EUROPEAN COMMISSION

Community Research

SEVENTH FRAMEWORK PROGRAMME

End-Users Requirements fOr Process heat Application with Innovative nuclear Reactor for Sustainable energy Supply

Coordination and Support Action - Supporting

Co-funded by the European Commission under the
Euratom Research and Training Programme on Nuclear Energy
within the Seventh Framework Programme

Grant Agreement Number: **232651**
Start date: 01/09/2009 Duration: 21 Months

Final plan for the use and disseminationof EUROPAIRS achievements

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EUROPAIRS – Contract Number: 232651

Document title	**Final plan for the use and dissemination of EUROPAIRS achievements**
Document type	Deliverable
Author(s)	A.Bredimas (LGI)
Work Package	WP0
Document number	D07 – Revision 0
Issued by	LGI
Date of completion	30/06/2011
Dissemination level	_ Public X Restricted to EUROPAIRS Members _ Restricted to 'EUROPAIRS-Office' partners

Summary

This document updates the EUROPAIRS Communication strategy and action plan 2009-2010 with the plan for using and disseminating the EUROPAIRS achievements after its termination in May 2011.

Approval

Rev.	Date	Short description	First author	Reviewer(s)	Coordinator
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Introduction

The European Union has acquired through some national and European research programmes strong competences in (V)HTR technology, which is one Gen IV technology. Nuclear cogeneration requires though some additional, challenging innovations.

The EUROPAIRS project took over from this effort. It has brought together the nuclear community and process heat end-users to build a common understanding and a strategy for the deployment of (V)HTR in Europe.

1 Summary of the EUROPAIRS Communication Strategy and Action Plan 2009-2010

This part summarises the preliminary communication strategy and action plan 2009-2010 which was issued at the beginning of the project. As part 2 will show, EUROPAIRS has achieved its objectives with very good results.

1.1 Objectives

- Widely disseminate the results of EUROPAIRS
- Raise interest of potential end-users to participate in the work of the EUROPAIRS project
- Convince European political and industrial decision makers of the feasibility, the potential and the benefits of (V)HTR technologies

1.2 Vision and key messages

Core vision to be widely communicated:

Nuclear technology can be used for low-carbon and inexpensive cogeneration of electricity and industrial process heat.

The High Temperature Reactor is a next generation concept which can provide the most suitable process heat and steam for current industrial applications, with inherent safety and high efficiency rates.

Key messages:

- State of the art
  - Some (V)HTR technologies were demonstrated in the past, especially in Germany
  - The competition is fierce worldwide and R&D activities are ongoing especially in the US, China, South Africa and Japan.
  - Europe must strive to stay a leader, especially by investigating nuclear cogeneration options

- Interest of (V)HTRs
  - Higher efficiency by better thermodynamic cycles, which implies a lower consumption of uranium
  - Intrinsic safety features
  - Possible co-development with Gas Fast Reactors
  - The steam generated might be usable for current and future industrial processes, especially synthetic oil and hydrogen production.

- Further needs
  - Nuclear cogeneration may revolutionise the energy sector by providing large amounts of low cost heat.
  - However it requires further development and validation
  - Nuclear cogeneration demands a clear knowledge of the boundary conditions in terms of nuclear operations, nuclear safety, end-user process heat requirements and coupling.
  - A demonstration programme (European or international) is necessary.

- Deployment
  - (V)HTRs span beyond the nuclear community and require end-users to be involved in the development.
  - Such involvement is already being initiated in other (V)HTR initiatives (NGNP in particular).
  - The development and deployment of nuclear systems are demanding a significant human and economic effort and international cooperation is advisable.

- Added value of EUROPAIRS
  - EUROPAIRS will clarify
    - the operational boundary conditions
    - the coupling process
    - a roadmap for the deployment of (V)HTRs
  - EUROPAIRS will especially address all potential markets for nuclear cogeneration.
  - EUROPAIRS will further build the necessary strategic alliance between the nuclear community and end-users to pave the way of (V)HTR demonstration.
  - EUROPAIRS will cooperate with equivalent international initiatives and will strengthen the position of the EU in this technology (in particular through the Gen IV International Forum).

