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Organisation de Coopération et de Développement Économiques  
Organisation for Economic Co-operation and Development

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**English - Or. English**

**NUCLEAR ENERGY AGENCY  
COMMITTEE FOR TECHNICAL AND ECONOMIC STUDIES ON NUCLEAR ENERGY  
DEVELOPMENT AND FUEL CYCLE**

NEA/NDC(2016)6  
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**Final Summary Record of the 2nd Meeting NEA NI2050 Advisory Panel**

**14-15 January 2016  
IEA Headquarters, Room 2  
9 rue de la Fédération, 75015 Paris**

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English - Or. English

## NEA NI2050

### Second Meeting of the Roadmapping Advisory Panel

#### *NEA Roadmap for R&D Priorities fostering Nuclear Fission Innovation for a low carbon sustainable future*

**IEA Conference Room 2  
14 and 15 January 2016, Paris**

#### **SUMMARY RECORD**

##### **Objective and Results of the Meeting**

1. Following the first meeting of the Advisory Panel held in Paris on the 5/6 October 2015, where the overall objective, scope, methodology and organisation of the NI2050 Roadmapping (NI2050 Step 2) were discussed, this second meeting was designed to enter into more details and to plan the next set of activities, in particular the Experts Meetings and the further consolidation process. The draft ToRs (Terms of References) for the Roadmapping and for the Advisory Panel were finalised, seeking their endorsement by the NEA NDC, end of January. On that basis, the overall organisation of the next steps of the Roadmapping could then be agreed, and necessary elements to guide the Experts Meetings were discussed. As per the ToRs, the participants agreed to propose Chairs, as well as experts, for the Experts Meetings.

##### **Overall organisation of the Meeting**

2. The meeting was opened by the Chair (Ms Fiona Rayment) and the NEA DG William Magwood. The latter insisted on the opportunity to develop a far looking perspective of R&D priorities in support of the role nuclear energy should play in a low carbon future (2050 and beyond). A number of R&D roadmaps are already available and the intention is to make full use of them, to come out with a consensus on top priorities, including for research infrastructures, for which cooperation frameworks might appear as most useful to foster their implementation.

3. The first half day of the meeting was nearly fully dedicated to the discussion and finalisation of the Draft ToRs for the NI2050 Roadmapping and the Advisory Panel, prepared and circulated before the meeting by the NEA Secretariat as an action decided at the first meeting of the Advisory Panel.

4. The second half day allowed detailed discussions on the organisation of the Roadmapping: objective, scope, methodology and organisation of the Experts Meetings.

##### **Main outcomes of the Meeting**

5. After recalling the main outcomes of the NI2050 Launching Workshop and the first meeting of the Advisory Panel, a brief state of play of the NI2050 Survey (NI2050 Phase 1) was provided by the NEA Secretariat. The Survey was sent out to the nominated representatives (via NDC) on the 23 September

2015. Nearly all member countries could not meet the initial return date of 16 November. On 14 January 2016, 10 returns (filled survey templates) had been received. Because the step 1 (Survey) and step 2 (Roadmapping) have been decoupled, this does not pose major problem for the start of the Roadmapping. Nevertheless a plea was made for member countries to send their Survey returns ASAP.

6. A short discussion took place to explain some of the difficulties associated with filling the Survey templates. As expected the request, coming from the NI2050 Launching Workshop of July, to provide information on both public and private financing (and/or their share) is not easy to handle. It was noted that gathering data from a number of different sources was causing some issues in meeting timelines, together with the level of detail of information available for the past/present and future programmes. Despite this some participants indicated that, while the Survey is indeed quite detailed and time consuming, it is nevertheless a useful exercise, also at national level. They suggested that the opportunity to make this a regular process and publication should be considered. There was some concern with the confidentiality of the provided information and future publication. The NEA Secretariat indicated that the returns will not be published as such, but the consolidation and analysis will be assembled into a report which will be presented to the Advisory Panel and NDC, prior to publication.

