

# Outcome of High-Level User Meeting 2021



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## ETN's High-Level User Meeting 2021

*"Operational optimisation and technology development needs for the transition to a carbon-neutral society"*

### ***Key messages from ETN Users to accelerate the transition***

Holistic approach in tackling barriers to develop a hydrogen economy

Development of trust for unlocking clean technologies' potential

Clear decarbonisation roadmap with defined end goals

Market readiness: interconnected demonstration efforts of decarbonised solutions

GTs an enabling technology of the energy transition

Enabling decentralised energy system solutions

Optimising existing assets to meet decarbonisation demands with required security of supply

Favourable market incentives and supportive policy frameworks

***Users call OEMs and the R&D community to join forces, enabling cost-efficient operations of the current asset base, while investing in solutions to respond to the decarbonisation challenge – ETN as key enabler***



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*"Operational optimisation and technology development needs for the transition to a carbon-neutral society"*

## Vision for the Energy Transition

**Energy Efficiency**  
Explore new and more efficient options

**Decarbonisation**  
Improve the carbon footprint of new and existing assets towards carbon-free generation

**Transition to new energy systems**  
Expand the solutions portfolio in the transition to new energy systems

## Strategic Areas and Goals

Integrated and trustful cooperation among the sectors to achieve affordable and decarbonised gas turbine-based solutions

Fleet improvements towards the most efficient and cost-effective solutions for the energy system

Decarbonisation and security of supply solutions through expanded fuel flexibility and system integration

## Current Assets Needs and Requirements

**Energy Efficiency Improvements**  
Existing assets upgrades and new assets  
Full and part load operation  
Increase overhaul service options  
Offshore OCGT to CCGT transition  
Light and compact bottoming cycles

**System transition**  
Large demonstration project  
Electrification

**Emissions**  
NOx monitoring  
NOx emissions with alternative fuels  
CO<sub>2</sub> catalysers efficiency  
Hybridization

**Decarbonisation**  
Carbon footprint measurements  
Large scale and post combustion CC(U)S  
Operation with decarbonised fuels  
Flaring reduction

**Reliability**  
Maintain availability and performance

**Competitiveness**  
CAPEX optimisation to support new investments  
Low OPEX models  
Affordable overhaul options  
Short term overfiring for peak power  
Economic viability of solutions  
Remaining useful life of components  
Remote assets solutions

## Key Enablers

**Hydrogen**  
Short-term retrofit to 20-30 vol.%  
2030 target to 0-100 vol.%  
Local, small scale (<100MW), intermittent power  
Cooperation with TSOs and DSOs on infrastructure

**Advanced Cycles**  
sCO<sub>2</sub>  
GT hybridisation with decarbonized fuels, batteries, thermal storage  
Standard package solutions  
New technologies exploration

**Servicing**  
Depot quality, diversity and capacity  
Healthy competition  
Lifecycle assessment

**Workforce**  
Develop and retain existing skills  
Attract new talents

**Policy and Regulatory**  
Market mechanism to reward transition  
System actors collaboration (TSO, DSO)  
Legislation and Carbon tax  
Certification

**Additive Manufacturing**  
Product quality & Control  
Circular Repair  
Advanced Control Systems / EMS  
Shorten lead time for spare parts

**Digitalisation**  
Unmanned plants  
Data analysis  
Remote monitoring  
Digital warehouse



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# Identified technology development requirements

1. Provide short-term engine specific retrofit solutions to enable a safe, flexible and reliable operation with fuels that contain up to 30% hydrogen. Launch a gas turbine specific upgrade package to operate with 100% H<sub>2</sub> in 2030 without significant increase in the NOx emissions and maintaining the plant's performance.
2. Provide a lifetime extension programme for plant specific gas turbines guaranteeing safe operation and optimised performance. It will involve life time assessment of critical components including advanced component repair to reduce material resources and costs of ownership.
3. Optimise power plant operation and maintenance through better use of digitisation and analytics. Combine analytics with engineering knowledge to reduce the operational costs and increase of plant's overall performance.
4. Develop gas turbine specific upgrade packages enabling operation with other low carbon fuels: e.g. biofuel (short term) and ammonia (long term).