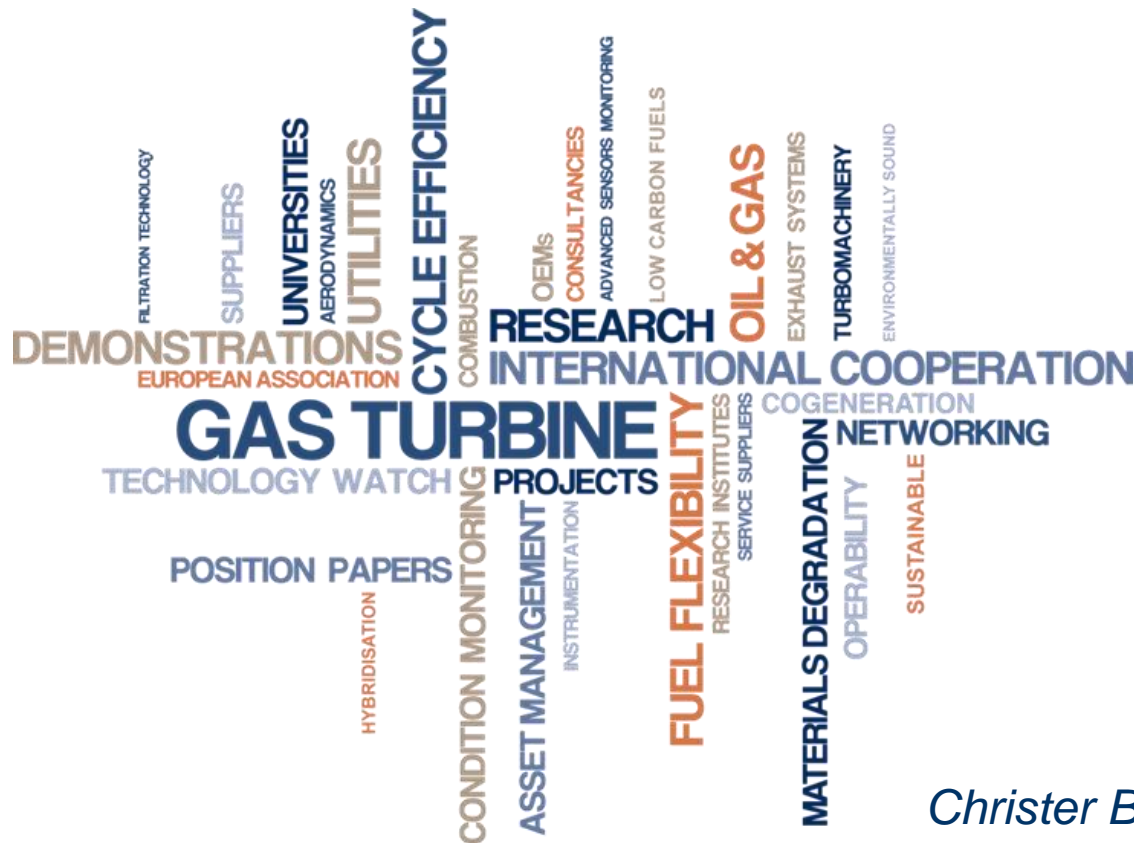




EUROPEAN  
TURBINE  
NETWORK



## ETN's 2<sup>nd</sup> Micro Gas Turbine Meeting



*Christer Björkqvist  
Managing Director, ETN*



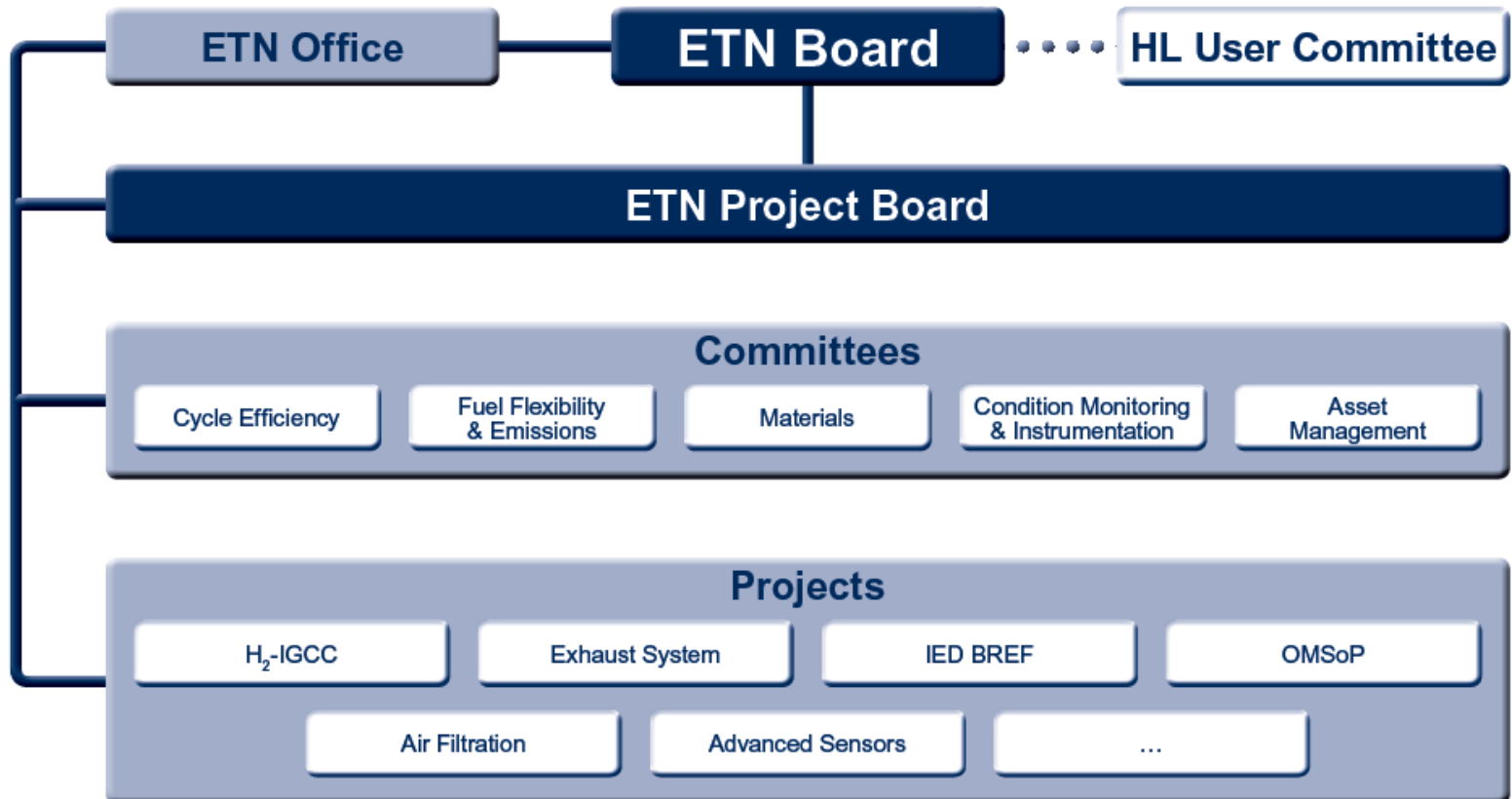
**ETN**

# Vision

Environmentally Sound  
Gas Turbine Technology  
with Reliable and Low Cost Operation



# Internal Structure



# Technical Committees



- ❑ Breeding platform for initiatives
- ❑ Expert groups that can be consulted
- ❑ Yearly meeting to review technical developments and to discuss and explore potential new initiatives.

