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D2.11: Questionnaire on nuclear cogeneration projects

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Summary

In the framework of the FP7 NC2I-R project two Working Packages ("WP2 - Infrastructures and competences" and "WP3 - Safety and Licensing") require direct feedback about operational experience from nuclear plants with cogeneration capability.

The objective of WP2 is to collect and analyze feedback from existing and past nuclear cogeneration projects in a number of countries. The scope of WP2 is large and includes technical and non-technical information (organizational structure, financial aspects, public relations, etc.).

The main objective of WP3 is to advise and support the definition of the general specifications of the demonstrator program in the field of safety. The WP3 partners intend to collect experience on licensing gained on existing and past nuclear cogeneration projects and existing nuclear cogeneration installations.

The present questionnaire was prepared as a support for meetings between the NC2I-R partners and several operators of nuclear cogeneration across Europe.

Approval

Rev.	Date	First author	WP leader	Project Coordinator
0	13/03/2014	Michael Fütterer, JRC 13/03/2014	Michael Fütterer, JRC 13/03/2014	Tomasz Jackowski, NCBJ 13/03/2014



Distribution list

Name	Organisation	Comments
P. Manolatos	EC	
All beneficiaries	NC2I-R	Through internet workspace

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- After the collection of data, the questionnaire report containing the answers to the questions will be systematically validated by the persons interviewed before further step(s) are undertaken.
- The final content of the questionnaire report will only be accessible by the persons involved in the NC2I-R project. If required, a Non-Disclosure Agreement can be signed.
- The information collected in this questionnaire will be further analyzed to elaborate a final report and (with agreement of the interviewee) may be quoted by name in the appendices of the final report.
- The final report containing the analysis of all of the interviews conducted for the NC2I-R project will be communicated only to the NC2I-R project participants and to the European Commission (DG RTD). The information on individual projects included in this report will only contain data allowed by the interviewees.
- By default, answers to the questionnaire are allowed to appear by name in the final report. If you do not want information to appear by name in the final report, please check the box for the specific questions:

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1 Who we are

The strategic objective of NC2I-R project is to structure the European public and private R&D capabilities for delivering a nuclear cogeneration demonstrator fully meeting the market needs, in support of the Nuclear Cogeneration European Industrial Initiative.

Following the FP7 EUROPAIRS project and in close collaboration with the ongoing FP7 ARCHER project, national projects (e.g. Polish HTRPL, German SYNKOPE), non-EU HTR programs (US, China, South Korea, South Africa) and Generation IV International Forum, NC2I-R intends to bring a decisive contribution to prepare for a successful, low-risk and rapid European nuclear cogeneration demonstration for Europe's industry.

To this end, NC2I-R has planned:

1) To structure the European public and private R&D capacities towards nuclear cogeneration demonstration and to identify clearly the status of Europe's public and private R&D infrastructures and competences;
2) To define the safety requirements to prepare for and de-risk the future licensing process of a cogeneration demonstrator;
3) To define clear and consensual specifications for the demonstrator, ensuring its economic viability, its market fit, its future replicability and its safety, in particular of the coupling scheme, and limiting all construction and operation risks;
4) To manage the knowledge from past projects on HTR and nuclear cogeneration with a comprehensive experience feedback in order to identify potential points of attention and success factors;
5) To prepare a European R&D capacities inventory, to prepare a roadmap towards the commissioning of the specified demonstrator and to identify gaps;
6) To prepare for and organize cooperation with similar non-European programs to possibly share the demonstrator risk in line with the European interest and to secure EU leadership in the global competition for HTR;
7) To define and establish an effective governance for the European Nuclear Cogeneration Industrial Initiative, engaging all stakeholders including civil society at large.

2 Why we are asking

In the framework of the FP7 NC2I-R project two Working Packages ("WP2 - Infrastructures and competences" and "WP3 - Safety and Licensing") require direct feedback about operational experience from nuclear plants with cogeneration capability.

The objective of WP2 is to collect and analyze feedback from existing and past nuclear cogeneration projects in a number of countries. The scope of WP2 is large and includes technical and non-technical information (organizational structure, financial aspects, public relations, etc.).

The main objective of WP3 is to advise and support the definition of the general specifications of the demonstrator program in the field of safety. The WP3 partners intend to collect experience on licensing gained on existing and past nuclear cogeneration projects and existing nuclear cogeneration installations.

The present questionnaire was prepared as a support for meetings between the NC2I-R partners and stakeholders (designers, operators, regulators, investors, etc.) of nuclear cogeneration across Europe.

3 Respondent's data

Name:.....

Qualification(s):.....

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Name of company(s):.....

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Name of NPP(s)[1]:.....

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Scope of activities at NPP(s):.....

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E-mail address:.....

.....

Phone number:.....

.....

May we contact you via e-mail or phone call for further information? **yes/no**[2]

Would you participate in an information exchange meeting on experience feedback regarding licensing of nuclear cogeneration facilities? **yes/no**[2]

4 Questionnaire

4.1 Motivation and initiative

1. For how long has your NPP provided process heat/district heating?

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2.Who has taken the initiative for your cogeneration project? End-user, utility, sovereign?

