ETN Global AGM & Workshop 2025

25-27 March 2025, Bergen, Norway

Event sponsors

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Media partners

Opening announcement

Christer Björkqvist, Managing Director,
ETN Global

Safety moment

Welcome speech

Hege Rognø, Snr Advisor CCS &
Low Carbon Solutions, Equinor

ETN AGM 2025

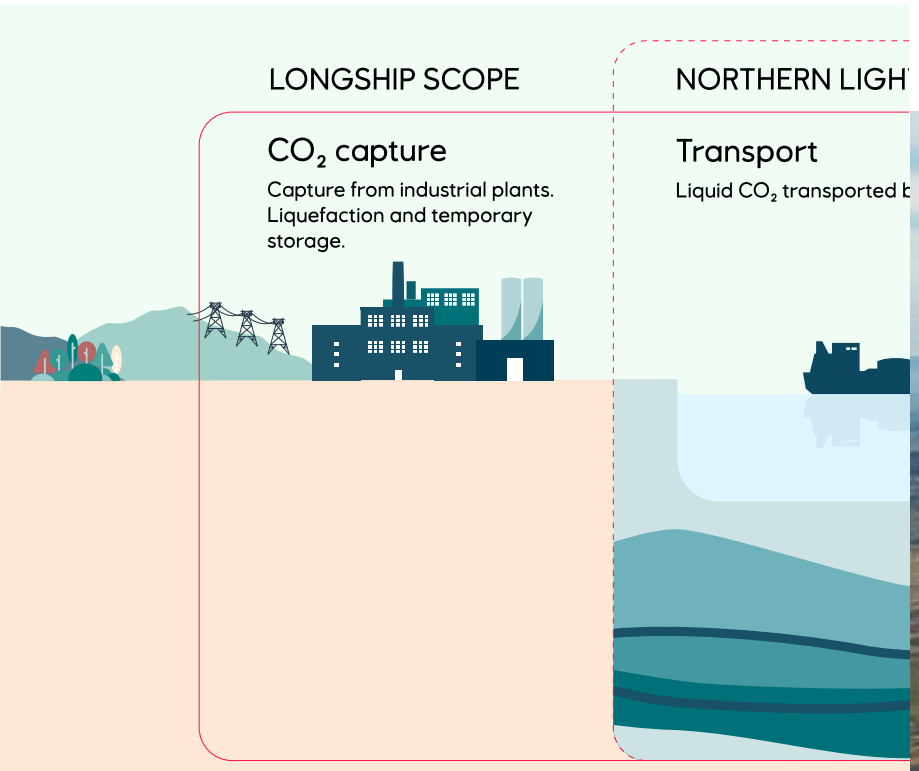
Bergen, Norway

March 25th – 27th,2025

10th December 2024

Greenlight for Net Zero Teesside Power

- Net Zero Teesside Power (NZT Power) announces entry into execution phase, creating and supporting thousands of jobs.
- NZT Power aims to be the world's first gas-fired power station with carbon capture and storage, providing flexible, low-carbon power to the UK grid.
- Start-up expected in 2028, supporting the UK Government's Clean Power 2030 ambition.



Hydrogen as Low Carbon Fuel

SSE Thermal and Equinor join forces on plans fo hydrogen and carbon capture projects in the H

April 8, 2021 08:00 CEST | Last modified April 8, 2021 08:40 CEST

The Keadby 1 power station. (Photo: Stuart Nicol / SSE Thermal)

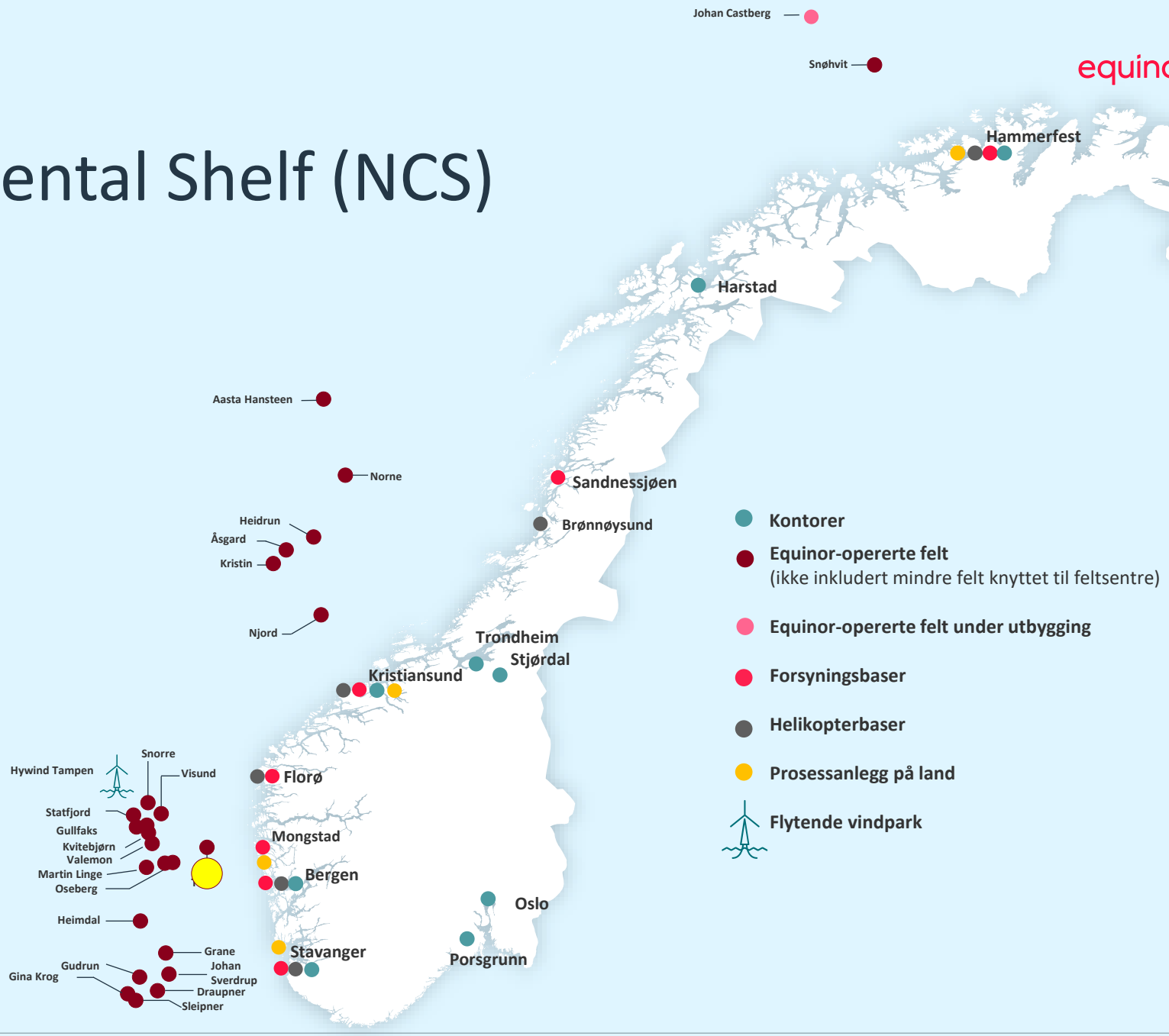
Equinor's first electrolyser – HyPilot modules on site at Kårstø

Kristoffer Kjærnes | Thu, 25 Apr 2024 14:00 | 3 min read | 2540 Views

Norwegian Continental Shelf (NCS)

~ 50

Fields in Operation
Equinor operated



WE ARE EQUINOR

A broad energy company, searching for better solutions

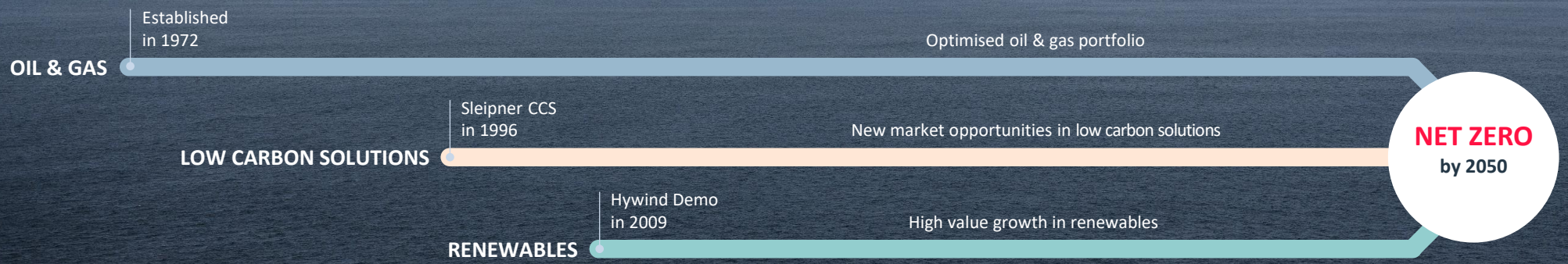
We are a Norwegian energy company, determined to use our competence, skills and innovation, continuously searching for the solutions that will drive the energy transition.