## Outcome:

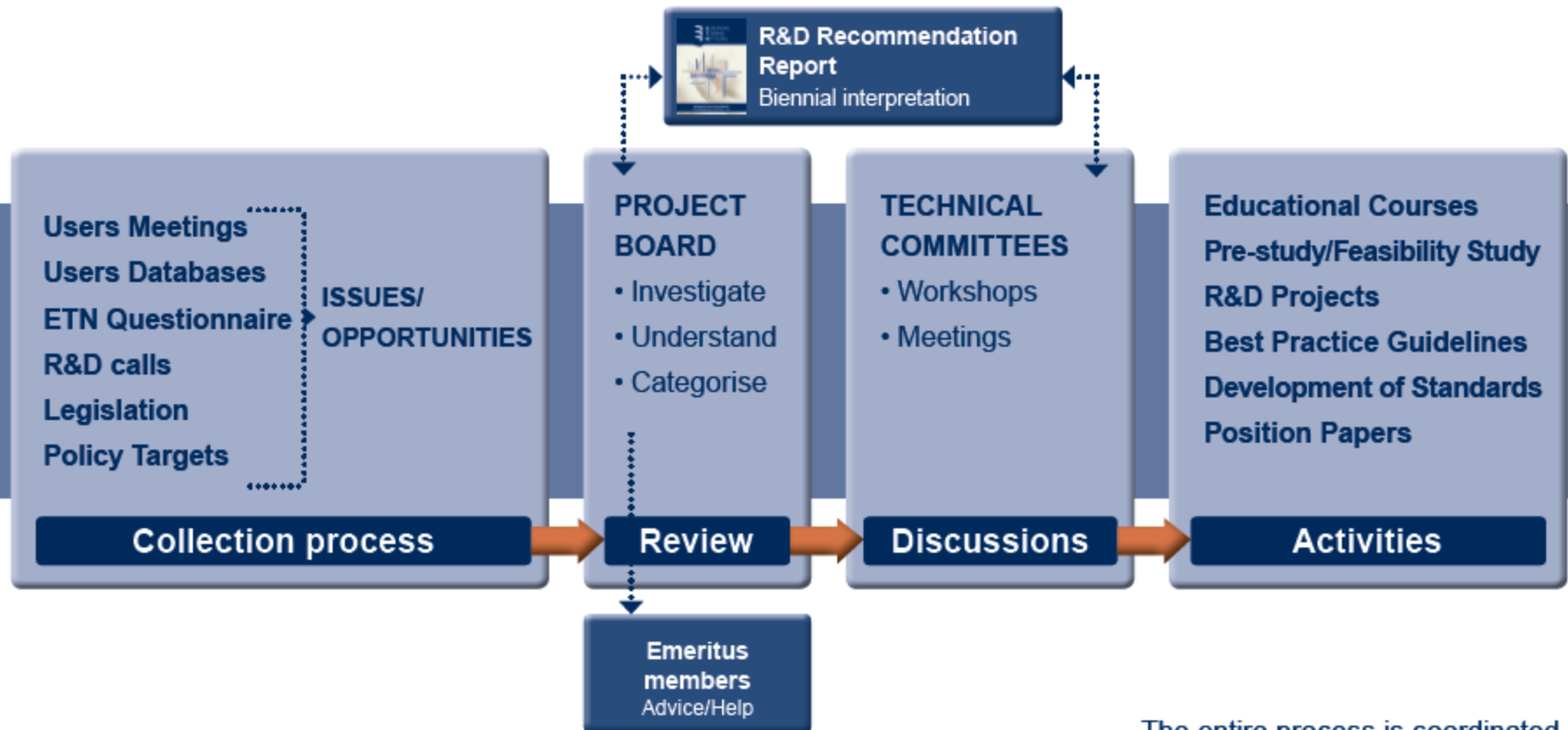
- Technology watch
- Feasibility studies
- Project initiatives
- Best practise Guidelines, Standards
- Technical courses







# Activities Initiation



The entire process is coordinated by the ETN secretariat and reviewed by the ETN Board

