ETN Working group objectives and initiatives 2024/2025

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ETN Global

Air Filtration Working Group

Initiatives 2024

Overview of ETN initiatives

Air Filtration Working Group

Initiatives	Scope	Objectives	Start-End dates
Best practices document for air intake maintenance and inspection	Establish an ETN best practice document for air intake maintenance and inspection	Ensure optimum air intake system performance over the lifetime of a gas turbine package	Q1/2024 – TBD
ISO Process finalization	To produce and publish an Offshore and Coastal Gas Turbine Air Filter ISO Test Standard.	To improve GT efficiency, availability and reliability To reduce the carbon footprint of the operations	Q1/2024 – Q4/2024

sCO2 Working Group

Initiatives 2024

Overview of ETN initiatives

sCO_2 Working Group

Initiatives	Scope	Objectives	Start-End dates
sCO_2 power systems in selected applications	Assessing the techno-economic feasibility of sCO_2 power systems in selected applications	Techno-economic analysis of sCO_2 bottoming systems in off-shore platforms Unconstrainted optimisation of sCO_2 combined cycles	Q2/2024 – Q3/2024
Technology gap matrix	List the current needs of sCO_2 technology to move forward	Roadmap to demonstrators	Q2/2024 – Q4/2024
sCO_2 Webinar series	Raise awareness of sCO_2 power cycles benefits	Webinars 7, 8, 9	Q2/2024 – Q4/2024

Decentralised energy systems Working Group

Initiatives 2024

Overview of ETN initiatives

Decentralised energy systems Working Group

Initiatives	Scope	Objectives	Start-End dates
Identification of “Gaps to close”	Identify open issues and gaps to close from the users’ point of view	Identification of open issues and gaps of decentralized energy systems to form a base for follow up activities Attracting additional / new members for ETN	Q1/2024 – Q4/2024

Hydrogen Working Group

Initiatives 2024

Overview of ETN initiatives

Hydrogen Working Group – various task forces

Initiatives	Scope	Objectives	Start-End dates
Hydrogen project database	Set up a database of H2-GT projects to access the status of development	Demonstrate the activeness of the gas turbine community to stakeholders ETN members being able to identify synergies to own activities	Q4/2023 – Recurrent
Hydrogen gas turbine report update	Update the hydrogen gas turbine ETN report, issued in 2020	Give an overview of the new developments Communicate status and the research needs to stakeholders	Q4/2023 – Q42024

Overview of ETN initiatives

Hydrogen Working Group – various task forces

Initiatives	Scope	Objectives	Start-End dates
Hydrogen Enclosure Safety	Determine if an update of the safety standards for gas turbines (ISO 21789) is needed for hydrogen applications	Experimental data of a reference case to calibrate CFD explosion simulations Recommendations for the next steps to an update of the standards	Q3/2024-Q4/2024

Overview of ETN initiatives

Hydrogen Working Group – various task forces

Initiatives	Scope	Objectives	Start-End dates
CCS webinar series	Cover different technical topics related to CCS-GT	Increase awareness and to promote members' expertise	Q3/2024-Q4/2024
CCS Master thesis	Evaluation of the minimum size of CCS-GT for economically viable CO_2 reduction measures Identification of maximum size of a H2-GT with given constraints on the H2 supply infrastructure	Evaluation of part-load performance of NGCC with post combustion CO_2 capture	Q3/2023-Q1/2024

Overview of ETN initiatives

Hydrogen Working Group – various task forces

Initiatives	Scope	Objectives	Start-End dates
Ammonia	Look into the actual developments and status of the utilization of NH_3 in gas turbines Comparison of NH_3-related technologies (NH_3 direct firing, NH_3 cracking)	Set the necessary boundaries for the research work	Q3/2023-TBD

Overview of ETN initiatives

Hydrogen Working Group – various task forces

Initiatives	Scope	Objectives	Start-End dates
Alternative fuels	Explore efficiency, handling, and safety of alternative fuels Compare alternative/renewable fuels to access availability, usability, and development status for GT applications	Expand survey to other aspects including economic, socio-political, technological, and environmental criteria	Q1/2023-Q4/2024