7. The ToRs for the Roadmapping and the Advisory Panel, as agreed at the meeting, are provided in annex. The issue of R&D (Research and Development) versus RD&D (Research, Development and Demonstration) came again to the front. The solution agreed at the previous meeting (using R&D and adding a footnote) is therefore now inserted in the ToRs. Indeed there is consensus that Demonstrators have to be part of the roadmapping, while recognising their specificities in terms of possible high costs, difficulties of financing, IP rights, etc.

8. The “Objective of the Roadmapping” was modified to provide the necessary focus on the notion of innovation, to reach commercial readiness for sustainable nuclear technologies, in a fast and cost effective manner. The word “sustainable” was added to ensure that all necessary conditions for the use of nuclear energy are properly integrated: not only economic aspects, but also safety, security, environment, etc., (also in line with the GIF goals).

9. The broad scope of the Roadmapping in five main categories was confirmed, with the modification of category “Fuel” into “Fuel and Fuel Cycles (including recycling)”. The category on “Emerging Energy Systems” will not include non-nuclear technologies (which may nevertheless be covered under the cross cutting issues as Key Enabling Technologies), but will focus on the necessary increased flexibility in the evolving electricity system and on non-electricity applications of nuclear energy. A revised version of the corresponding figure was discussed and is now integrated in the ToRs.

10. The Membership of the Advisory Panel will be made of the persons invited to the meeting. Membership is nevertheless an open process. In particular the NDC may want to nominate additional participants, but the overall number of Members needs to stay under control.

11. A presentation was given by Jim Gulliford for the NSC (Nuclear Science Committee) providing insight of the work done in Science and the available material of use for NI2050. An Initiative on Innovation and Education, aiming at involving students at PhD level in specific research programmes (and infrastructures), to foster the transfer of competence and experience to the new generation of researchers,

was presented. It may constitute an element of the NI2050 roadmap on human resources and skills. A brainstorming session on this topic will be scheduled by NSC.

12. An extensive discussion took place on the organisation, scope and timing for the first Experts Meetings. The result is as follows:

***Expert Meeting Reactors – 2 Rooms reserved for 2 to 4 March:***

- Subgroup 1: Evolutionary Water Cooled Rxns, large and SMRs (water cooled), GENIV SCWR
- Subgroup 2: Innovative/Advanced Systems: FNRs, ADS, (V)HTR, MSR, including SMRs for these technologies

***Expert Meeting Fuels and Fuel Cycles – 2 Rooms reserved for 2 to 4 March:***

- Subgroup 1: Fuel and Fuel Cycle for Evolutionary Rxns
- Subgroup 2: Fuel and Fuel Cycles for Innovative/Advanced Systems

***Expert Meeting Decommissioning and Waste Management – 2 Rooms reserved for 16 to 18 March:***

- Subgroup 1: Decommissioning
- Subgroup 2: Waste Management, mainly High Level Waste, i.e. extended intermediate spent fuel storage, final (geological) disposal of spent fuel (as waste) and vitrified waste

***Expert Meeting Emerging Energy Systems – Room(s) reserved for 6 to 8 April:***

- Innovative Energy Systems (nuclear flexibility in evolving electricity systems, non electricity applications, hybrid systems, etc.)

13. A question was raised on the expected number of Experts Meetings. The NEA Secretariat clarified that these are not “established “standing” Expert Groups”. The Expert Meetings are taking place under the umbrella of the Advisory Panel. Depending on the outcomes of the first Experts Meetings, the Advisory Panel will decide on the need for further meetings. At this stage one might consider that a second set of Experts Meetings might have to be organised in September/October, but probably not more.

14. As it can be seen in the list of meetings as planned above, the experts meetings on reactors and fuels will meet in parallel at the same location. This was specifically requested by participants to foster contacts between participants since the research priorities on reactors and fuels are all connected.

15. A generic agenda for the Experts Meetings was discussed, fostering a coherent systematic approach for all of them.

***“Generic Draft Agenda for Experts Meetings”***

- Background information on NI2050. Mandate/objectives/methodology for Experts Meetings. Technical scope for groups/subgroups. *Chairs and NEA Secretariat*. 1hr

***Separation in 2 subgroups.***

- Existing Roadmaps and Ref Documents. *Presentation by selected experts*. 2 hrs
- Brainstorming: List of topics – Establishment and Structuring of the list/priorities. 6 hrs
- Drafting Templates for selected topics. 3 hrs
- Consolidation of outcomes: Report/PPTs preparation. 3 hrs

***All together***

- Cross presentations – discussion on cross cutting issues. 3 hrs.