23,000
EMPLOYEES
Across the world

30
COUNTRIES
Presence and business operations

8,000
SUPPLIERS
Working together with us

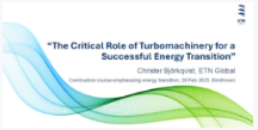
170
MILLION PEOPLE
Get access to our energy – everyday



AGM 2025 Exhibitors

ETN AGM & workshop

- Reflect on progress & present key developments
- Focus on strategic initiatives and collaborative efforts

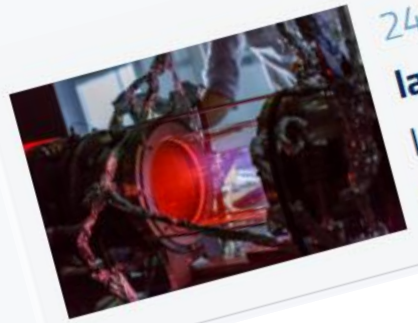


06/03/25 | **ETN Global's Christer Björkqvist highlights role of turbomachinery in energy transition at TUE**

Read about ETN Global's latest presentation on the critical role of turbomachinery for a successful energy transition at Eindhoven University of Technology... READ MORE.

06/03/25 | **ETN Global urges EC to consider gas turbines part of the NZIA**

Reasons for EC to recognise gas turbines in the Net-Zero Industry Act... READ MORE.



24/03/25 | **InsigH2t project officially launched!**

Learn more about the project and follow us on social media!... READ MORE.

ETN-Global-NZIA-input-public-consultation-Feb2025.pdf

AGM 2024 opening and approval of last meeting's minutes

Hege Rognø, Equinor/
ETN Global Vice President

AGM 2024 opening and approval of last meeting's minutes

- Minutes of ETN Global 20th Annual General Meeting
  - Shared via email on 19 March
  - Available on ETN Global's 21st AGM & Workshop webpage


ETN minutes of the 20th General Assembly

20 March 2024, NEM Energy office, Leiden, the Netherlands

Achievements and 2024-2025 Activity Update

Christer Björkqvist, Managing Director,
ETN Global

Activity Update

Strategy, activities and achievements

1. Vision and Mission
2. Strategic goals agreed at AGM 2024
3. Progress and achievements on our strategic goals
4. Communication strategy

Energy & Turbomachinery Network

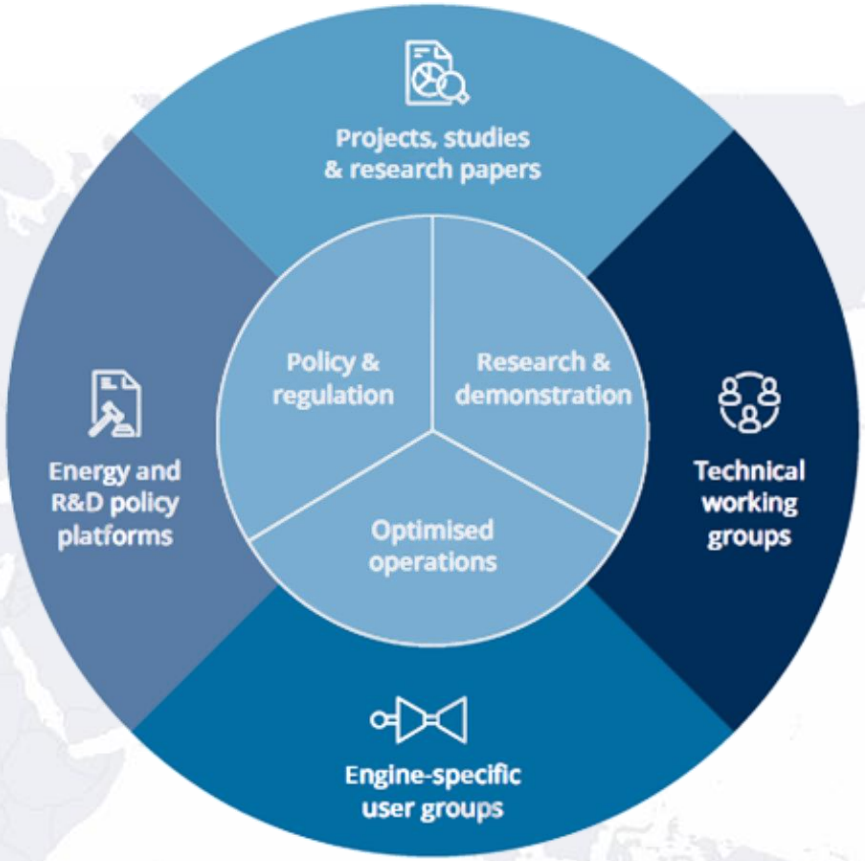
Vision and Mission

Our vision:

To provide safe, secure, affordable and dispatchable carbon-neutral energy solutions.

Our mission:

To globally facilitate information exchange and cooperation to accelerate research, development, demonstration of innovative energy solutions aligned with our vision.



Strategic Goals for 2024-2025

Agreed at AGM 2024

1. **Globalising and growing ETN Global:**
   - Expand our user community to strengthen a coordinated market demand;
   - Build strategic alliance and partnership in key markets
2. **Research & demonstrations:** Accelerate the development and deployment of ETN's commonly agreed research topics
3. **Optimised operations:** Exchange experiences and explore development needs
4. **Policy & regulations:** Advocate for a stable regulatory framework and supportive policies to improve investment conditions
5. **Changing the perception of our industry**
   - Position gas turbines as a vital net-zero technology
   - Promote turbomachinery as a life-long career opportunity to students

Globalisation and Growing

New Members since AGM 2024

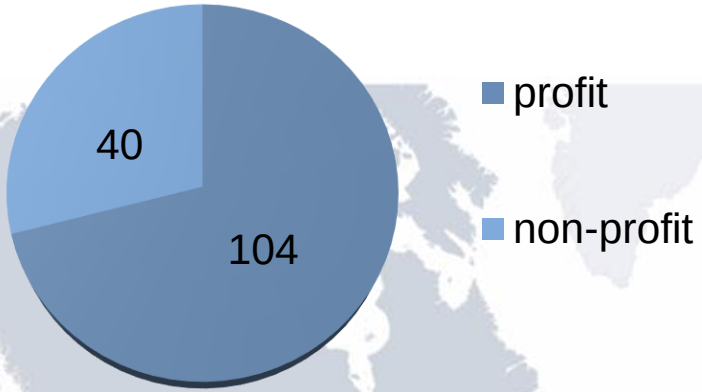
Net increase: 8 Members

▪ Sime Srl	Italy	▪ University of Alberta	Canada
▪ Valmet Automation	Finland	▪ ATL Turbine Services	UK
▪ HPI Energy	UK	▪ Power Service Consulting	Germany
▪ Woodward	Netherlands	▪ SINTEF	Norway
▪ MFS B.V.	Netherlands	▪ Energy Link International	Canada
▪ University of Mons	Belgium	▪ GE Aerospace	USA
▪ Vår Energi ASA	Norway	▪ University of Roma Tor Vergata	Italy
▪ National Gas	UK	▪ Golar LNG	Norway
▪ Enbridge	Canada	▪ Marvel-Tech Ltd	China

Resignations: ADEX; Omniseal-saint Gobain; Man-Hummel; Allied Power; Heatric; University of Perugia; Paul Scherrer Institute; Airproducts; Gastops; AOG