1.3 Targets and priorities

1.3.1 Targeted audiences beyond the EUROPAIRS partnership

Priority	Targets	EU MS[1]	EU	Non-EU	Objective	Expected impact	Specific targets
1	**Policy makers**	**	***		Inform, convince	Support for RD&D programmes (DG TREN, DG RTD)	DG ENER, DG RTD, national ministries, SET Plan bodies
1	**End-users**	***	***	***	Inform, attract, convince, get support, , collaborate	Bring operational experience of their facilities and propose options for coupling with (V)HTR	Companies active in the production of refinery, chemistry, paper, steel, etc. + European TPs
1	**Utilities**	***	***	*	Inform, convince, collaborate	Bring operational experience	Operators of nuclear and conventional cogeneration plants
2	**International initiatives for GenIV reactors**	***	***	***	Network, collaborate	Share development experience, especially on partnership with end-users	NGNP, GIF
2	**Vendors**		**	**	Inform, attract, convince, collaborate	Bring development and manufacturing experience	Nuclear vendors
2	**Large engineering companies**	**	**	**	Inform, attract, convince, collaborate	Bring competences in the coupling	Nuclear and conventional engineering companies
3	**Safety authorities and TSOs**	**	**	*	Inform, attract, convince, collaborate	Bring upfront safety and licensing advice for HTR systems	Via ETSON and SNETP
3	**Nuclear research centres**	**	**	**	Inform, attract, collaborate	Bring competences for required R&D	Non-European research centres may include KAERI, INET
3	**Scientific community, students and young professionals**	**	**		Inform, convince	Work on HTR specific scientific subjects, educate and attract students and young professionals on specific topics	Theoretical researchers, university professors
4	**Citizens**	*	**		Inform, convince	Introduce to nuclear cogeneration capabilities and its contribution to a low-carbon economy	Civil society associations, NGOs, general public
4	**Investors**	*	*		Inform, convince	Introduce to HTR contribution to a low-carbon economy	Institutional investors (EIB, EBRD), private banks (mostly via SNETP Cogeneration WG)

[1] EU = European Union
MS = Member States

1.3.2 Priorities

Priority 1 targets are the key stakeholders for the development and deployment of (V)HTR:

- Policy makers at national and European levels must be convinced of the potentialities of nuclear cogeneration and be aware of the general interest of end-users. They may consequently provide political and financial support to this technology.
- End-users are the key to the deployment. They are the final consumers and they must have a clear view of the advantages and disadvantages that the switch to nuclear heat production may incur. They should collaborate to overcome the disadvantages and be gathered around the technology to push its development.
- Utilities will be necessary to operate the reactor of a nuclear cogeneration installation. They must be enrolled early in the process to ensure that the reactor fully meets their operational requirements.

Priority 2 targets could bring an additional support to the project:

- International initiatives for Gen IV and (V)HTR may share their development experience. Note: PBMR is directly involved in EUROPAIRS and DoE is in close contact. Contacts with foreign programmes on (V)HTR or Gen IV technologies (Russian, Chinese, South-Korean, Japanese…) might reveal also very useful.
- Extra-European vendors might be involved early in order to share the development effort.
- Large engineering companies which are active in designing, manufacturing, building and installing large nuclear and industrial plants may bring a specific knowledge on the coupling of the nuclear reactor and the industrial facility.

Priority 3 targets are important stakeholders, although not the principal targets for EUROPAIRS. They include TSOs, safety authorities, nuclear research centres and the general scientific community.

Priority 4 targets could be indirectly touched by EUROPAIRS in order to diffuse the interest of (V)HTR. In particular, investors may be interested in some presentations about the ongoing R&D.

