

EUTurbines Position on Zero Emission Fossil Fuel Power Plants (ZEP)/Carbon Capture Storage (CCS)

EUTurbines is the voice of the European gas and steam turbine manufacturers employing 70,000 people across Europe with a turnover of 20 billion euros. Gas and steam turbines are the key element for future power generation offering the highest degree of fuel flexibility – from fossil fuels through nuclear energy to biomass.

- 1. EUTurbines fully supports the development of zero emission fossil fuel power plants (ZEP), the main application of the Carbon Capture and Storage (CCS) concept, as a major solution for CO₂ emission reduction objectives in Europe and worldwide.**
- 2. Huge R&D efforts are still needed for demonstration of ZEP/CCS technology on a large scale, notably for the integration, optimisation and cost-effectiveness of the entire value chain.**
- 3. It is crucial to increase the efficiency of the power generation process in order to compensate for efficiency losses and thus make CCS economically viable.**
- 4. EUTurbines supports the inclusion of the ZEP/CCS Flagship Programme as large-scale initiative in the EU's Strategic Energy Technology (SET) Plan.**
- 5. EUTurbines calls on the European Commission to maintain ZEP/CCS and clean coal technologies including turbine R&D topics as priority areas in FP7.**
- 6. Gas and steam turbine manufacturers invest heavily in R&D on ZEP/CCS and thus bear a huge capital risk as "technology owners" in an uncertain market area. Large-scale demonstration of ZEP/CCS technology can only be done if there is a public-private risk sharing.**
- 7. EUTurbines pleads for a number of key criteria to be respected when setting both a framework for funding of ZEP/CCS demonstration projects and an enabling regulatory framework for the deployment of ZEP/CCS:**
 - a. Consistent and long-term framework,
 - b. Market-based instruments such as the EU Emission Trading Scheme (ETS),
 - c. Inclusion of incentives for efficiency increases,
 - d. Level playing field for all technology options.
- 8. EUTurbines believes that public acceptance of ZEP/CCS is a crucial factor for its deployment and therefore calls on all EU institutions and stakeholders to support efforts to raise awareness about this future energy technology.**

Detailed Views

Gas and Steam Turbine Manufacturers – Key “Technology Owners” Supporting the Development and Deployment of ZEP/CCS

The European gas and steam turbine industry is committed to ensure reliable and sustainable energy supply by making best use of all types of energy sources and all technology options. EUTurbines therefore welcomes the European Union's push for a common energy policy that places strong emphasis on technological innovation to boost energy efficiency and low-carbon solutions.

EUTurbines fully supports the development of zero emission fossil fuel power plants (ZEP), the main application of the Carbon Capture and Storage (CCS) concept, as a major solution for CO₂ emission reduction objectives in Europe and worldwide. In fact, turbomachinery is a fundamental element for ZEP/CCS, as it is the determining factor for the highly efficient energy conversion processes required to make CCS economically viable. To this end, gas and steam turbine manufacturers invest heavily in R&D and thus bear a huge capital risk as “technology owners” in an uncertain market area.

As of autumn 2004, EUTurbines actively promoted a “Clean Power” concept based on efficiency increases and carbon abatement technologies which led to the creation of the European Technology Platform “Zero Emission Fossil Fuel Power Plants (TP ZEP)” by the European Commission in spring 2005. EUTurbines is now a major sponsor of TP ZEP, and our member companies play a vital role in ongoing TP ZEP operations. This industry-led stakeholder process has brought about the vision and strategic documents on ZEP/CCS which are publicly available at www.zero-emissionplatform.eu.

EUTurbines contributes actively to the policy debate on ZEP/CCS, providing our industry sector's input into the legislative process and liaising with all EU institutions. At the current stage, our position laid down below addresses the principles to be taken into account when shaping a European ZEP/CCS policy. They comprise the following four major axes:

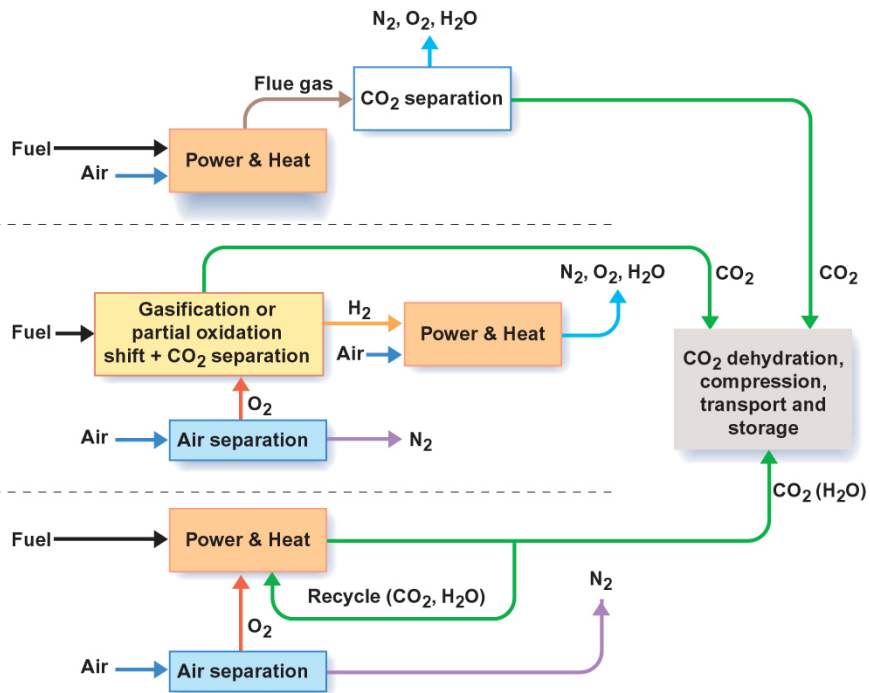
- Technology
- Demonstration
- Regulatory Framework
- Public Acceptance

Technology

Availability of ZEP/CCS technology

Many technology elements required to capture CO₂ from fossil fuel power plants, transport it and store it underground are individually proven. However, huge R&D efforts are still needed for demonstration of ZEP/CCS technology on a large scale, notably for the integration, optimisation and cost-effectiveness of the entire value chain. This applies to all of the three ZEP/CCS technology paths considered as viable options: post-combustion, pre-combustion and oxy-fuel.

Post-combustion capture

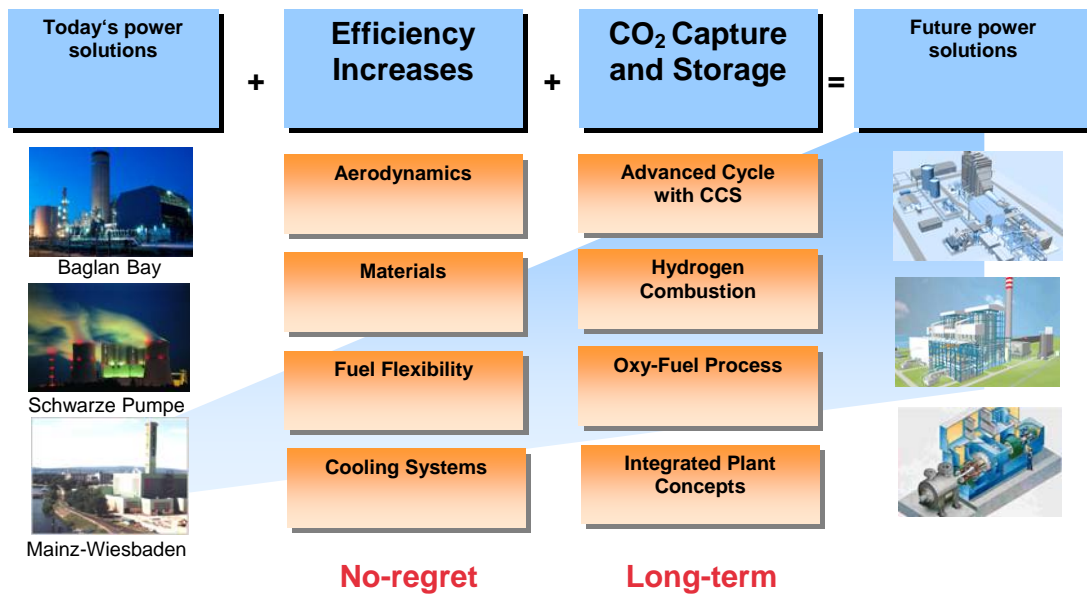


Main technology options for CO₂ capture from power plants (source: TP ZEP)

Crucial role of efficiency improvements

Capturing and storing CO₂ from fossil fuel power plants inevitably requires additional energy input, which can lead to losses in the overall plant efficiency of up to 13 percentage points, which means up to 37% higher fuel demand. As the energy penalty arising from CCS depends on the efficiency of the base plant, CCS makes more sense if applied to highest-efficiency plant. It is therefore crucial to increase the efficiency of the power generation process in order to compensate for efficiency losses and thus make CCS economically viable.