# Energy Challenges

Still high amount of  
Uncertainties



- ❑ **Policy**
  - 2030 Energy and Climate Framework?
  - Global agreement COP 2015?
- ❑ **Market** uncertainties – tough competitions but an accelerating shift from a centralised generation to distributed generation
- ❑ **Fuel prices** –Supply/demand

Need to cooperate in a proactive way to pave  
the way for the MGT technology

Common  
MGT Vision

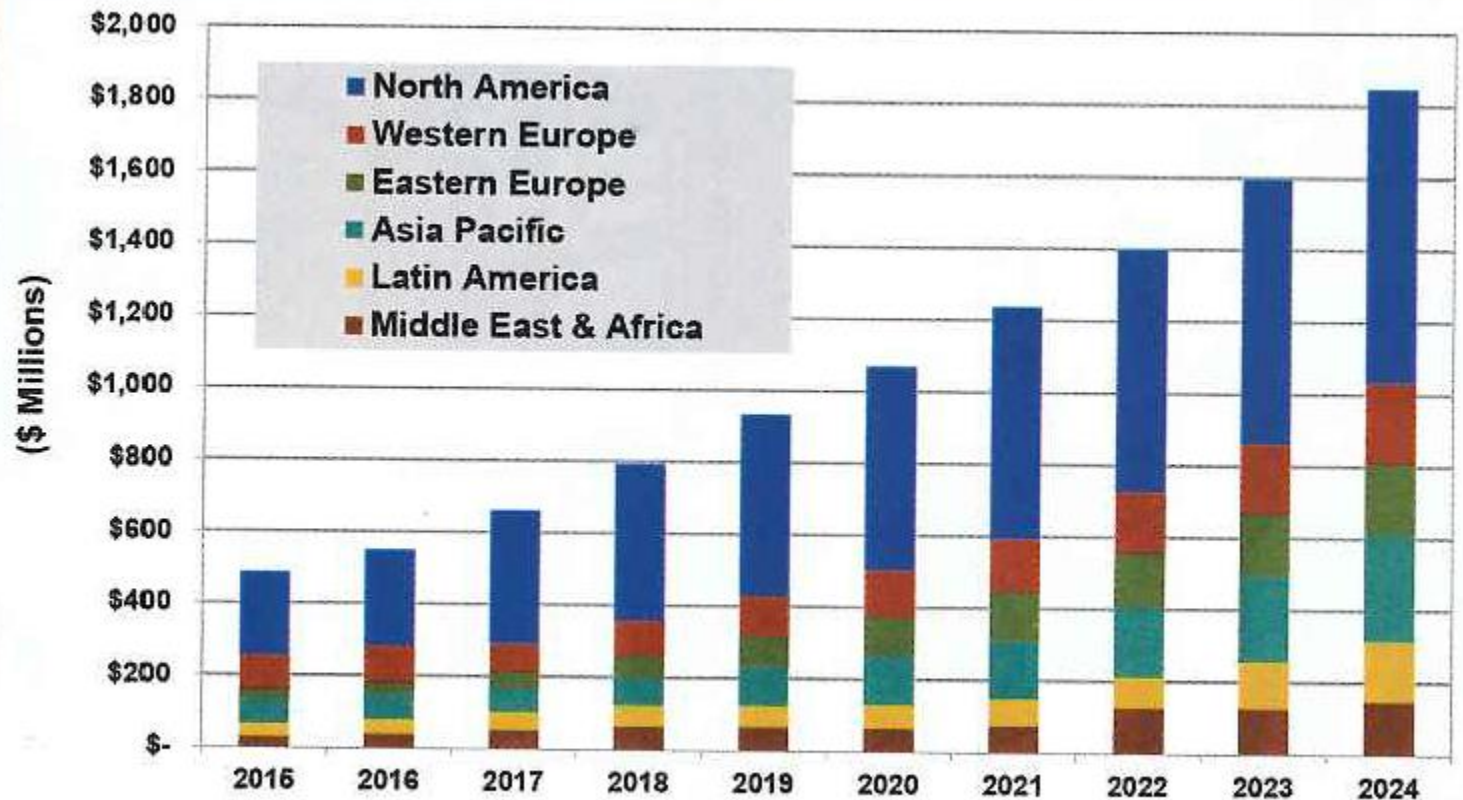


**ETN**

# MGT market boom predicted by Navigant Research report

Annual revenue from installed MGT expected to surpass 1 Billion by 2020

The Navigant report cover MGT up to 2MW



*Annual microturbine revenue by region 2015-2024*



# MGT market forecast by Capstone

for MGT 30-250 kW



## Split:

- Oil & gas 50%
- Commercial & Industrial CHP 40%
- Renewables (biogas, agriculture, food ind. etc.) 8%
- Transport (marine and hybrid vehicles) 2%

**Global market conditions for CHP continue to improve. Estimated global market size for CHP:**

- 4GW by 2024

**Main regions:** North America, Latin America, Asia Pacific and Africa

Planned  
Development

**200 kW MGT**



**250 kW MGT with  
36% efficiency  
2017**



**350 kW MGT with  
40-42 % efficiency  
2019**





# MGT market forecast by Capstone



## Key R&D areas:

- Improved combustion process with lower emission
- Power electronics to comply with interconnections regulations