1.4 Strategy

Targets	Actions	Performance indicators
Policy makers	▪ Reports, brochures ▪ Reporting to EC and SNETP WG Cogeneration ▪ EUROPAIRS workshop	Number and quality of papers
End-users	▪ End-user network (EUROPAIRS Associated Industry network) ▪ Conference presentations ▪ Contacts and presentations with professional associations and ETPs ▪ Visits of specific companies	Number of companies in contact Quality and quantity of collaborative work carried out
Utilities	▪ FORATOM WG and conference presentations ▪ Attract in the end-users network	Number of companies in contact
International initiatives for GenIV reactors	▪ Initial involvement of DoE, PBMR and Northwest university ▪ Presentation in the US	Number of common meetings and deliverables
Vendors	▪ Direct contacts ▪ Conference presentations	
Large engineering companies	▪ Attract in the end-users network	Number of companies in contact Quality and quantity of collaborative work carried out
Safety authorities and TSOs	▪ Coordinate with ETSON through the partner TSOs in EUROPAIRS	
Nuclear research centres	▪ Conference presentations ▪ Networking with foreign research centres	
Scientific community, including universities	▪ Publications, participation in conference to present EUROPAIRS, article in CORDIS newsletter ▪ Participation in EUROCOURSE seminar in ARCHER	Number and quality of papers

The communication strategy is therefore based on different axes, all of them being of foremost importance to the success of EUROPAIRS communication:

- Direct contacts with stakeholders: conference presentations, participation in working groups, visits of individual organisations
- Organisation and management of the Associated Industry Network
- Paper based communication: reports to the Commission, brochures, factsheets, deliverables, scientific articles
- EUROPAIRS workshop, which is to be a large scale event
- Synchronisation with electronic media, such as: SETIS, SNETP, CORDIS

2 EUROPAIRS Communication achievements

2.1 A comprehensive communication toolkit was created

- A **logo** and a graphical chart (including standard templates for presentations, etc.)

- The EUROPAIRS public **website** (www.europairs.eu) and restricted member area (http://members.europairs.eu)
  - Over the project duration, the website has had 480 visits, with each visitors vieweing on average 7,25 pages (out of 10-12 pages) and 8 minutes average time spent on the site. The bounce rate has been of 33,54%. Therefore, the website has attracted targeted visitors which browsed completely the website.

- A standard PowerPoint **slideshow** (to be used or customised in presentations by EUROPAIRS members)

- Public **summary report** of EUROPAIRS and any **public deliverables**

- **Project presentation**

2.2 An industrial network was built around the HTR technology

- Beyond the industrial companies involved in the EUROPAIRS consortium, EUROPAIRS has raised the industrial awareness on HTR technologies by taking numerous contacts with heat intensive European industries, mostly represented by their European representative associations (pulp & paper, iron & steel, oil & gas, aluminium, coal, synthetic fuels, ceramics, glassmaking, chemicals, fertilisers, industrial gases, lime, cement, cogeneration). European associations are demultiplyers of the communication reach of EUROPAIRS so the number of companies in direct and indirect contact is potentially high.

- An Associated Industry Network was set up, gathering different European heat intensive industries. This network constitutes an important network of industrial contacts which cold be interested in HTR technology in the future.