Additive Manufacturing Working Group

Initiatives 2024

Overview of ETN initiatives

Additive Manufacturing Working Group

Initiatives	Scope	Objectives	Start-End dates
High Temperature Turbine Blade Alloy for Additive Manufacturing	Review the available information and connect with alloy development companies	Identify high temperature blade alloy (early TRL) and develop/validate it to TRL3/4 level.	Q1/2024 – Q1/2027
AM (L-PBF) Machine Evaluation Initiative	Understand the capabilities and boundaries of the technology	Compare execution and results between AM producers in the manufacture of the same parts	Q3/2021 – Q1/2024

GT components life assessment & extension Working Group

Initiatives 2024

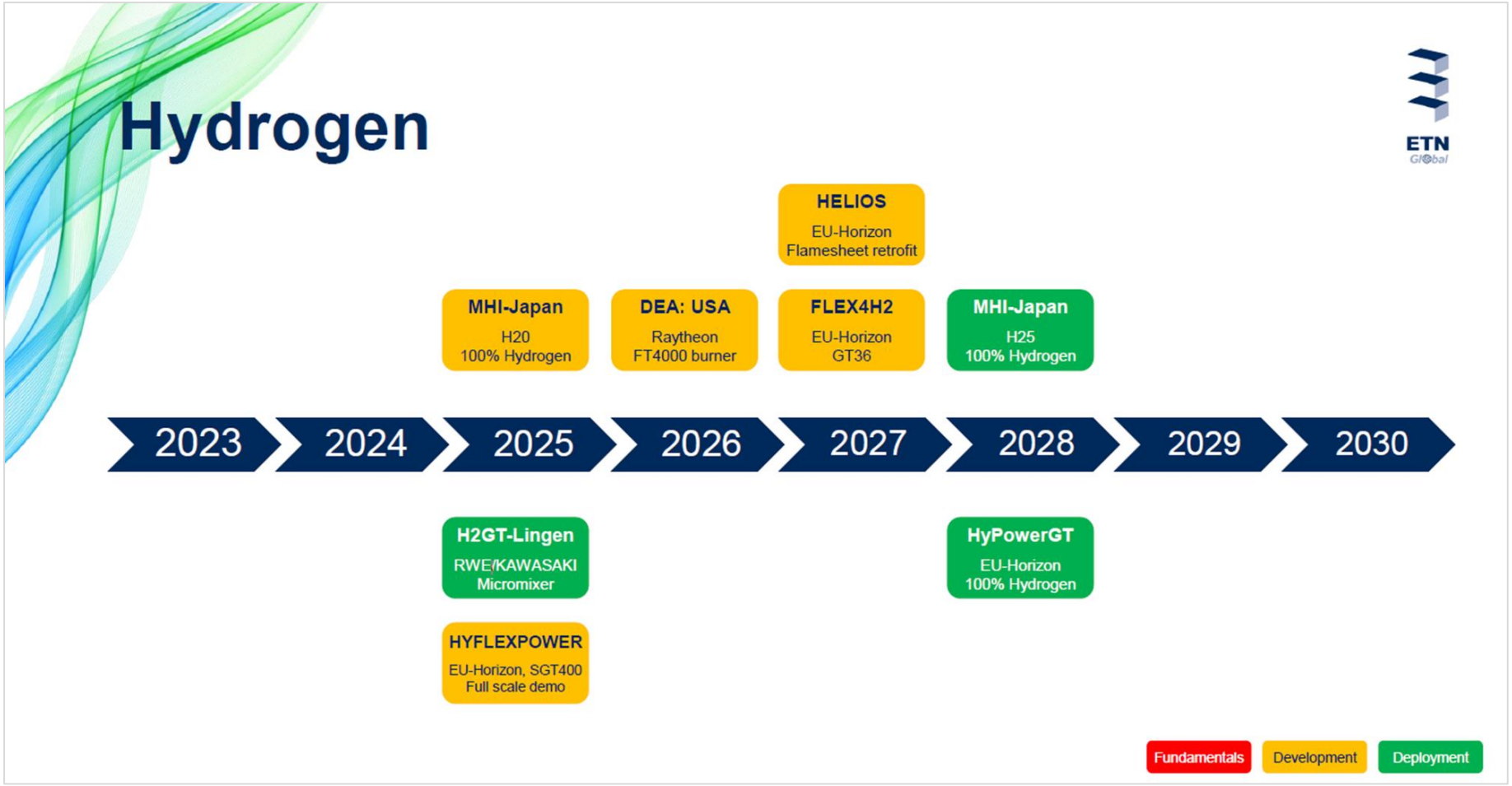
Overview of ETN initiatives

GT components life assessment & extension (LTA) Working Group

Initiatives	Scope	Objectives	Start-End dates
Rotor life assessment and extension	Review rotor lifing practices Identify gaps and recommendations	A code of practice (or a platform) for the rotor lifing	Q2/2023 – Q1/2024 (paper already printed)
Hot section degradation and integrity	Understand the impact of turbine operation (cyclic regime) on the hot section part degradation and life extension	To perform a review of the impact of GT operation on integrity of hot gas parts Develop a guideline for the life extension of turbine blades with high cyclic loads	Q2/2024 – Q4/2025

Update of timelines

First release of project timelines



100% DLN Hydrogen

H2R Technology
Swiss Federal Office of Energy (CrossTown, Sulzer)