16. There was no consensus on the need to present existing (previous) roadmaps. Some participants considered it necessary in order to set a common ground for the meetings, other not, since the experts are supposed to know these roadmaps. This then triggered a discussion on the necessary adequate selection of the experts: technically competent, broad and forward looking vision, having been close to some previous roadmapping exercises.

17. A request was made for the NEA Secretariat to try to summarise information out of the existing roadmaps and other reference materials to facilitate and prepare the work for the experts. This will be challenging due to the timing of the Experts Meetings, however the NEA Secretariat will endeavour to enable this, recognising that the most effective way of achieving this is through the involvement of experts having experience of previous roadmaps.

18. In order to foster a concrete outcome of the Expert Meetings and ensure some coherence, a template was discussed for them to describe their selected R&D issues/topics.

***Generic Template to fill for each R&D issue/topic:***

- Title of Topic and objective of the associated R&D – what to obtain
- Justification why this issue/topic was selected
- Technical description of the R&D tasks – how to obtain/what to do
- Correspondence with Survey categories (to be used for comparison with survey)
- Timeline/planning (steps) for reaching the objective/implement the tasks

- Necessary infrastructures: existing + access/availability, new
- Estimated necessary resources: finance (including for infrastructures), manpower
- Reference materials (roadmaps, documents, websites, etc.)

19. The Advisory Panel did not want to be prescriptive by fixing the list of issues/topics, but decided to leave this to the experts themselves. Experts will be asked to justify why the issues/topics were selected. They will also be asked to cross connect with the categories of the Survey to ease the further definition of gaps.

20. A discussion on the necessity to fix a minimum “scale” for issues/topics (i.e. minimum budget figure) was not conclusive. One might hope that “visionary” experts will stay at the adequate level of aggregation of issues/topics. This again gets back to the adequate selection of experts.

21. The discussion on the objectives (generic NI2050 and specific for each Experts Meetings) to be presented to the experts has not been very detailed. The wording for the “Objective” in the ToRs will serve as a basis, insisting on the need for R&D topics to foster “innovation and sustainability in fast and cost effective manner”.

22. A discussion emerged on how to handle critical enabling factors such as public opinion/acceptance, financing and investments, supply chain... The NEA Secretariat proposed to flag these in the report which will be the product to be presented at the end of this NI2050 Roadmapping. It will cover diverse “risks” associated with the implementation of R&D: Energy and Research policies and public acceptance, financing and investments, human resources, industry interest and supply chain, safety and regulatory issues, security and non-proliferation aspects, etc.

23. This approach allows not to have safety and security as “issues/topics” for R&D per se, since they are embedded in most nuclear R&D activities.

24. A preliminary list of background documents (roadmaps and other ref materials) prepared by the NEA Secretariat was discussed. Beyond the further consolidation of this list, participants asked the Secretariat to extract the substance of the documents to prepare the work for the experts. This will be done as time permits.

25. Focussing on existing roadmaps (GIF, EU SNETP and associated roadmaps, national roadmaps, etc.) it might lead to a consolidation and a kind of “meta-roadmap”. This might be an additional product of NI2050.

26. Once the list of issues/topics will be established (and templates filled in), the experts will be asked to prioritise them (1 to 3 with 3 being the highest priority) and justify their prioritisation. The criteria for prioritisation will have to be further elaborated, using the “Objective of the ToRs” and the initial list proposed by the NEA Secretariat as a guide, i.e.:

- Effectiveness of the R&D to accelerate innovation – timeline to results

- Effectiveness of the R&D to foster investment for commercialisation/deployment
- R&D issue/topic as a necessary element in a chain – complementarity and critical path
- Necessary infrastructure – replacement of ageing infrastructure, multipurpose, etc.
- Potential for cooperation

27. The Advisory Panel will have to develop its own prioritisation criteria to perform the higher level prioritisation of R&D issues/topics once the outcomes of the Experts Meetings are available.