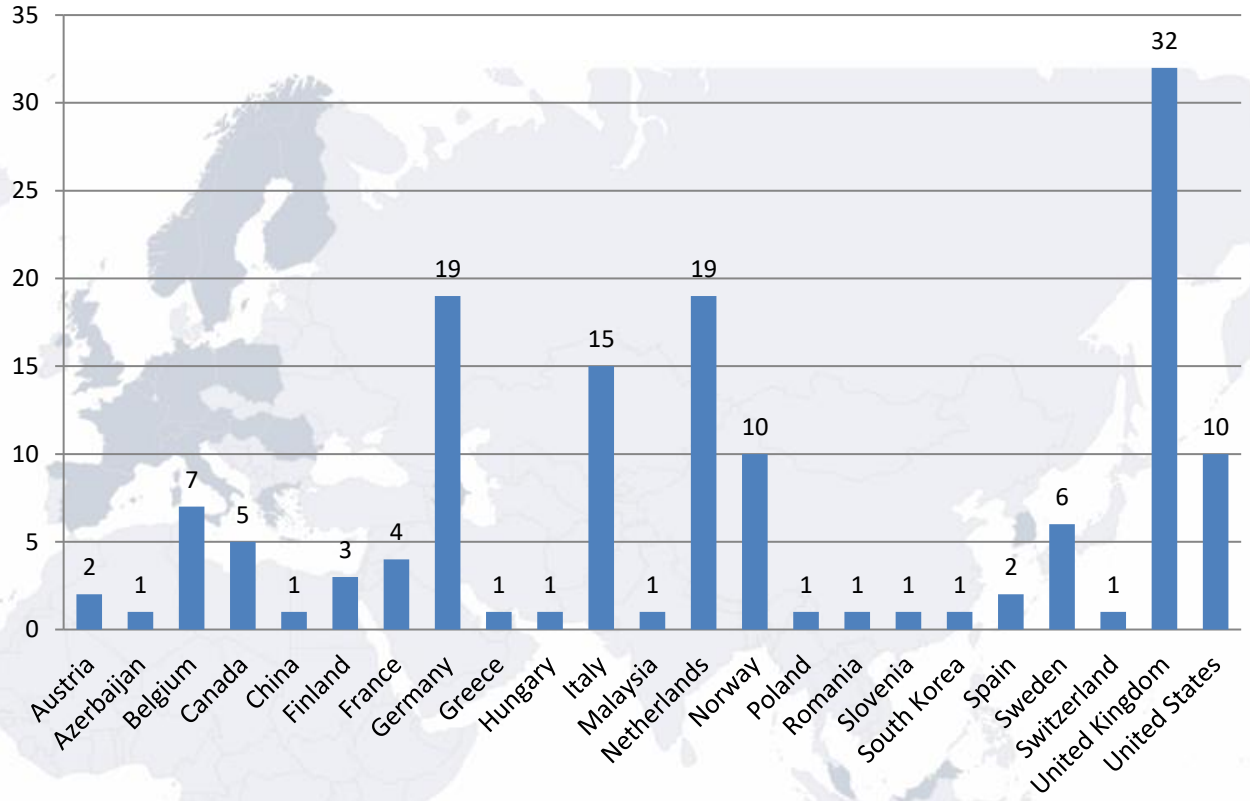
Energy & Turbomachinery Network

144 Member organisations from 23 countries



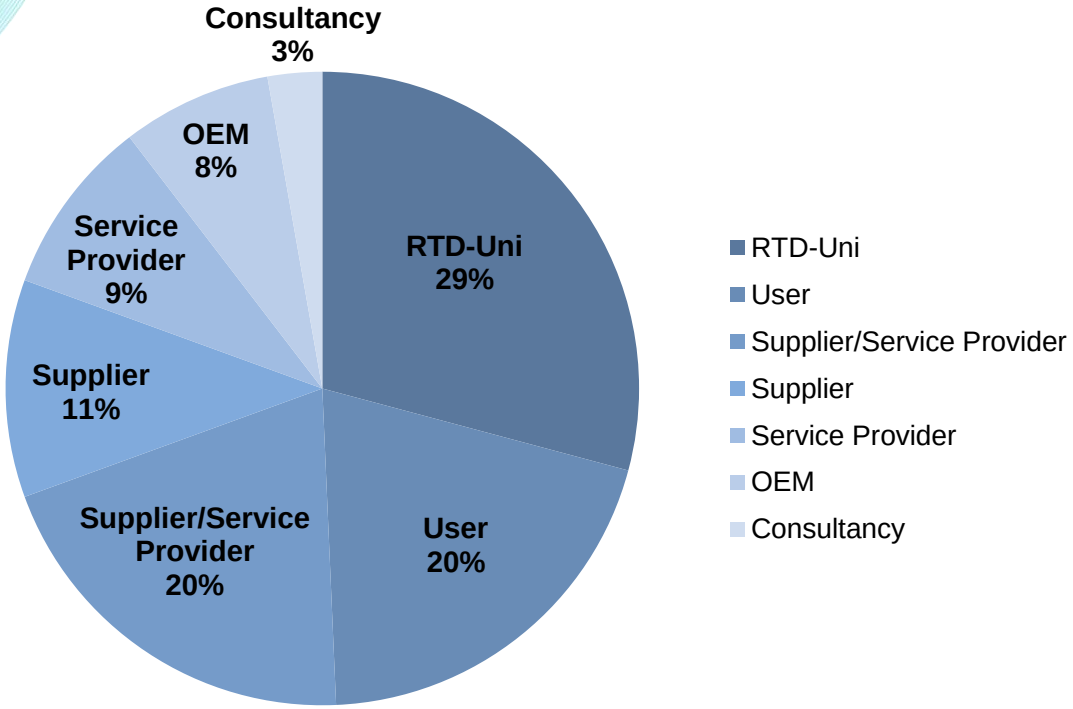
Higest participation per country

1. UK	6. Norway
2. Germany	7. Belgium
3. Netherlands	8. Sweden
4. Italy	9. Canada
5. US	10. France



Energy & Turbomachinery Network

Balanced Global participation



10 original equipment manufacturers (OEMs), shaping cutting-edge technology and responsible for **84% of global orders** for dispatchable thermal turbines.

63 global suppliers and service providers, delivering practical solutions to market challenges.

29 energy users, including **15 utilities** and **14 leading energy companies**, providing direct insight into operational needs and challenges.

43 international R&D institutions and universities, driving innovation and advancing energy research.

4 international consultancies, offering strategic, global perspectives on the energy transition.

Strategic Alliances

- **European Clean Hydrogen Alliance:** EU lead alliance to promote investments and stimulate clean hydrogen production and use
- **European Net Zero Alliance (ENZA)** – Like-minded 23 associations committed to climate neutrality
- **COGEN Europe:** Highlighting the role of cogeneration in the energy transition
- **The Knowledge Center on Organic Rankine Cycle technology (KCORC)**
- **Gas Turbines for Energy Network (GTEN), Canada**
  - Spring Technical Course 26-27 May, 2025 at Halifax, Canada
- **ASME Electric Power Committee, US**
  - ETN Global lead Turbo Expo panel sessions: *Voice of the Customers*; and *Pathways Forward: Future Gas Turbine OEM Developments & Technology Update*

Research & Demonstrations

Accelerate the development and deployment of ETN Global's commonly agreed research topics

ETN Roadmap

To map out net-zero carbon pathways and accelerate development

Identify needs & Challenges

User Community

Explore technical solutions

Turbomachinery Community

R&D Report & WG Roadmaps

Advocate for suitable policy framework

Global outreach

Shifting the Technology Perception

Accelerate Technology Development

Research & Demonstration Projects

Portfolio of net-zero pathways

Key takeaways
2024 High Level User Meeting

Challenges and barriers to address

Decarbonisation pathways

From ETN's High Level User Meeting 2024

Utilities

- Renewable energy expansion
- Nuclear energy
- Energy storage solutions
- Hydrogen and biofuels
- Carbon capture and storage (CCS)

Turbomachinery solutions

Energy Companies

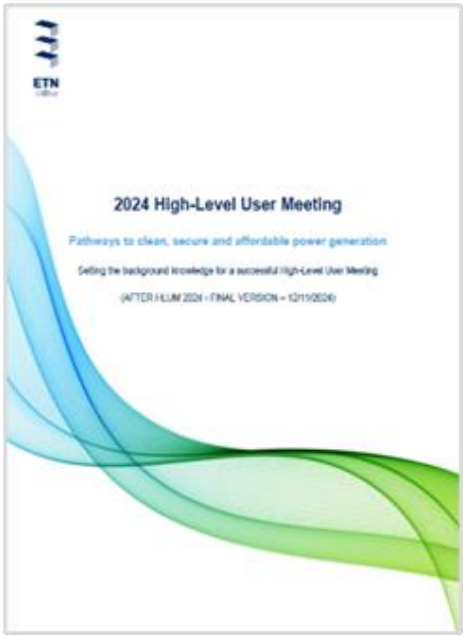
- Electrification of operations and renewable electricity
- Energy efficiency and operational optimisation
- Methane emissions
- Hydrogen and biofuels
- Carbon capture and storage (CCS)