Engine testing with NG/H2 mixtures with up to 100% Hydrogen for AVON GT

HYFLEXPOWER
EU-Horizon
Engine testing with NG/H2 mixtures with up to 100% Hydrogen for SGT-400

DEA-USA
Raytheon – FT4000 burner
Details missing

HELIOS
EU-Horizon – Flamesheet retrofit
Flamesheet retrofit solutions

FLEX4H2
EU-Horizon – GT36
Highly flexible combustion fuel system for GT36

Takasago Hydrogen Park
MHI-Japan
100% H2 testing for H-25 GT class

HyPowerGT
EU-Horizon – DLE technology
Engine testing with NG/H2 mixtures with up to 100% Hydrogen for NovaLT16

HyCoFlex
EU-Horizon – DLE technology
Engine testing of fuel flexibility with up to 100% H2 for SGT-400

EU - HORIZON-JTI-CLEANH2-2024-04-02
Flame stabilisation in high-pressure premixed hydrogen combustion

Keywords:

- NG/H2 mixtures with concentrations up to 100% H2
- Retrofit solutions
- Engine testing
- Flame stabilisation

Details missing | Fundamentals | Development | Deployment

2023 2024 2025 2026 2027 2028 2029 2030 2035 2040 2045 2050

CCUS (Post-Combustion)

FEED Calpine Delta Energy Center
DoE – 95% capture in geologic storage
95% capture

TCM Mongstad
TCM – DEMO CCGT – Flue Gas
Testing centre for CO_2 capture techniques

FEED in Alabama and Mississippi
DoE – PCC installation
Installation of a Linde-BASF aqueous amine solvent-based post-combustion CO_2 capture technology

FEED in Deer Park Energy Center NGCC
DoE – 95% capture
95% capture

Keadby 3
SEE, Equinor – (UK Cluster – Sequencing Phase-2)
90% capture

Net Zero Teeside
BP, Equinor, Eni, Shell and Total
(UK Cluster Sequencing Phase-2)
90% capture

