ANNOUNCEMENT FOR STUDENT CONTEST PROBLEM COMPETITION 2016

This contest problem is open to Bachelor/Master/PhD level students.

The participants have approximately three months to prepare and submit solutions to the problem (see below) no later than **December the 31st 2015, 23:59 CET.** Solutions can be prepared by individuals or by teams.

The jury will select the best solution, based on technical excellence (i.e. cost effectiveness, energy efficiency, environmental impact, social impact, operability, flexibility, etc.), quality of the report and originality. The jury will take also into account the size of the team and its academic level (Bachelor/Master/PhD).

The Award includes:

- One invitation to attend to the 26th ESCAPE, to be held in Portorož, Slovenia, 12th – 15th June 2016 http://escape26.um.si/ to get the award.
- A money transfer of **1000 EUR,** after the ESCAPE event, to cover the travel and accommodation expenses.
- The publication of the selected solution at the EURECHA web site.

Submission procedure:

The written report should consist on a **pdf** file written in **English** and not exceeding **15 pages** (including figures).

This **written report**, any **other support file** (Annexes, Spread Sheets, Simulation Input files, etc.), and a **support letter** from an academic supervisor at your home university, should be packed (zip format) and sent, before the established deadline, as e-mail attachment to eurecha.secretariat@gmail.com.

In the body of this e-mail you **must** include the following information:

- Complete name (for all authors).
- Level (Degree/ Master/PhD) and current year of your studies (for all authors). If available, please provide a link to a web page at your home institution related to one of the courses you are currently enrolled.
- Complete name and address of your home institution (School/Department/Research Center, etc.). Please provide a link to the web page of your home institution and an official contact to eventually confirm your affiliation/enrolment.

Carbon Capture, Storage and eventually Reuse from large stationary sources

Global warming is largely caused by CO_2 emissions from our use of fossil fuels. Carbon Dioxide (CO_2) capture and storage (often known by its acronym CCS) is the term used to describe the set of technologies aimed at capturing carbon dioxide emitted from industrial and energy-related sources before it enters the atmosphere.

The challenge is to demonstrate that CCS is safe, effective and can be done now at industrial scale at a competitive cost.

So the task is to propose a specific design for a generic CCS process able to lead to an optimum balance between energy efficiency and operability under different circumstances, and to perform a preliminary feasibility study in order to demonstrate such ability.

Address at least two CO_2 capture scenarios for the capture plant (e.g. refinery, heavy oil and natural gas power generation, CO_2 separation from natural gas production). Consider one of the following alternatives:

1) Subsequent store the captured CO_2 in non-atmospheric reservoirs (e.g., depleted oil and gas reservoirs, un-mineable coal seams, deep saline formations, deep ocean). This long term storage should be located in a different place as the capture.
2) Propose a specific process for CO_2 reuse located in the same place as the capture.

The two capture scenarios and one of these alternatives should be fully described.

- Perform a technical and cost analysis (include the long-term perspective, and any aspect you consider relevant to allow a fair comparison among proposals).
- Identify the most appropriate technologies, equipment and skills needed to use them.
- Identify the main characteristics of the different units to be installed in the CCS plant.
- Perform a flow diagram/superstructure of the proposed solution, with special emphasis on the identification of the flow-path(s).
- Provide mass and energy balances and steady state operating conditions for this wide range of processing circumstances.
- Give an assessment of expected economic performance, and demonstrate the benefits of the proposed solution in front of other solutions optimized for a specific (nominal) scenario. For comparison purposes, you must consider some indicators like, Net CO_2 emissions, Energy used per kg of CO_2 captured, Energy used per kg of CO_2 stored, etc.