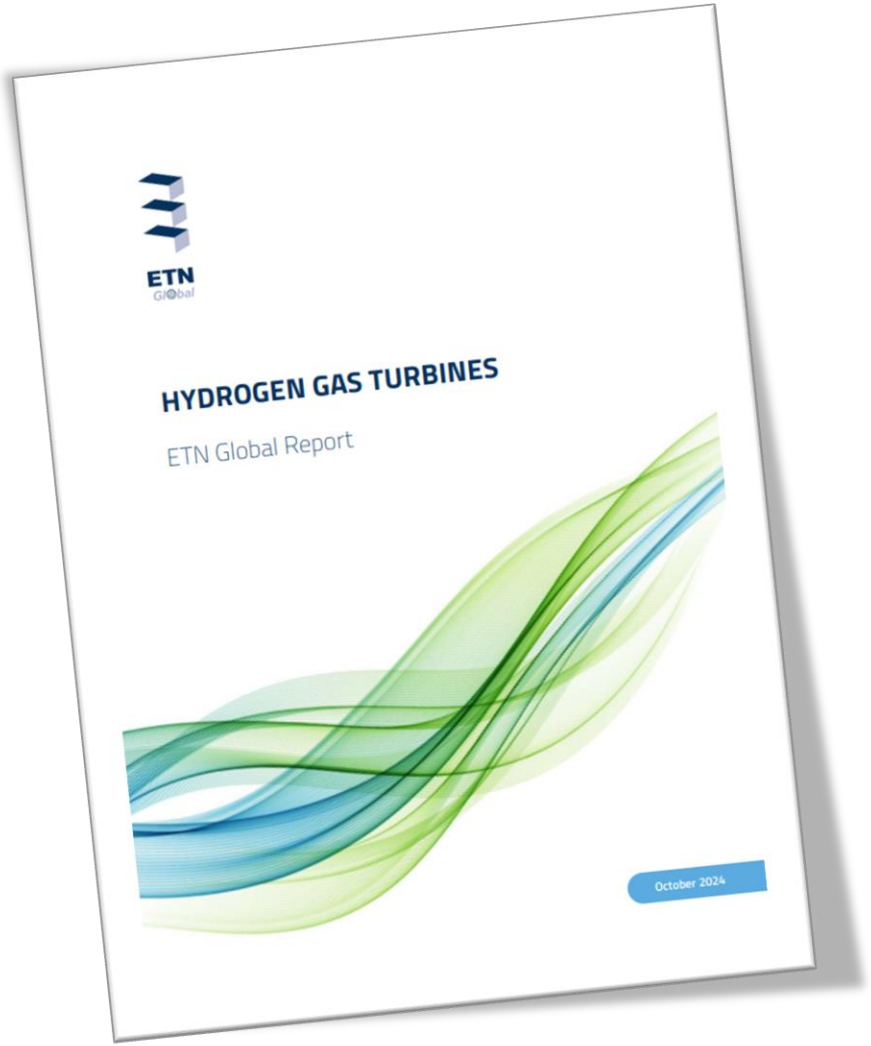
1. Results of 2024 & Learnings from Day 1
2. Activities for 2025
3. Q&A
4. Thematic Presentation
    1. “Low-carbon alternative fuels for sustainable and secure gas turbine power generation”, Jon Runyon, ETN Global YEC
    2. “Micro Gas Turbine retrofit for 100% hydrogen”, Martin Unverricht, Power Service Consulting

Results of 2024 & Learnings from Day 1

H_2 GT report update taskforce

- The report was **revised and adapted** to the current state of development and boundary conditions
- **Information added** on
  - Development of hydrogen infrastructure
  - Ongoing development and demonstration projects based on ETN H_2 project database
  - And much more …



GT Enclosure taskforce

Initiative on CFD dispersion and explosion modelling to assess the applicability of ISO 21789 “Gas turbine applications – Safety” for hydrogen

- Ten partners expressed interest to join the initiative
- The Consortium Agreement is currently being finalized
- Project start is delayed, but still planned for Q4/2024

CCS Taskforce

Current and future activities

- **CCS Webinar Series**
  - The first episode with BASF took place in June
  - The second is currently being organised and will be in November

- **New activities (under discussion for Q4/2024 and 2025)**
  - Report on the most optimal way of transportation of CO_2 (related to CCS-GT)
  - Investigate the tipping point between H2-GTs and CCS-GTs
  - Proposal to jointly develop a database of CCS-GT relevant technologies

Ammonia taskforce

Status

- Task is to prepare a **whitepaper on GT combustion of NH_3 and mixtures**
- List of subjects was developed
- First contributions have started but are still quite minimal

We need more members actively involved in this task force to realise the planned paper!

Alternative fuels taskforce (YEC)

- Paper on the utilization of low-carbon alternative fuels in gas turbines prepared

Learnings from Day 1

Key take-aways

- **Clear definition of "hydrogen/low-carbon-ready"**
  - Develop categories of readiness / timeline
  - Define reference cases and boundary conditions
  - Review of business models in which investments can develop
- **Uncertainty what needs to be considered for Retrofit**
  - Develop ETN industrial standard for safety measures
  - Facilitate collaboration and experience sharing
  - Connect other sectors with experience in hydrogen handling
- **Flexibility of gas turbine power plants**
  - Investigate CCGT with flexibility with CCS

Activities for 2025

H_2 and other alternative fuels WG: Objectives for 2025

Challenges	What could the Working Group do to cope with these challenges? What could be done next?
Viable **Business Cases**	• Identify required economic conditions (e.g. subsidies, market mechanisms). • Benchmarking against other technologies that can provide low carbon/carbon neutral flexible dispatchable power.

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Transition to a **capacity driven market**	• Identify the expected boundary conditions for dispatchable power production. • Scenario analysis for different GTs to identify viable options.

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Transition to a capacity driven market	• Identify the expected boundary conditions for dispatchable power production. • Scenario analysis for different GTs to identify viable options.
Urgency & Positioning	• Analyze the expected demand for electricity due to electrification and increasing share of renewables. • Identify and quantify the need for H_2 ready flexible dispatchable capacity (i.e. gas turbines).

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Use of **hydrotreated vegetable oil** in existing GTs	• Multiple ETN members have recent experience in this topic • Share knowledge and experience • Collaborate for large-scale testing • Sustainability / certification • Develop business cases / support mechanisms • Investigate different use cases: GT, diesel gensets, boilers