Industrial users

- Electrification of operations
- Hydrogen and e-fuels
- Energy storage solutions
- Energy efficiency and operational optimisation
- Carbon capture and storage (CCS)
- CO_2 abatement/ compensation

High Level User Meeting report

Available on our website



Download on ETN Global's website www.etn.global

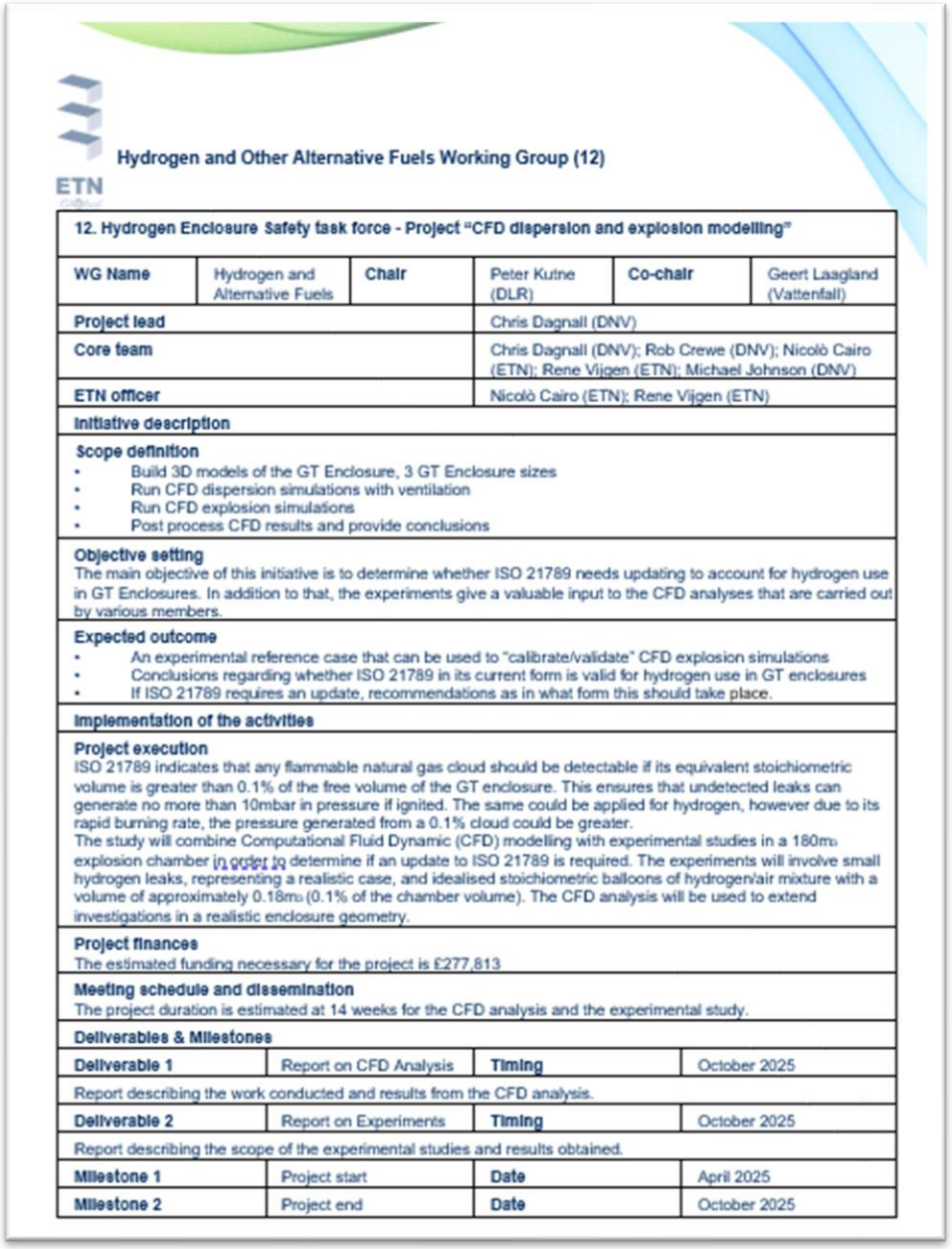
1. Login
2. R&D report
3. Research & innovation
4. High-Level User meeting report 2024

A structured and focused approach

To maximise our WG's impact

- A well-defined project charter for each WG that identifies the scope, objectives, timeline, and contributors
- Introduce milestones as intermediate targets to ensure progress
- Provide full transparency of all the initiatives for all members

Launch a one-pager to define the initiatives and install a process to monitor initiation and progress



Hydrogen and Other Alternative Fuels Working Group (12)

12. Hydrogen Enclosure Safety task force - Project "CFD dispersion and explosion modelling"					
WG Name	Hydrogen and Alternative Fuels	**Chair**	Peter Kutne (DLR)	**Co-chair**	Geert Laagland (Vattenfall)
Project lead			Chris Dagnall (DNV)		
Core team			Chris Dagnall (DNV); Rob Crewe (DNV); Nicolò Cairo (ETN); Rene Vijgen (ETN); Michael Johnson (DNV)		
ETN officer			Nicolò Cairo (ETN); Rene Vijgen (ETN)		

Initiative description

Scope definition
- Build 3D models of the GT Enclosure, 3 GT Enclosure sizes
- Run CFD dispersion simulations with ventilation
- Run CFD explosion simulations
- Post process CFD results and provide conclusions

Objective setting
The main objective of this initiative is to determine whether ISO 21789 needs updating to account for hydrogen use in GT Enclosures. In addition to that, the experiments give a valuable input to the CFD analyses that are carried out by various members.

Expected outcome
- An experimental reference case that can be used to "calibrate/validate" CFD explosion simulations
- Conclusions regarding whether ISO 21789 in its current form is valid for hydrogen use in GT enclosures
- If ISO 21789 requires an update, recommendations as in what form this should take place.

Implementation of the activities

Project execution
ISO 21789 indicates that any flammable natural gas cloud should be detectable if its equivalent stoichiometric volume is greater than 0.1% of the free volume of the GT enclosure. This ensures that undetected leaks can generate no more than 10mbar in pressure if ignited. The same could be applied for hydrogen, however due to its rapid burning rate, the pressure generated from a 0.1% cloud could be greater.
The study will combine Computational Fluid Dynamic (CFD) modelling with experimental studies in a 180m³ explosion chamber in order to determine if an update to ISO 21789 is required. The experiments will involve small hydrogen leaks, representing a realistic case, and idealised stoichiometric balloons of hydrogen/air mixture with a volume of approximately 0.18m³ (0.1% of the chamber volume). The CFD analysis will be used to extend investigations in a realistic enclosure geometry.

Project finances
The estimated funding necessary for the project is £277,813

Meeting schedule and dissemination
The project duration is estimated at 14 weeks for the CFD analysis and the experimental study.

Deliverables & Milestones

Deliverable 1	Report on CFD Analysis	**Timing**	October 2025
Report describing the work conducted and results from the CFD analysis.			
Deliverable 2	Report on Experiments	**Timing**	October 2025
Report describing the scope of the experimental studies and results obtained.			
Milestone 1	Project start	**Date**	April 2025
Milestone 2	Project end	**Date**	October 2025

Hydrogen and other alternative fuels WG

SEND AN EMAIL TO THE MEMBERS OF THIS WORKING GROUP

Description | Partners | Latest development (ETN) | Documentation (ETN) | Members (ETN) | Ammonia Taskforce | Events

ETN hydrogen and other alternative fuels Working Group

The objective of the Hydrogen Working Group is to share technical knowledge and experiences to progress towards the overall objective of safe and flexible low-carbon solutions for 0 to 100 vol.% of hydrogen blends and other sustainable fuels, such as ammonia. Through research collaboration and sharing of best practises, from an operational and maintenance perspective, the aim is to accelerate the development and implementation of economically viable solutions, for retrofit as well as for new and advanced technologies and solutions, in line with the user community's needs.