Peterhead
SSE, Equinor – (UK Cluster Sequencing Phase-2)
90% capture

Project Enterprise at Calpine LMEC
DoE – 95% capture
95% capture

Connah's Quay GT-CCS
Uniper
Details missing

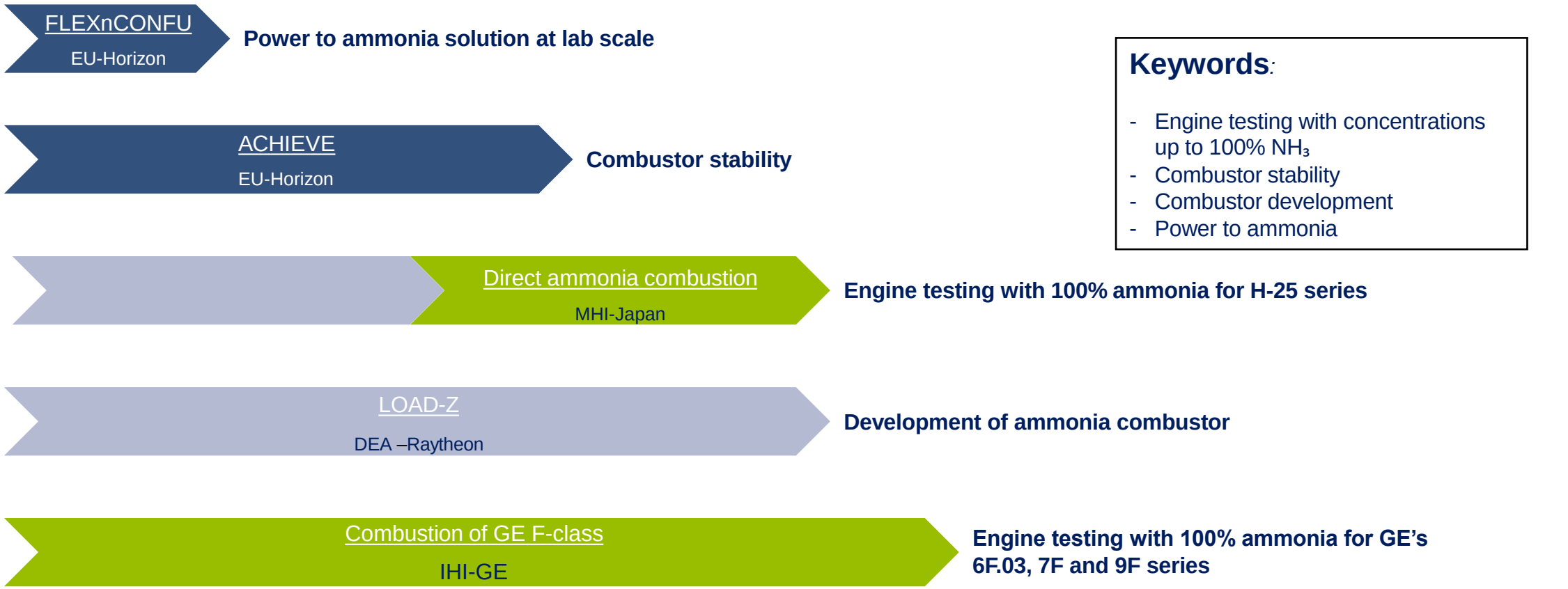
Keywords:

- Capture rate
- Testing of CO_2 capture techniques
- Post-combustion CO_2 capture technologies