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[1] Nuclear Power Plant

[2] Please mark (e.g. underline) your answer

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3.What was the reason/trigger for this project?

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4.At which level are/were politicians involved (community, department, national, regional)?

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5.Was there opposition? By whom and how was it overcome?

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4.2 Role of key players/stakeholders

6.Who are/were the key players in this project?

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7.Was the public involved in the decision and were there acceptance problems? If yes, how were they overcome?

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4.3 Organizational structure

8.How was the construction and operation of your project structured?

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9.Was a specific consortium created? What is/was its organizational set-up?

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10.Did any of the consortium members join or leave the project? Why?

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11.What was the role and relative weight of each consortium member?

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12.Did the project interact or exchange experience with other similar projects elsewhere? As a bilateral effort or in the frame of international cooperation, e.g. through the IAEA?

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4.4 Technical aspects

13. Was it an upgrade project after the startup of the NPP or was it included in the original design of the NPP?

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14. Did your project require technical plant modifications?

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15. Was it necessary to build infrastructure to interface with the customer (e.g. additional heat exchanger, steam pipeline)?

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16. If heat supply/district heating was planned from the start of the NPP, did it influence the site selection?

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17. What is the product delivered? If heat, please specify carrier fluid, throughput, temperature, pressure, amount of heat per year, its minimum and maximum values, its annual profile (e.g. continuous or seasonal).

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18. Did you encounter specific unexpected technical difficulties during the installation or the operation? If so, please describe the difficulties?

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19. How has the efficiency of your plant evolved (e.g. slight decrease in electric efficiency, strong increase in overall efficiency)?

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20. How did this impact availability of plant and other operation and maintenance aspects?

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21. How did this impact the need for cooling provisions including effect on microclimate (reduction of mist from cooling towers)?

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22. Was it necessary to build back-up heat/power supply in case of NPP outage?

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23. What type of reactor(s) operates with cogeneration? Is it a single-unit site or multi-unit site? How many units can support cogeneration? What is the installed thermal capacity of the plant? What is the installed electrical capacity?

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4.5 Safety and licensing

24. What were the main steps (safety report, construction permit, etc.) of the licensing of your installation and which were the public authorities involved?

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25. If cogeneration was implemented after the start-up of the nuclear installation, were additional safety objectives/criteria prescribed, and were specific safety assessments and authorizations from your national authorities required?

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26. How was the heat production capability taken into account in the safety report of the nuclear installation? In particular, were there any specific initiating events to be considered for the safety assessment, in association with the heat production capability?

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27. Are there any specific criteria and radiological controls required on the heat transfer fluid coming out of the installation perimeter (or delivered to the end user)?

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28. Does the cogeneration influence the environmental footprint of the nuclear plant (effluent quantities, heat rejected through the cold source, quantity of steam released to the atmosphere, etc.)?

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4.6 Financial aspects

29. Did your project require investments, e.g. in design, licensing, infrastructure, terminals, plant modifications etc.?

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30. What was the order of magnitude of Capital Expenditure, if it is public?

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31. How was this financed?

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32. Did the investors have a short/medium/long term financial objective?

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33. What are the Operation and Maintenance costs, if it is public?

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34. What is the levelized cost of delivered electricity and heat? How did it evolve from the beginning to now?

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35. Were there investors? How many? Which kind of investors? Where they attracted by the project or did they come on their own initiative?

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36. Were there budget overruns?

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37. Was the project subsidized? If yes, please describe by whom?

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38. Is the delivered energy taxed? If yes, how?

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39. When comparing heat and electricity production, are heat sales economically viable? If not, what is the reason for maintaining this business?

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4.7 Timing

40. How long did the various steps in the process take? Design, Licensing, Construction, Operation, Decommissioning

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41. Were there delays and if so, why?

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42. What was the initially planned lifetime, what is the actual lifetime?

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4.8 Public relations

43. Did any of the players make public relations efforts to obtain and/or raise support for the project?

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44. How regularly were they made?

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45. Was the public/customer/end-user proactively informed about any issues?

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46.Was any specific public inquiry held on nuclear cogeneration before, during or after the installation?

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4.9 Experience feedback

47.Could a similar project be started today? What aspects have changed?

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48.How successful was the experience technically?

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49.How successful was the experience financially?

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50.How successful was the experience with respect to societal and environmental aspects?

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51. How long did it take to write off the initial investment?

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52. What is the customer/end-user satisfaction? Dependability, cost stability etc.

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53. Has public acceptance changed since the project was started?

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54. Is the cogeneration project linked to the lifetime of the NPP? What happens when the NPP has an outage or will be decommissioned?

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55. What would you change today?

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56.What are the next plans for your cogeneration project? Do you plan any new nuclear cogeneration project?

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5 Conclusion

Thank you very much for the time you granted to answer this questionnaire.
Is there someone else in your company we may usefully contact for additional information?
If so, please indicate here:

Name:

Date:

Company:

Position:

6 Acronyms and definitions

Acronym	Definition
EC DG RTD	European Commission – Directorate General for Research and Innovation
HTR	High Temperature Reactor
NPP	Nuclear Power Plant