ETN hydrogen and other alternative fuels reports

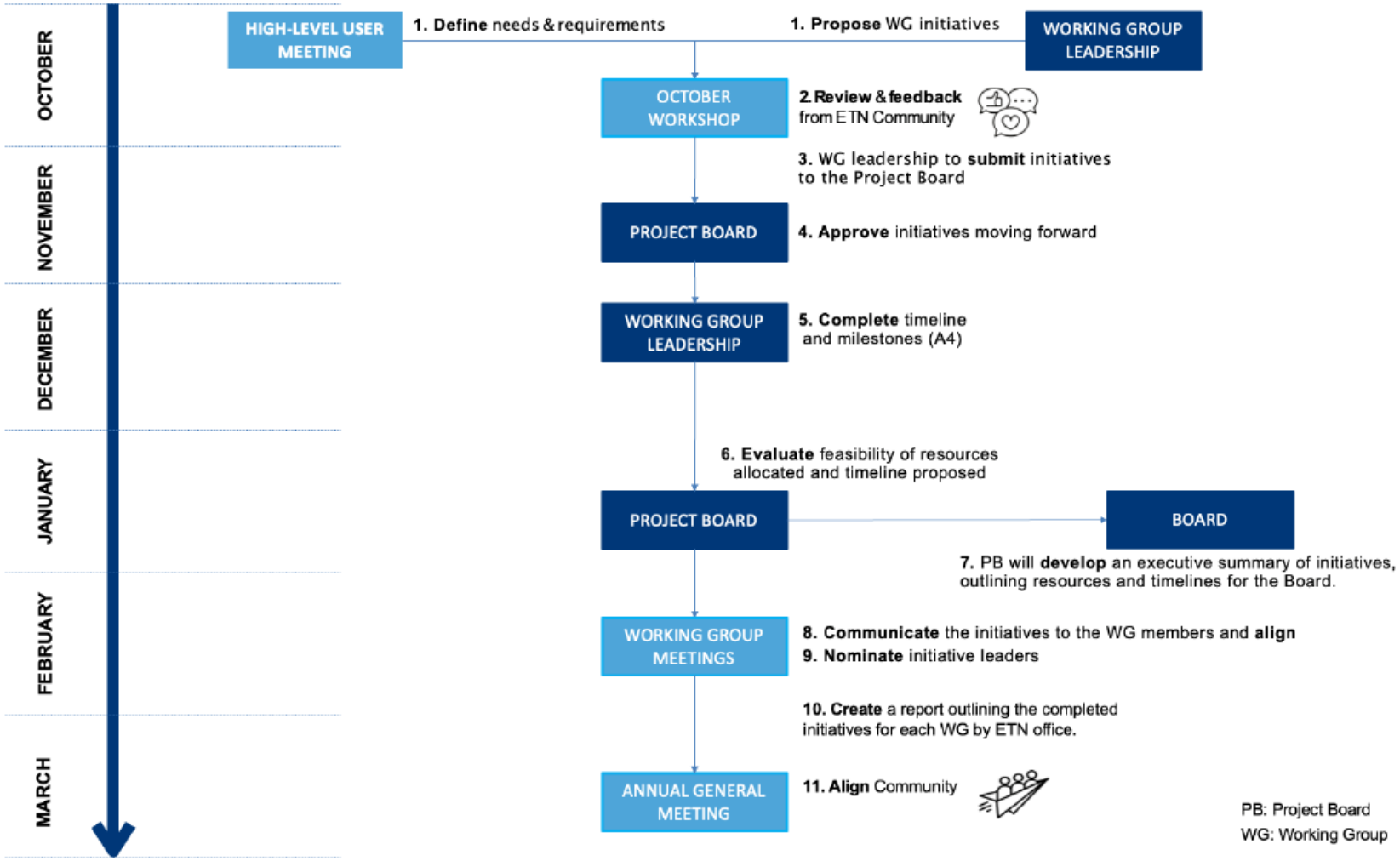
Please find all reports from ETN's working groups here.

Interested to join this Working Group? Please send an email to info[at]etn.global

Not a member yet? Find out more about the ETN membership here.

Selection Process

For new initiatives and projects



ETN Global's Technology Development Platform 2024

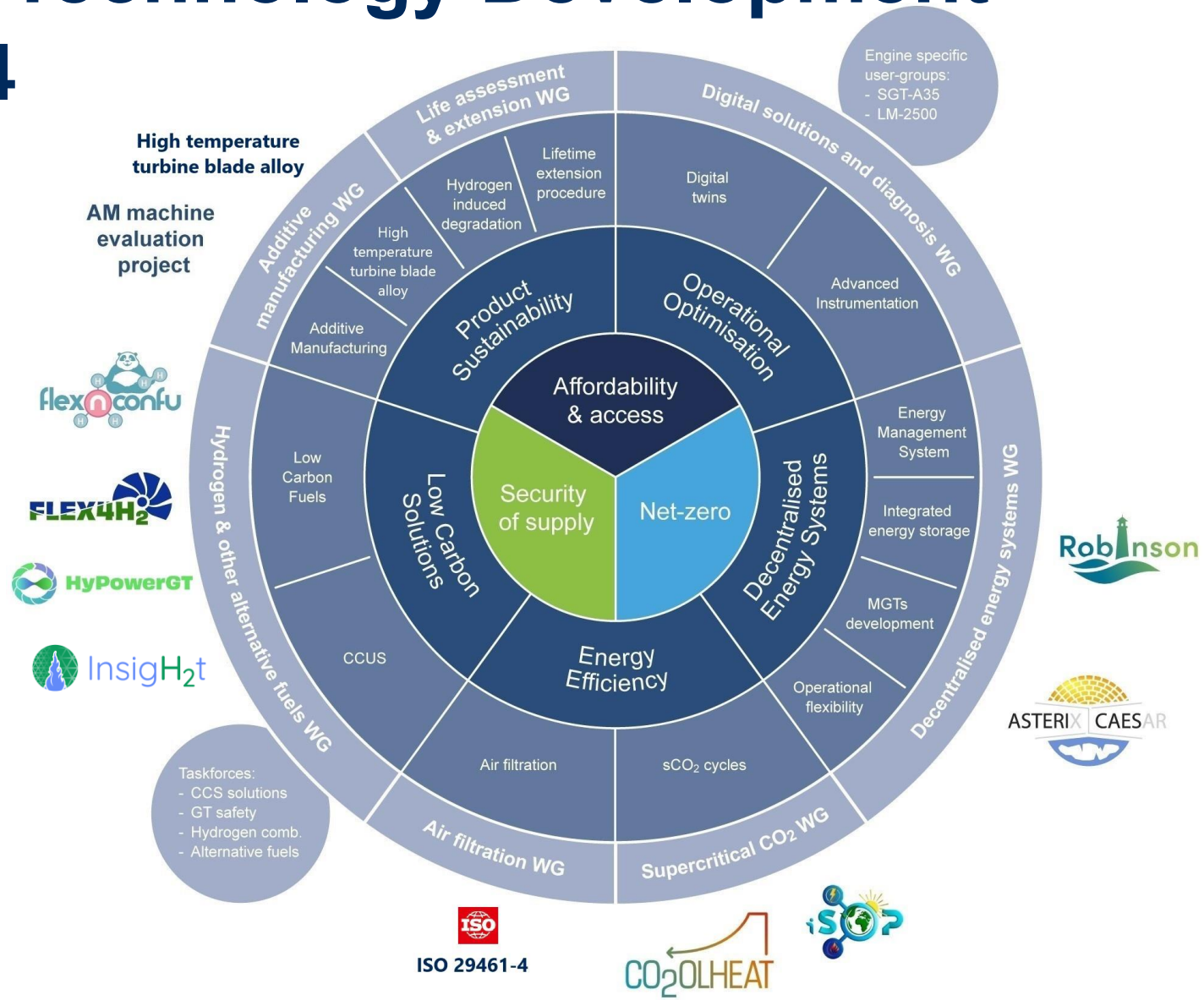
Overall Goal

Key topics

Solutions

Working Group's

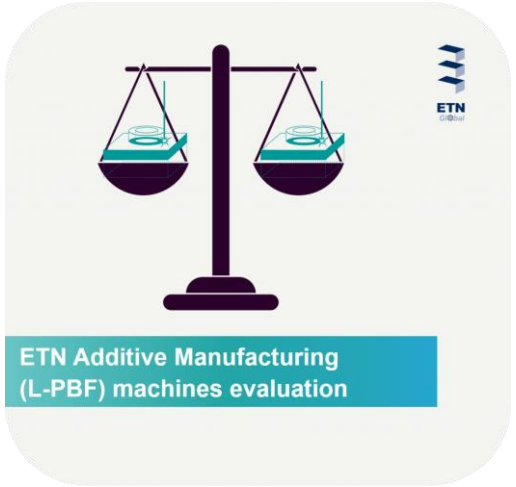
ETN Projects



Collaboration and Global Partnerships

Driving innovation through industrial collaboration

ETN Global Industry-funded projects



Additive manufacturing

Hydrogen Safety enclosure

Standardisation

ISO/FDIS 29461-4

Optimised operations

Exchange experiences and explore development needs

Engine-specific user groups

Meetings in April 2024-March 2025

Working Group	2024 Programmed Activities
LM2500	• **User Group Meeting: 4 – 6 June 2024 (Utrecht, The Netherlands)** • Participation: US, Canada, Italy, Germany, Netherlands, UK, Belgium, Norway, Azerbaijan, United Arab Emirates • Regular 6-weeks User calls
SGT-A35	• **User Group Meeting: 5 – 7 November 2024 (Malmö, Sweden)** • Participation: US, Canada, the UAE, Azerbaijan, Colombia, Spain, UK, France, Netherlands, Belgium, Germany, Slovakia, Norway, and Sweden • Regular 6-weeks User calls
Frame 5, 6B, 7E & 9E	• **Kick-off meeting: 7 May 2024 (SC web meeting)** • Preparation steering Committee calls • First in-person meeting for ETN AGM 2025