### ***Next Steps and Planning***

FOR FRIDAY 22 JAN:

- NEA Secretariat to send the Draft Summary Record of the Meeting to the participants.
- Advisory Panel Members to propose Chairs for the Experts Meetings (at the “subgroup level” for Evolutionary and Innovative Reactors and Systems, Fuel/Fuel Cycles for Evolutionary and Innovative Reactors and Systems, Waste and Decommissioning, Emerging Energy Systems).

FOR FRIDAY 29 JAN:

- Advisory Panel Members to provide names for experts (at the “subgroup level” as above). As far as possible Advisory Panel Members will have checked the availability of these experts for the selected dates of meetings.

FOR FRIDAY 5 FEB:

- The NEA Secretariat will inform the Advisory Panel Members of its proposed list of Chairs for the Experts Meetings.
- The NEA Secretariat will also have drafted the “basic material” to serve for the invitation of the experts (Background, General and Specific Objective, Scope and list of background documents, Methodology and Template, Agenda and Process). The material will be further developed with the Chairs.

WEEK 8 to 12 FEB:

- Invitations and Agenda for the Experts Meetings will be sent out by the NEA Secretariat (Advisory Panel Members in copy).

2-4 MARCH: Experts Meetings Reactors and Fuels.

16-18 MARCH: Experts Meetings Decommissioning and Waste.

6-8 APRIL: Experts Meeting on Emerging Energy Systems.

APRIL-MAY: Consolidation of outcomes of the Experts Meetings (Chairs and NEA Secretariat) and Analysis of the Survey (Step 1 of NI2050) (NEA Secretariat).

20-21 JUNE: Meeting of the Advisory Panel.

Elements of Agenda:

- Presentation and Analysis of the returns of the Survey
- Presentation and Analysis of the outcomes of the Experts Meetings
- Handling the Cross-cutting issues
- Need for additional Experts Meetings
- Process towards the consolidation and setting of the Adv Panel top NI2050 priorities
- Views on the content of the final report and preparation of the Final Workshop.



## DETAILED AGENDA OF THE MEETING

### **DAY 1 – 14 January 2016** (*starting at 14:00*)

*14.00 – 15.00*

Item 1. Introduction by the Chair and Secretariat

Tour de Table of Participants

Approval of the Draft Agenda [[NEA/NDC\(2015\)28](#)]

Status of the Survey Phase 1 NI2050

Recap of Outcomes of the First Meeting of the Advisory Panel, [[NEA/NDC\(2015\)26](#)]

Discussion on the Draft ToRs for the Advisory Panel.

*15.00 – 17.30*

Item 2. Discussion on the Structure of the **4 Expert Groups** and Subgroups and definition of more detailed (technical) Scope/Topics for each of them. Link with and List of existing Roadmaps (and other reference material) to be used as inputs by the Groups (participants having experience of developing roadmaps are asked to come prepared to contribute to the discussion with concrete information on approaches they used).

Link ? with the Categories of the Survey (to allow further comparison).

### **15 January 2016**

*09.00 – 10.30*

Item 3. Discussion on the **Methodology** to be followed by the Expert Groups/Subgroups. “Guidelines” for setting priorities – associated with the overall Objectives of NI2050. How to keep focus – use experience of existing roadmaps. Link ? with Categories of the Survey (for further comparison with priorities). Timelines for priorities; Financial/Financing dimension for priorities; Programmes vs Infrastructures...

Item 4. Draft Agenda for the Expert Groups/Subgroups Meetings.

*10.30 – 11.00*

Item 5. Nomination of Chair and Co-Chairpersons, and participants for the Expert Groups/Subgroups.

*11.00 – 12.00*

Item 6. Next Steps for the Advisory Panel: methodology to reassemble outcomes of the Expert Groups, integrate cross cutting issues, selection of top priorities.

*12.00 – 12.30*

Planning for next steps and meetings. AOB. Conclusions.

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