Joint **EUTurbines – ETN** input on:

SET-Plan ISSUES PAPER No. 6

Continue efforts to make EU industry less energy intensive and more competitive

The European associations representing the turbine sector in Europe, EUTurbines (European Association of Gas and Steam Turbine Manufacturers) and ETN (European Turbine Network), welcome the Commission's initiative to refocus and prioritise the actions and activities within the updated SET-Plan and appreciate the opportunity to participate in the consultation to this "issues paper".

Supporting the Targets

EUTurbines and ETN support the targets that have been set up by the Commission in this issues paper: a clear support to develop technologies that deliver improvements of industrial processes in the energy intensive industries will contribute to their competitiveness.

Gas and steam turbines are key components in a wide range of applications, including industrial applications in many energy intensive industries. As the issue paper shows, the adaptation and optimisation of turbines for industrial purposes in the energy intensive industries can contribute considerably to more energy savings.

Turbines are key components for energy efficiency in the industry

The issues paper identifies two emerging technologies based on turbines that could have a high energy-savings - and thus cost reduction - potential in the future:

- sector-specific technology for the chemical industry as well as petroleum refineries: **Integrated Gasification Combined Cycle (IGCC)**,
  and
- cross-cutting technology for waste heat recovery:
  Organic Rankine Cycle, Supercritical Rankine Cycle

Both technologies already exist for a number of years. However, technical challenges obstruct the commercial exploitation on larger scale so far. These challenges can be overcome by additional R&I efforts.

Ahead of the second step of the SET-Plan process, EUTurbines and ETN would like to highlight some key R&I areas that need to be addressed in order to achieve the targets set up in the issues paper.

Integrated Gasification Combined Cycle (IGCC)

The integration of gasification and energy production in one plant is a very complex process, which, if running stable and controlled, can efficiently use by-products and waste to reduce the energy needs and/or provide input factors for other processes in chemical plants. The complexity today leads to

high downtimes and low utilisation rates. Further research is therefore needed to stabilise the process.

Main areas where R&I is needed concern (1) the impact of low(er) caloric gases on the turbine design, (2) the impact of the often varying composition of residual or waste products on the emissions of the combined-cycle plant and (3) the impact of the limited purity of the residual or waste products on the lifetime of the components (e.g. corrosion).

Organic Rankine Cycle, Supercritical Rankine Cycle

Organic Rankine Cycles enable the use of turbines for energy generation from waste heat with lower temperature, through the use of organic or supercritical fluids. The use of this technology could contribute in many industry sectors, recovering a large amount of waste heat from e.g. glass furnaces, ceramics ovens or steel mills with lower temperatures, which today cannot be used efficiently to generate electrical energy for use in their own facilities. Heat pumps can also be used to process the heat into higher value forms and usually also require turbo machinery components. Industrial process may not be steady state and therefore the dynamics of the heat cycle must be well understood and controlled to use the additional energy effectively. Thermal storage may be a good enabler to achieve more viable waste heat solutions.

Similar technology can be used for waste cold recovery from LNG regasification as found in Petroleum refineries. The waste cold can be used on the cold temperature of a waste heat recovery cycle. This could drastically improve the power cycle by raising efficiency and reducing cost.

R&I areas that should be addressed to develop the Organic/Supercritical Rankine Cycle technology concern (1) the improvement of the turbine performance using organic fluids – particularly at the low end of the power output range, (2) the improvement of heat recovery cycles to maximize energy extraction (sub-critical, trans-critical and super-critical) (3) the identification/development of specialised low global warming (organic) working fluids and (4) the adaptation of typical turbine materials to the use of specialised working fluids, including design aspects (e.g. internal/external sealing design). A key challenge in this area of technology is economics, solutions are required that have suitable low investment costs and acceptably high investment paybacks.

Partners for Implementation

EUTurbines and ETN offer their support in closely working with the interested energy-intensive industries in achieving the targets outlined in the issue paper. We would welcome the chance to be involved in at early stage in the discussions on the implementation plan. This will ensure that the technology needed to increase the energy-efficiency and raise the competitiveness of Europe's energy-intensive industries is properly developed and on time to meet the political targets on energy-efficiency outlined in the Energy Union concept.

ETN – European Turbine Network
Chaussée de Charleroi 146-148/20
1060 Brussels Belgium
www.etn-gasturbine.eu

EUTurbines – European Gas and Steam Turbine Manufacturers
Boulevard A. Reyers 80
1030 Brussels, Belgium
www.euturbines.eu