2.3 International relations were strengthened

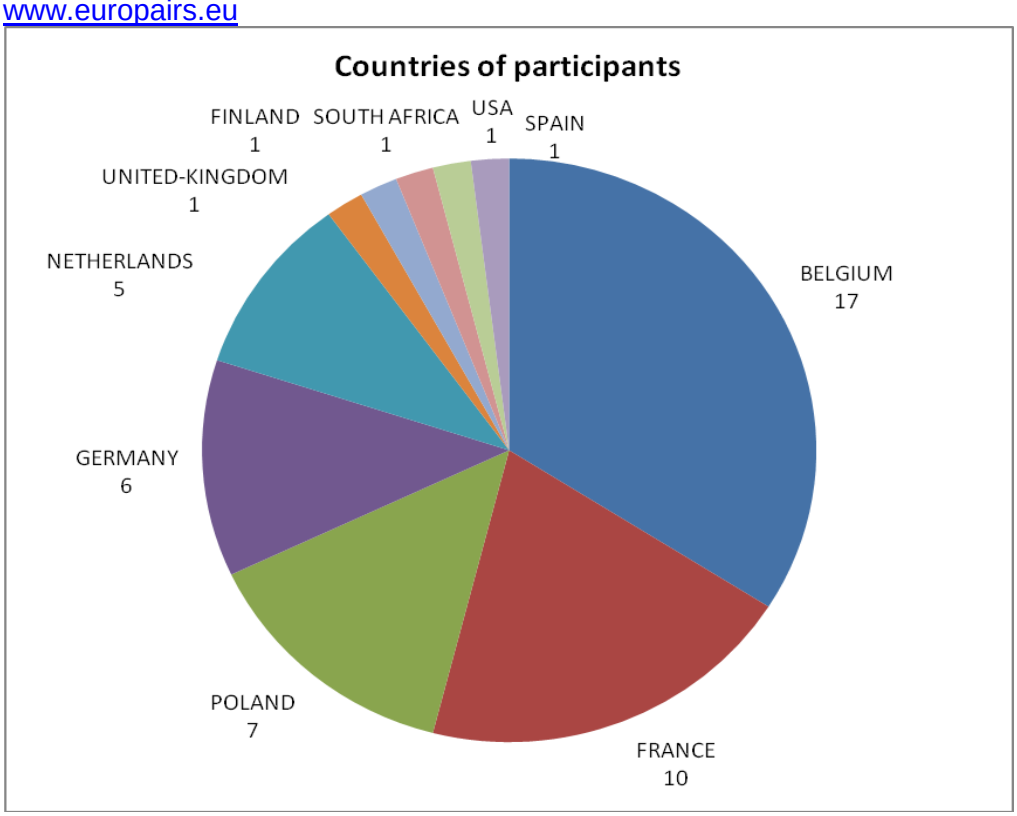
- A leading meeting with representatives from the Industry Alliance for the US NGNP programme was organised in Paris on the 13th and 14th October 2010. This meeting has enabled to exchange information on both European and US HTR programmes and to prepare a potential transatlantic cooperation. Important links were made and will make possible to dialogue and organise both programmes at best.

- The South African HTR programme, represented in the EUROPAIRS project by PBMR (which retired from the project due to the financial crisis) and Northwest University, was closely involved in every activities of EUROPAIRS. Both programmes may further cooperate on the demonstration of high temperature nuclear cogeneration coupled to advanced applications such as hydrogen or synthetic fuel production.