Policy & Regulations

Position GT as a key net-zero technology

Advocate for a stable regulatory framework and supportive policies

Policy advocacy

With Strategic Alliances

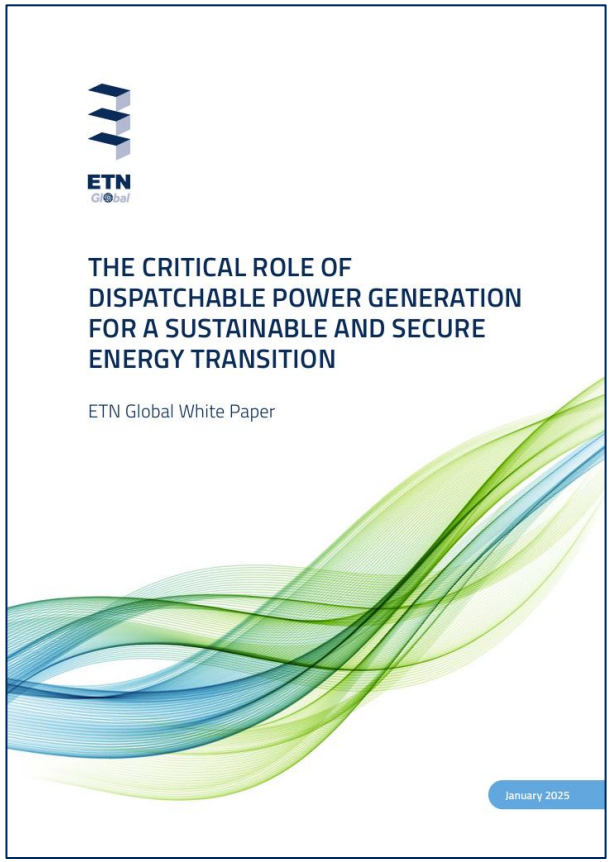
- Contributed to the Net-Zero Industry Act (NZIA) consultation, advocating for gas turbines as a net-zero technology
- ***100 measures for 100 days -*** Recommendations to the new European Commission together with the ENZA alliance (24 associations)
- ETN Global's White Paper: ***The Critical Role of Dispatchable Power Generation for a Sutainable and Secure Energy Transition***
- Joint letter on Net Zero Industry Delegated ActCogen Europe: ***Cross-industry call for Recognition of Cogeneration in the Net-Zero Industry Delegated Act***
- Active engagement with policymakers, key regulatory bodies and IEA

ETN Global White Paper

Supporting policymakers with technical expertise

Objectives and call to actions:

1. To inform policymakers about the upcoming anticipated energy capacity gap.
2. To get recognition of the critical role dispatchable thermal turbines play in ensuring grid reliability.
3. To accelerate production of hydrogen and carbon-neutral fuels as essential elements of Europe's energy transition.
4. To introduce financial incentives and supportive regulatory frameworks to encourage investments in dispatchable thermal turbine fleets

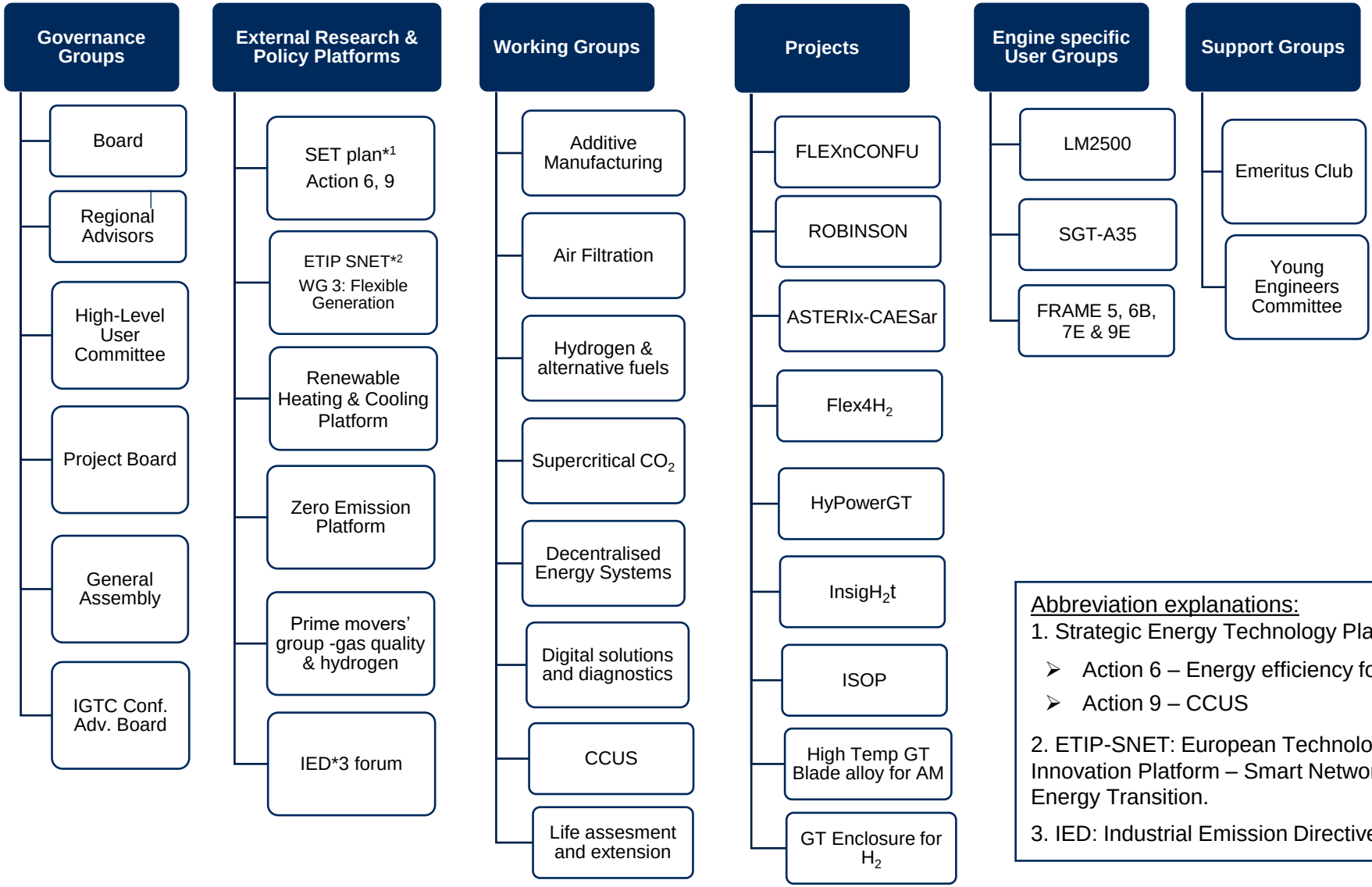


Constructive meetings

To present our White Paper and discuss our call to actions

- **European Commission**:
  - Tudor Constantinescu (Prinsipal Adviser, DG-ENER)
  - Ruud Kempener (Deputy Head of Unit, Energy security & safety, DG ENER)
- **European Parliament**
  - Cristian Ehler, Group of the European People‘s Party, Rapporteur: Industry, Research & Energy committee
- **International Energy Agency (IEA)**
  - Head of Gas, Coal & Power Markets Division,
  - Head of Power Sector Unit,
  - Head of the Renewable Energy Division
  - Head of Unit, Renewable Integration and Secure Electricity

Structure of governance and focus areas 2024-2025



Abbreviation explanations:

1. Strategic Energy Technology Plan:
   - Action 6 – Energy efficiency for industry
   - Action 9 – CCUS
2. ETIP-SNET: European Technology and Innovation Platform – Smart Networks for Energy Transition.
3. IED: Industrial Emission Directive Forum

ETN Global communication strategy

for effective communication

ETN Global communication strategy

Key focus areas

- **Increase awareness & visibility**
- **Enhance member engagement and knowledge-sharing**
- **Engage & influence policymakers**
- **Strengthen industry networks & alliances**
- **Promote ETN Global's events & initiatives**
- **Enhance media relations**

ETN Global communication strategy

Key channels

- **Digital platforms:**
  - **Emails** – WG/UG/YEC/Emeritus Members club, event(s) and annual updates, press releases
  - **Calls/webinars**
  - **Newsletters** – monthly & quarterly, referencing website articles.
  - **Website** – news articles, events & webinars, R&D reports, updates under WGs & UGs
  - **LinkedIn**
- **Direct engagement:**
  - **Events** – ours and external (ASME, ENLIT,…)
  - **Meetings** – policymakers

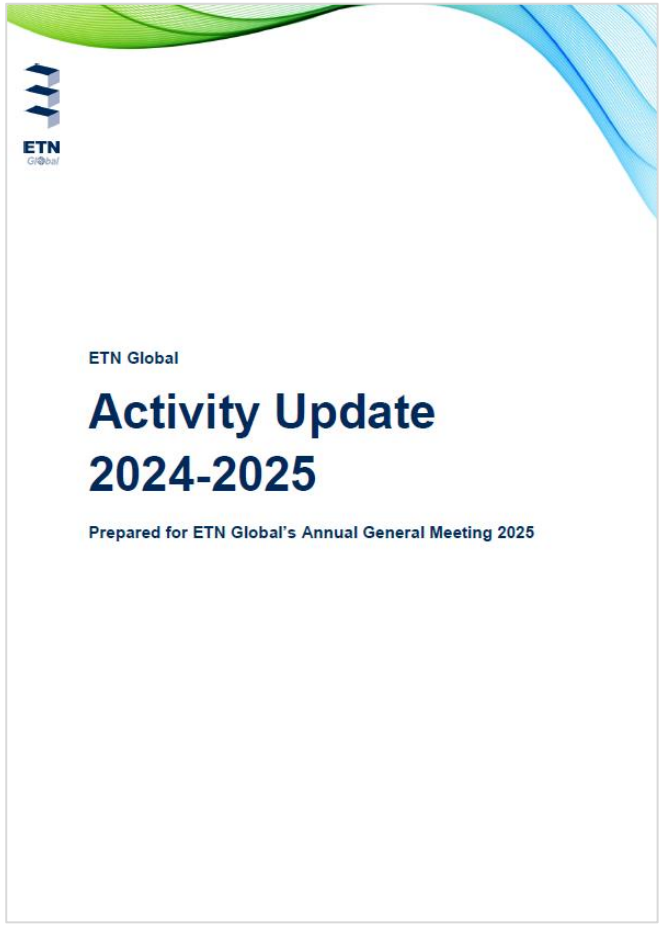
ETN Global communication strategy

Member involvement

- **Share ETN Gobal's updates** – events, reports, LinkedIn posts
- **Contribute with your expertise** – join WGs/UGs, industry-funded projects, share your knowledge for reports
- **Help us grow the network**
- **Give us feedback** – surveys after events/webinars; annual survey

Annual Activity Update

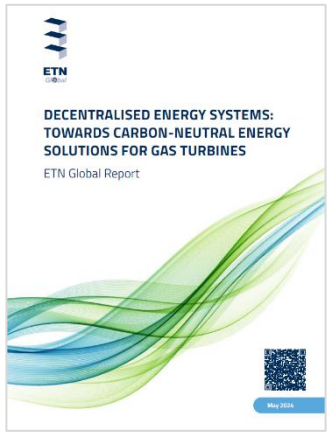
April 2024-March 2025

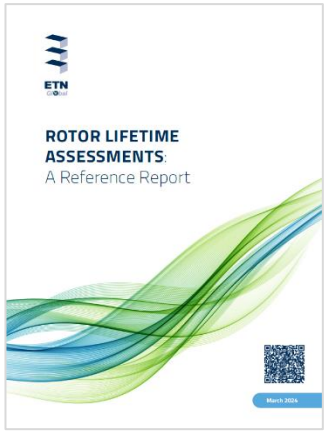


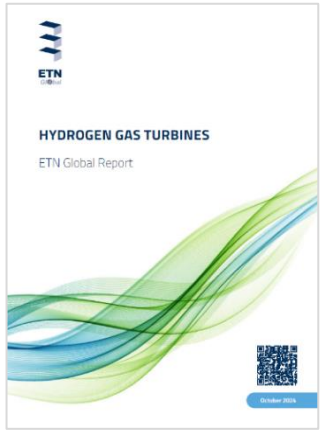
- Shared with attendees via email on 19 March
- Available for download on ETN Global's AGM & Workshop website.

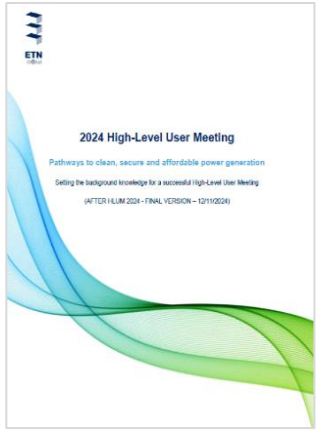
2024 Reports

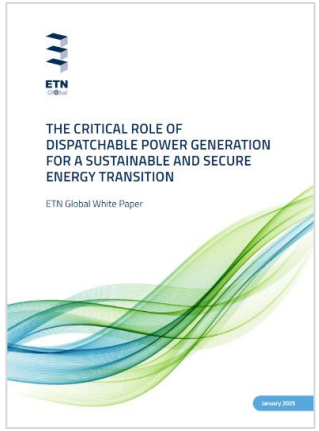
Available for download on ETN Global's website











