EUROPEAN COMMISSION

European Research Area

PROJECT PRESENTATION (PP)

End-Users Requirements fOr industrial Process heat Applications with Innovative nuclear Reactors for Sustainable energy supply
EUROPAIRS

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Introductory paragraph

(Very) High Temperature nuclear Reactors (V)HTR are innovative concepts with high efficiency and advanced safety features, which may contribute significantly to a low-carbon economy by cogenerating large amounts of low-carbon process heat for industry (e.g. hydrogen, transport fuel). The cogeneration potential of (V)HTRs was recognised by the Sustainable Nuclear Energy Technology Platform for achieving the SET Plan objectives.

1. Nuclear cogeneration for industry: a decisive step towards a CO2-lean Europe

EUROPAIRS aims at paving the way of the development of an industrial demonstrator cogenerating power and heat for industrial processes. The goal is to establish strategic links between all involved communities and to collaborate on the development of (V)HTRs for such applications.

The EUROPAIRS consortium gathers world leaders in nuclear engineering and research, nuclear safety and conventional process engineering. More importantly, it attracted end-user representatives and collaborates with international initiatives (US, South Africa).

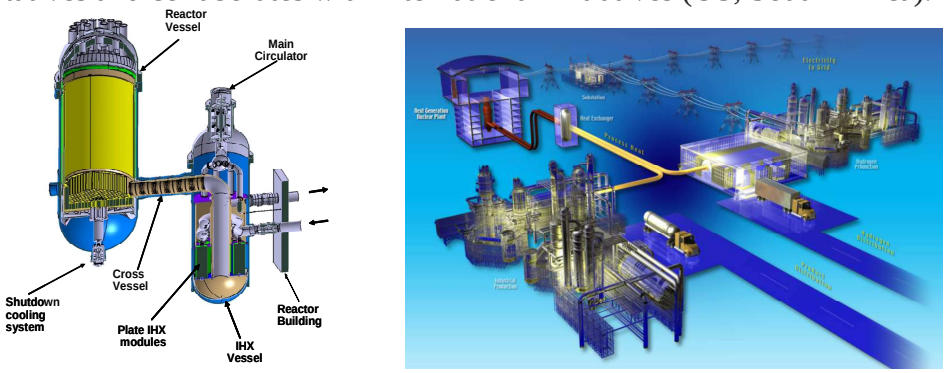

Figure 1 Examples of cogeneration plants: European design ANTARES (2004, left) and the American Next Generation Nuclear Plant concept (2009, right)

2. EUROPAIRS activities

The coupling between the nuclear heat source and the end user requires challenging innovations. EUROPAIRS is creating the direct interaction between the end-user industries and the nuclear community to address these challenges and opportunities.

EUROPAIRS partners work to

- found a strategic partnership between the key players in nuclear technology and from industrial end-users
- establish the boundary conditions of future nuclear cogeneration systems connected to industrial processes
- investigate and integrate all licensing questions early in the development process
- elaborate a roadmap for the development of a demo plant coupling a (V)HTR with an industrial process
- liaise with other relevant communities, organisations and international activities

A workshop will be organised at the end of the project to disseminate the results, and project partners will participate in international conferences to present the project.

3. Expected results

EUROPAIRS will define the boundary conditions for nuclear cogeneration systems. The temperatures, pressures, flow rates, power and the various coupling options with industrial processes will be investigated. This is an important step towards a demonstrator which meets the needs of industrial heat consumers.

The safety analysis of the nuclear heat source and its interface with an industrial facility will be a key upfront input for the development of a prototype. Considering safety aspects early on will enhance the design and smoothen the licensing process of the demo plant.

All information will be summarised into a synthetic roadmap towards demonstration. Based on the above inputs, the project will assess fuel cycle scenarios (resource availability and waste), depending on future (V)HTR deployments and will produce a clear, realistic, consistent and exhaustive work programme.

The strategic partnership between nuclear and process heat industrial end-users will then be established. This partnership is the strength of the project and will ensure that the work programme can become a reality.

4. Societal impact

The power sector contributes to one fifth of the European greenhouse gases emissions (GHG). The remaining 80% originate from fossil fuel combustion in residential and industrial heating as well as from transport.

Nuclear cogeneration systems can significantly change the situation from now on. They may replace many fossil-fuels boilers producing heat for industry. Industrial heat production is a significant market, and nuclear energy would avoid large amounts of direct GHG emissions.

In the longer term nuclear cogeneration could produce hydrogen and recycle CO2 to synthetic hydrocarbon fuel, making the cogeneration plant an effective CO2 sink.

Nuclear cogeneration offers therefore a realistic potential to enhance EU's security of supply by consuming less fossil fuels and bridging with a future hydrogen economy. Nuclear cogeneration can further significantly contribute to a CO2-lean economy in compliance with the SET Plan targets. Development, construction and deployment of such systems can create numerous jobs and establish the European Union as a world leader in this advanced technology.

5. Information about important public events

An open workshop will be organised at the end of the project (towards May 2011) to present EUROPAIRS major results. EUROPAIRS will also participate in nuclear and end-users technologies conferences.

Project information

Website address: http://www.europairs.eu

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