Details missing | Fundamentals | Development | Deployment

2023 2024 2025 2026 2030 2035 2040 2045 2050

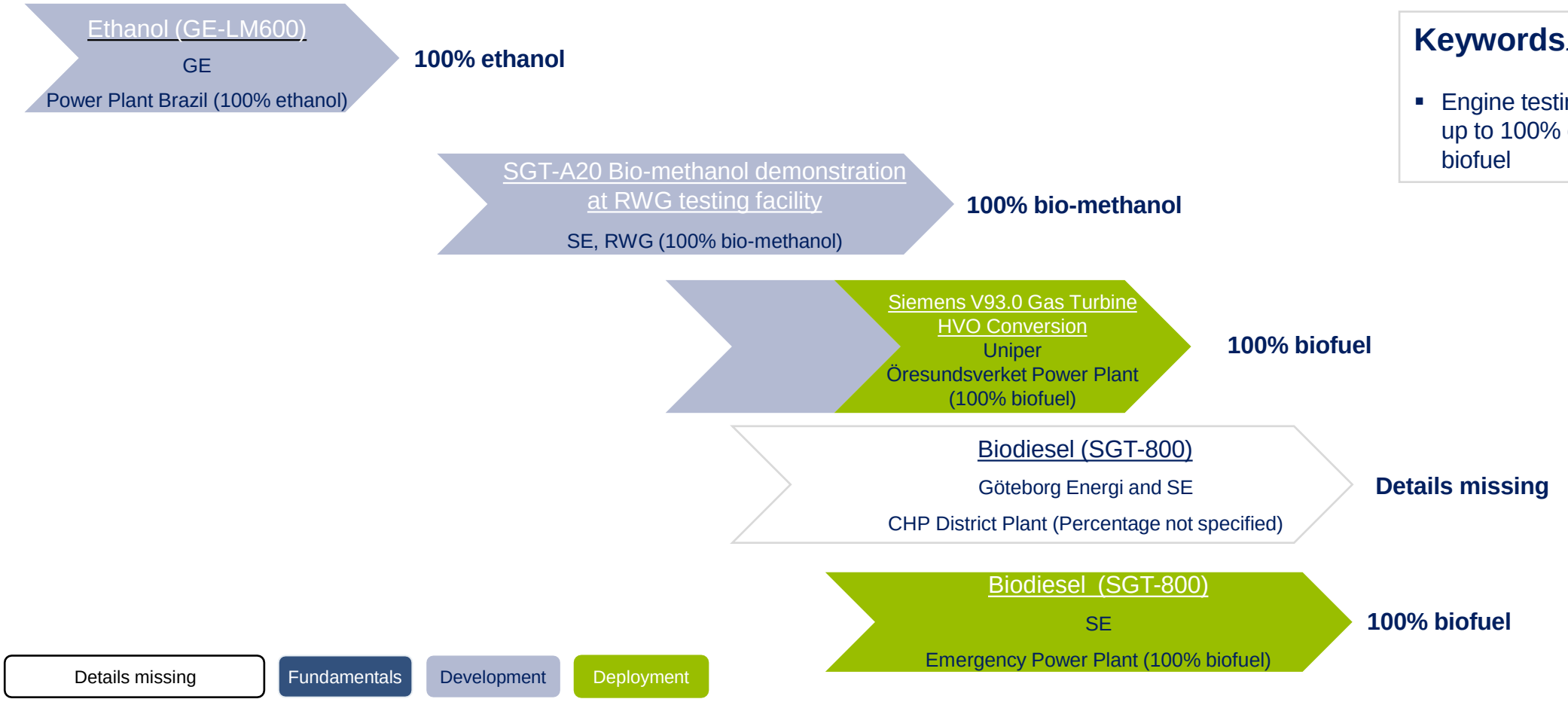
Ammonia



Keywords:

- Engine testing with concentrations up to 100% NH_3
- Combustor stability
- Combustor development
- Power to ammonia