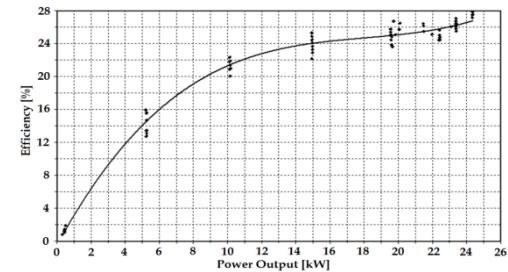
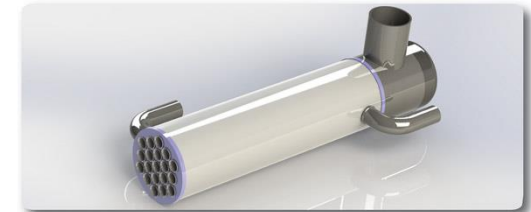
ETN

# MGT Key Challenges and way forward

## Outcome - ETN MGT meeting in London

### ☐ Key R&D areas to focus on

1. Recuperator
2. Improved efficiency
3. Fuel flexibility with the same MGT



### ☐ Develop a MGT Vision Document



**“By associating with wise people  
you will become wise yourself”**



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- ❑ Operational Flexibility
- ❑ Efficiency
- ❑ Fuel Flexibility
- ❑ Emissions
- ❑ Carbon Mitigation and CCS
- ❑ Advanced Cycles
- ❑ Materials
- ❑ RAM
- ❑ Condition Monitoring
- ❑ Sensors and Instrumentation







**ETN**

# ETN Technical Committees

## **TC1: Low Carbon Gas Turbine Operation**

Chair: Mohsen Assadi, University of Stavanger

Co-chair: TBD

## **TC2: Operational and Fuel Flexibility**

Chair: Jean-Louis Vignolo, GE Power & Water

Co-chair: Yannis Hardalupas, Imperial College London



## **TC3: Material Degradation, Repair Technologies and Manufacturing**

Chair: Ron van Gestel, Chromalloy

Co-chairs: Daniel Mack, Julich Research Centre and Nigel Simms, Univ of Cranfield

## **TC4: Condition Monitoring and Instrumentation**

Chair: Chris Dagnall, GL Noble Denton

Co-chair: Herwart Hönen, RWTH Aachen University

## **TC5: Asset Management**

Chair: Pascal Decoussemaeker, Alstom

Co-chairs: Christoforos Romesis, NTUA and Giuseppina Di Lorenzo, Univ of Cranfield