Gas and steam turbines are the determining factor for overall plant efficiency. If efficiency increases are a prerequisite for the long-term deployment of ZEP/CCS technology, it must be stressed that they also benefit the reduction of CO₂ emissions and fuel consumption in power plants without CCS. R&D activities in the field of aerodynamics, materials or combustion are essential to push efficiency increases. This "less in – more out" approach represents a "no-regret" pathway to CO₂ reduction.



→ Two Complementary Pathways for CO₂ Reduction

Roadmap towards Future Power Generation Portfolio

Capture-readiness

Building new fossil fuel power plants “capture-ready” is a useful concept in preparing the way towards “zero emission”. However, this concept represents a technological step in equipment integration capability and therefore requires specific R&D activities. The concept needs to be clearly defined before any legal obligations are introduced. EUTurbines is working towards the development of an adequate definition of “capture-readiness” that can be implemented in business practice.

Demonstration

EU Flagship Programme

EUTurbines supports the objective of setting up 10-12 demonstration projects to be comprised in an EU Flagship Programme on ZEP/CCS. As a matter of fact, EUTurbines' member companies are among the major business players taking part actively in the design of such demonstration projects.

To match up with the importance of the ZEP/CCS technology, EUTurbines calls for the inclusion of the ZEP/CCS Flagship Programme as large-scale initiative in the EU's Strategic Energy Technology (SET) Plan being prepared by the European Commission for the EU Spring Summit in 2008.

R&D and demonstration needs

The estimated extra CCS cost for the 10-12 demonstration projects comprised in an EU Flagship Programme on ZEP/CCS amounts to 6-10 billion euros. In addition, R&D expenditure in the order of 1 billion euros is needed for the specific development of plant equipment.

To allow the actual demonstration of ZEP/CCS technologies on a large scale, intensive upstream R&D is still required. EUTurbines therefore calls on the Commission to maintain ZEP/CCS and clean coal technologies including turbine R&D topics as priority areas in FP7. To this end, EUTurbines has provided a "Proposal for Key Topics in the Energy Theme of the FP7 Working Programme for 2008" in a paper elaborated with grass-roots expertise from our member companies, dated 12 March 2007.

Funding of ZEP/CCS demonstration projects

Gas and steam turbine manufacturers invest heavily in R&D on ZEP/CCS and thus bear a huge capital risk as "technology owners" in an uncertain market area. Large-scale demonstration of ZEP/CCS technology can only be done if there is a public-private risk sharing.

Provided that the necessary framework conditions are in place, the equipment manufacturing industry is committed to contribute its share in joint efforts with the plant operators and the oil and gas industry. EUTurbines pleads for a number of key criteria to be respected when setting a framework for funding of ZEP/CCS demonstration projects: consistent and stable framework, market-based approach, inclusion of incentives for efficiency increases, level playing field for all technology options.

Regulatory Framework

Establishing a consistent and stable enabling framework

EUTurbines supports the speedy establishment of an enabling regulatory framework at EU level for the implementation of ZEP/CCS technology. We call on EU decision-makers to ensure that such a framework is consistent and stable in order to allow the necessary long-term investment by industry.

Market-based instruments instead of mandatory requirements

EUTurbines supports market-based instruments to stimulate the deployment of ZEP/CCS technology such as the EU Emission Trading Scheme (ETS). We believe that a level playing field for all technology options contributing to a sustainable energy supply, and in particular to a low-carbon economy, needs to be ensured.

Public Acceptance

EUTurbines believes that public acceptance of ZEP/CCS is a crucial factor for its deployment and therefore calls on all EU institutions and stakeholders to support efforts to raise awareness about this future energy technology. In this respect, referral should be made to activities undertaken by the European Technology Platform “Zero Emission Fossil Fuel Power Plants (TP ZEP)”, which gathers a wide range of stakeholders including industry, academia and NGOs.

Contact:

EUTurbines
Udo Kremer
Manager European Affairs
Phone + 32 2 706 82 11
udo.kremer@mcm.be