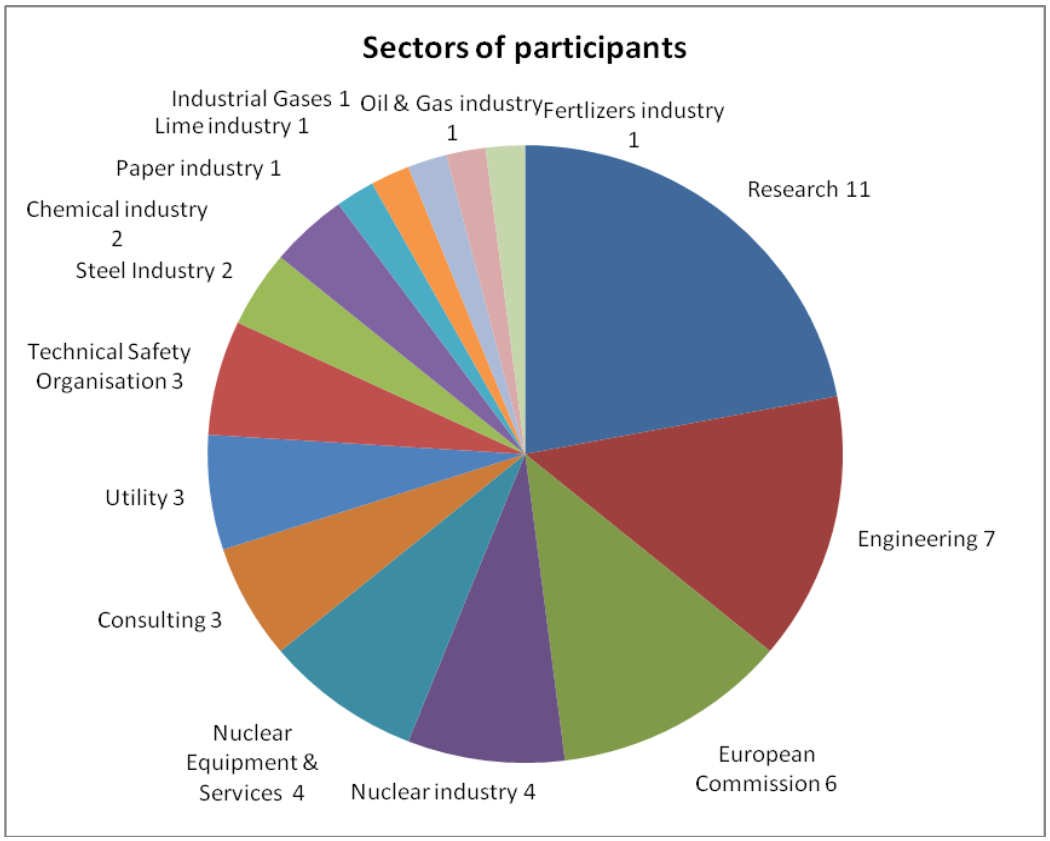
2.4 EUROPAIRS results were disseminated

- The EUROPAIRS results were presented at the final workshop to a diverse audience of 50 persons. Participants came from research and engineering in various fields (energy, coal, nuclear, oil sciences) as well as the nuclear industry at large (vendor, safety organisations). Heat consuming industries were represented (chemical, paper, lime, industrial gases, fertilizers, oil & gas industries) and other industries in the project networks could not participate in the workshop but asked to be kept informed (glassmaking, ceramics, synthetic fuels, cogeneration, oil and refining). Finally utilities with a strong experience in operating nuclear power plants, in particular in cogeneration mode, were also represented.

- All presentations were made public on the website of the EUROPAIRS project: www.europairs.eu



Countries of participants to the EUROPAIRS Workshop



Sectors of participants to the EUROPAIRS Workshop

- Some confidential deliverables were further adapted in a public version (e.g. the study on the European industrial heat market) or through journal papers (e.g. in Nuclear Energy Design)

- EUROPAIRS participated and presented in various conferences: the General Assembly of the Sustainable Nuclear Energy Technology Platform on 14th September 2010 in Brussels, the Conference on High temperature nuclear reactors on 18-20th October 2010 in Prague (HTR 2010), the International Conference on Advances in nuclear Power Plants on 2-6th May 2011 in Nice (ICAPP 2011).

2.5 A community was built up

- Finally, the EUROPAIRS project has enabled to build a strong core community around the HTR technology gathering nuclear and heat-intensive industries in Europe. This core group may support further the concept after the end of the project, realising one of the goals of EUROPAIRS of creating this industrial ecosystem.

3 EUROPAIRS achievements use and dissemination plan

The use and dissemination plan of the EUROPAIRS achievements is merely based on the communication achievements of the project.

Building on the industry network of EUROPAIRS, an industrial alliance is planned to be constituted at the end of the project. This alliance would be a forum for end-user industries, energy companies, technology developers and engineering firms to define the industrial requirements for a nuclear cogeneration prototype and commercial units. This alliance should gather companies from a wide

range of activities, including heat intensive industries as consumers of nuclear cogeneration, nuclear operators, nuclear vendors and engineering companies.

In addition, the group has also created on the 22d June 2011 a task force in the Sustainable Nuclear Energy Technology Platform focusing on nuclear cogeneration and in view of creating a nuclear cogeneration industrial initiative under the Strategic Energy Technology Plan.

The technical research and detailed roadmap will be carried out by the EU-funded FP7 project ARCHER.

All EUROPAIRS confidential studies will be the base for further technical, licensing and economic research activities, in individual companies or in collaboration under the above mentioned initiatives.

Conclusions

The EUROPAIRS project has had excellent communication results. The project has communicated over different media with a targeted audience and good results. An industrial community has been created and is pursuing its activities after the end of the project; the major results of the EUROPAIRS projects have led some companies to enter into the preparation of a European industrial initiative and a demonstrator.

The overall objective of EUROPAIRS of building a partnership between the nuclear community and process heat end-users was therefore achieved and enabled a follow-up after the project.