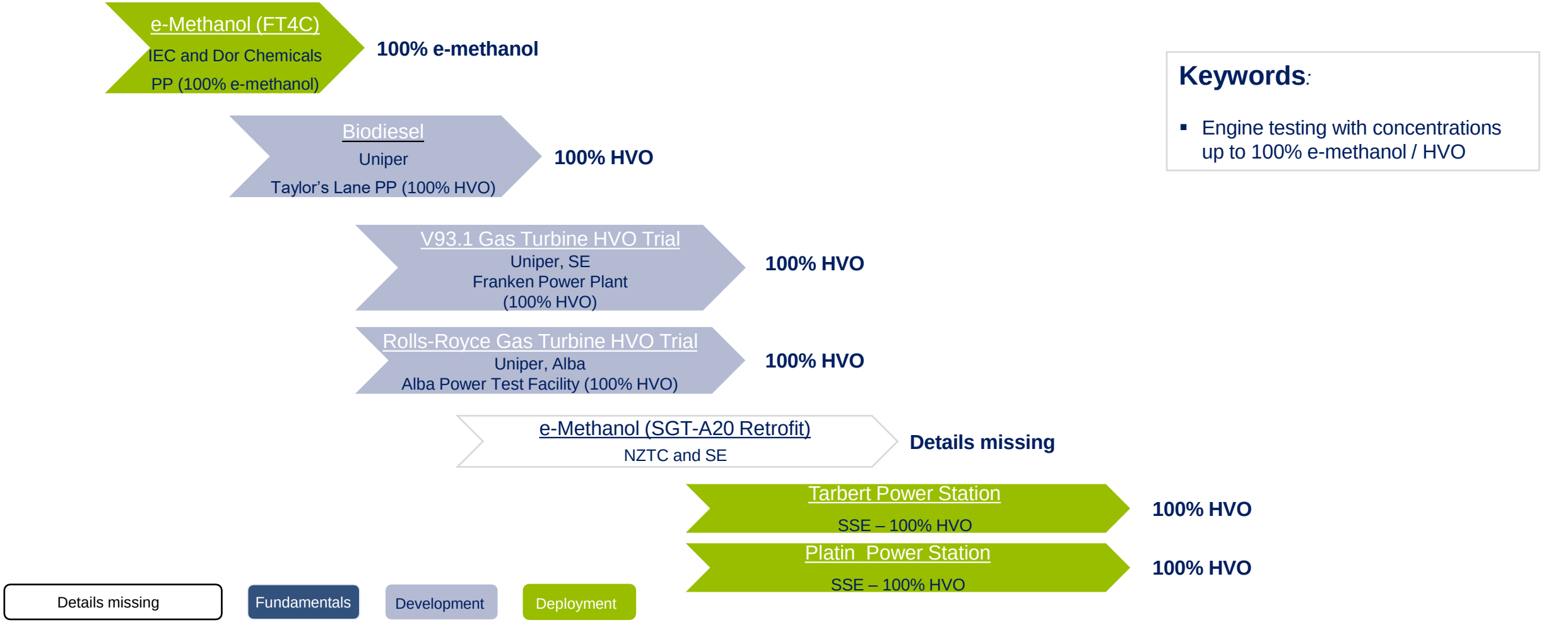
Biofuel



Keywords:

- Engine testing with concentrations up to 100% ethanol / bio-methanol / biofuel

E-fuels



Keywords:

- Engine testing with concentrations up to 100% e-methanol / HVO

Summary

- Our R&D roadmap is constantly evolving. Today we have **13 initiatives spread over 6 working groups**
- In response to end-user needs, we have started a new working group: **Digital Solutions and Diagnostics**
- End-user initiatives have been formalised into a **one pagers projects** with a defined process for initiation and tracking progress.
- The developed **Technology Timelines** provide a good overview of the deployment in relevant areas, providing recognition on a global scale. We urge all our members to share relevant information and additional input!

We thank you for your support and welcome your active involvement to populate all these initiatives.

Overview of ETN initiatives

Working Group	Initiatives	Parallel session
Digitalisation	N/A	Digital solutions and diagnostics 09:00-10:00 **Room B1.24A/B1.24B-Daniel Bernoulli**
Air Filtration	▪ Best practices ▪ ISO process finalisation	More efficient and/or Innovative cycles 09:00-10:00 **Room Atrium**
sCO_2	▪ Assessment of the technologies ▪ Engagement of the end-users ▪ sCO_2 Webinar series	

Overview of ETN Initiatives

Working Group	Initiatives	Parallel session
Additive Manufacturing	▪ LBPF initiative ▪ High Temperature Alloys	Product circularity 10:30-11:30 **Room B1.24A/B1.24B-Daniel Bernoulli**
Hydrogen & Alternative Fuels	▪ Alternative fuels ▪ Ammonia ▪ CCS Master thesis ▪ CCS webinar series ▪ GT enclosure safety ▪ H_2-GT report update ▪ H_2 project database	Low carbon solutions 10:30-11:30 **Room Atrium**

Overview of ETN Initiatives

Working Group	Initiatives	Parallel session
LTA/LTE	▪ Rotor lifetime and extension ▪ Hot section degradation and integrity	Product reliability and lifetime extension 12:00-13:00 **Room B1.24A/B1.24B-Daniel Bernoulli**
Decentralised Energy Systems	▪ Identification of gaps to close	Integrated Energy Systems 12:00-13:00 **Room Atrium**