Financial report

Andy Williams, ETN Global Treasurer/ Chromalloy

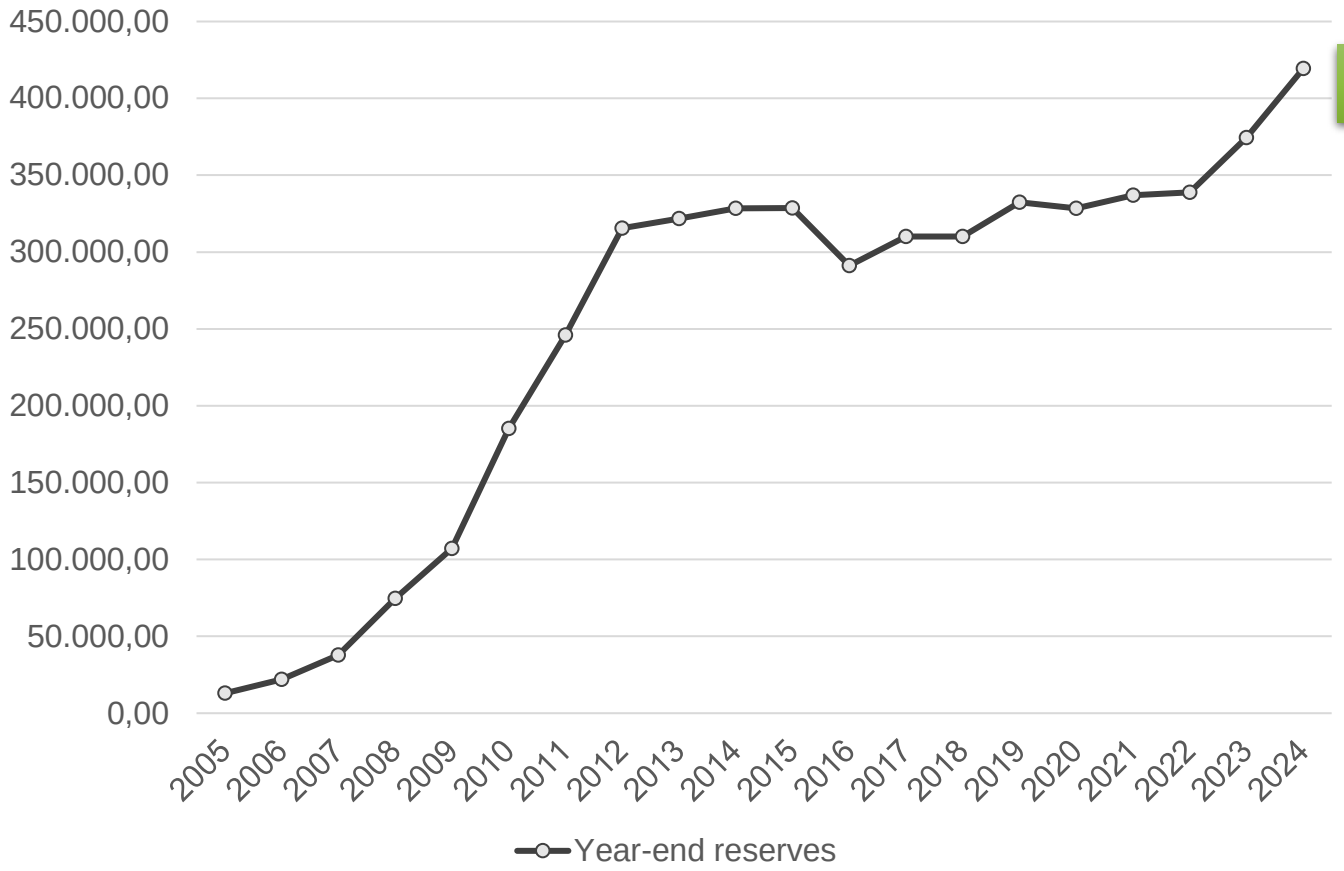
Budget 2024

INCOME	Budget	Year-end	EXPENSES	Budget	Year-end
Membership fees	618.000	642.676	**Personnel**	738.000	748 195
EU projects	236.000	247.720	**Offices cost** (incl. tax, electricity, heating, computers, phone, storage, supplies, stationary)	100.500	100.623
AGM Workshop; October Workshop (2024); User groups	232.000	209.910	**Meetings & Travel** (AGM & Workshop, October Workshop, User meetings, Board/Project Board; WG's, ASME, other internal and external meetings); + Projects meetings & travel (Robinson, FlexnConfu, FLEX4H2, HypowerGT, ASTERIx, ISOP)	207.500	164 867
AM project	100.000	0	**Industrial AM project**	85.000	0
Provisions from previous year	68.300	68.000	**PR & Dissemination cost**	41.000	35.416
Other	2.500	3.470	**External services:** IT, websites services (incl. individual projects), accountant, legal fees	39.000	39.790
			Other external costs: education, taxes, leasing and bank fees	26.000	26 439
			Marketing initiative (changing perception)	15.000	9.639
			Project development	4.000	1.791
Sub-total	**1.256.800**	**1.171.776**	**Sub-total**	**1.256.000**	**1.126.761**
			Exp. Result 2024	**+800**	**+45.015**

Budget 2025

INCOME	2025	EXPENSES	2025
Membership fees	673.000	**Personnel**	750.000
EU projects	242.000	**Offices cost – Brussels and Seville** (incl. tax, electricity, heating, computers, storage, phones, supplies, stationary)	105.000
AGM Workshop; IGTC; User groups	323 000	**Meeting costs & travel** (AGM & Workshop, IGTC, User meetings, Board/Project Board; WG's, ASME, other external meetings); + Projects meetings & travel (Robinson, FlexnConfu, FLEX4H2, HypowerGT, ASTERIx, ISOP)	273.000
Industry funded project (AM project + GT enclosure)	482.000	**Industry funded project (AM project + GT enclosure)**	433.000
Provisions from previous year	0	**PR & Dissemination cost**	53.000
Other	3.000	**External services:** IT, websites services (incl. individual projects), accountant, legal fees	42.000
		Other external costs: education, taxes, leasing and bank fees	28.000
		Projects initiation/ development cost	14.000
		Events: Showcasing Clean Energy Transition & Career opportunities	5.000
Subtotal	**1.722.000**	**Subtotal**	**1.703.000**
		Exp. Result 2025	**+19,000**

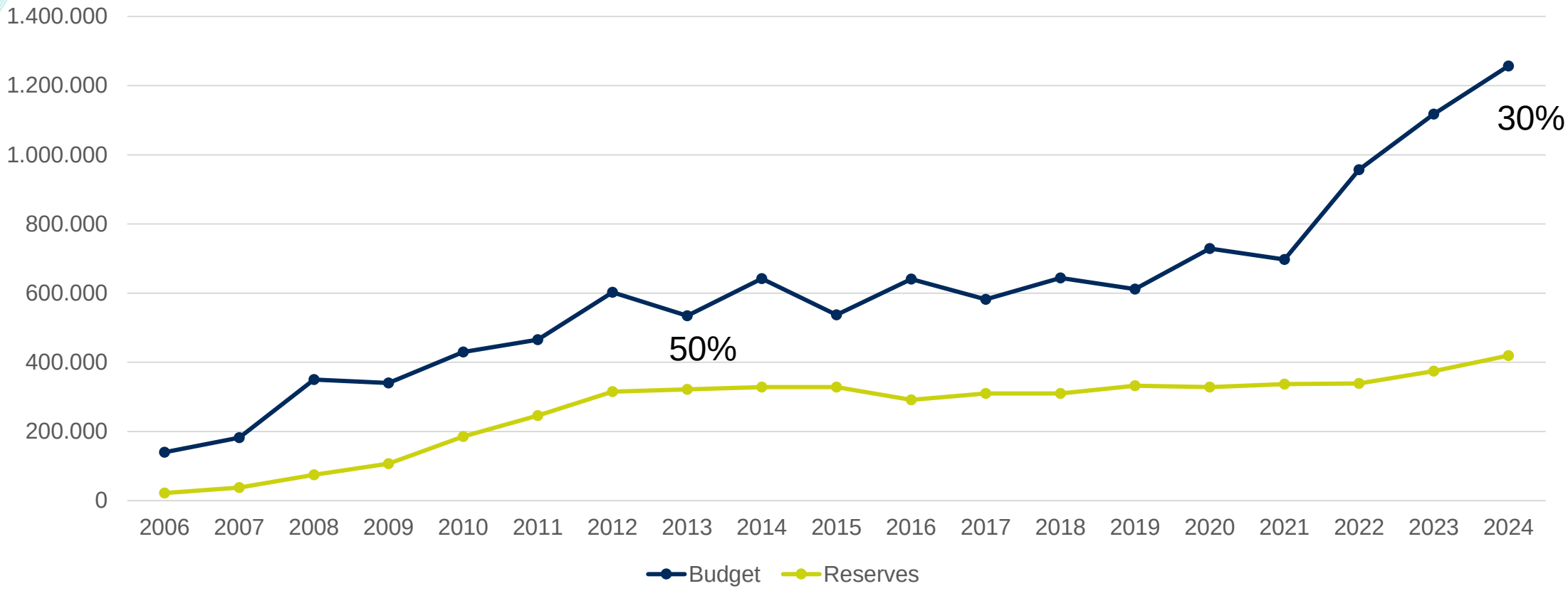
Development of Reserves



+12,0% in 2024

Year-end reserves 2024: 419.300 Euro

Budget comparison with reserves



Attestation of Accounts 2024

B & D bvba — Accounting - Tax Management

Av. Jean Sobieski 48
1020 Brussels (Belgium)

Tel : 32-2-474.15.90
Fax : 32-2-474.15.99

E.T.N.
ENERGY&TURBOMACHINERY NETWORK
Chée de Charleroi 146-148/20
1060 BRUXELLES

Brussels, 20th March 2025

Concerning : E.T.N. Accounts
O/Ref. : 2024

Dear Sirs,

We have drawn up the annual accounts of the accounting year that ended on the 31st December 2024, which have been prepared in compliance with the Belgian legal and regulatory requirements.

We can state that the annual accounts present fairly the financial position of the association as of 31st December 2024, and the results of its operations for the year then ended is adequate.

We certify that, without prejudice to certain formal aspects of minor importance, the accounting records are maintained in accordance with the Belgian legal and regulatory requirements.

We remain at your disposal for any information or explanation you could need.

We wish you a good receipt of this letter and in the meantime we remain,

Yours faithfully,

Jacques DEGRAEVE
Tax accountant
ITAA n° 10.372.229

BCE 430.416.187 VAT BE 0430.516.187 Bank 210-0296390-10

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We certify that, without prejudice to certain formal aspects of minor importance, the accounting records are maintained in accordance with the Belgian legal and regulatory requirements.

Closing of AGM

Christer Björkqvist, Managing Director, ETN Global

12:30 – 13:45 Lunch & expo

Store salong

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