

Nuclear Innovation Cooperation

In the Low-Carbon Perspective

NEA NI2050 Initiative TORS

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Terms of Reference for the NI2050 Roadmap (Top-Down Step 2) and for the Adv Panel:

DRAFT TERMS OF REFERENCE (ToRs)

For the NEA NI2050 Roadmapping of Nuclear Fission R&D and Advisory Panel

Background

The NEA NI2050 Initiative, launched in July 2015, is aiming at mapping the actual nuclear fission R&D programmes and infrastructures (step 1), highlighting R&D (see footnote) priorities to enable innovation and foster the longer term role of nuclear fission in the sustainable low carbon energy future (step 2), and evaluating the potential for cooperation to implement some of these priorities, in particular where there are gaps and synergies in terms of programmes and infrastructures (step 3). See Figure 1.

While step 1 is to be performed via a survey managed by the NEA Secretariat (NDD), the step 2 will take the form of a high level roadmapping of R&D priorities. It will require the recourse to high level expertise having a far reaching vision, technical knowledge, and experience of similar roadmapping processes. As one of the outcomes of the NI2050 Launching Workshop (7 and 8 July 2015 Paris), the NEA Secretariat was tasked to draft Terms of Reference for the roadmapping process, including for an Advisory Panel providing the necessary guidance and expertise.

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Footnote

R&D:

There was extensive debate at the first Advisory Panel Meeting on “R&D” (Research and Development) vs “RD&D” (Research, Development and Demonstration). “R&D” will be further used, but “demonstrators” are fully part of the scope of the roadmapping. As a result of the discussion it was decided to propose an ad-hoc clarification of the notion of demonstrator vs prototype/FOAK (First of A Kind). A Demonstrator is an experimental facility designed to prove the technical and industrial feasibility, as well as the safety case (licensability), of a technology in its integrity (e.g. a demonstrator reactor). The aim is not to produce energy (e.g. electricity) in an economic way, but such production might be part of the scope of the demonstration. Such “demonstrators” are flexible tools, allowing diverse configuration and experiments to take place (e.g. on materials and fuels), and may be associated with additional specific support facilities and labs (i.a. hot cells for PIE). The next stage, after the demonstrator, is the prototype, for which the aim is to produce energy (e.g. electricity) and prove the economic viability of the technology. A FOAK is the first fully commercially operated plant based on the given technology.

ToRs for the Roadmapping of R&D priorities

Objective

The objective of the NI2050 roadmapping is to identify R&D strategies and associated priorities to achieve commercial readiness of innovative sustainable nuclear fission technologies in a fast and cost effective manner. For the 2050 perspective, the IEA ETP 2DS (2 Degree Scenarios of the 2015 Energy Technology Perspectives of the International Energy Agency) serves as the reference.

Scope

The roadmapping will be organised along 5 main categories (see Figure2). Each of these five categories will be further elaborated as necessary in the course of the roadmapping. Both R&D programmes and infrastructures will be mapped. Infrastructures cover “physical infrastructures” (facilities, labs and tools) but may also cover “human resources and skills” as appropriate.

ToRs for the Roadmapping of R&D priorities

Methodology

Maximum use will be made of existing roadmaps (GIF, European Technology Platforms, national roadmaps, Owners/Users Groups of facilities,...).

Priorities consistent with the objective will first be mapped for the four first categories (see Figure 2). These will then be consolidated, together with priorities for cross cutting topics.

Once priorities are established in the roadmapping, they can then be cross-checked with the outcomes of the survey mapping the actual R&D (step 1), leading to the identification of some gaps and synergies which may better be addressed (efficiency, cost, use of resources,...) through cooperation.

A concrete outcome, beyond the survey results and the roadmap per se, might therefore be to define a limited number of priorities/gaps/synergies, not yet properly taken care of, for which there is willingness to cooperate.

Process

An Advisory Panel, made of NEA member countries high level experts and NEA Secretariat, will guide the Roadmapping. The first task will be to define more precisely the scope and methodology for the roadmapping (eg which “process and criteria” to use for the prioritization). Following this, specialised Experts Meetings will be organised, under the umbrella and responsibility of the Advisory Panel, to highlight R&D priorities for the first four categories of the roadmapping. The Advisory Panel will consolidate the outcomes, cross check with the priorities for the cross cutting issues, and look for duplications and synergies. A final list of priorities should then be elaborated and cross-checked with the outcome of the survey, leading to the identification of potential gaps and synergies, for which cooperation might be proposed.

ToRs for the Advisory Panel

Membership and Chairpersons

A list of members for the Advisory Panel, to ensure the proper combination of the necessary high level vision, expertise and experience, will be proposed to the NDC. The list (see list in annex) is based essentially on the list of participants invited by the NEA Secretariat for the first meeting of October 2015, complemented by an invitation to the chairs of the main NEA Standing Technical Committees, to ensure the necessary coordination for this broad NEA Initiative, and by the IAEA as observer. NDC may propose additional members for the Advisory Panel.

A chairperson will be proposed by the NEA Secretariat for each meeting of the Advisory Panel and endorsed by consensus by the participants of the meeting.

The specialised Experts Meetings should be chaired by a member of the Advisory Panel to ensure the global consistency of the overall process. The NEA Secretariat will call for volunteers and propose the list of chairs (and co-chairs as appropriate) for approval by the Advisory Panel.

Members of the Advisory Panel will nominate the experts for the specialised Experts Meetings (they may also decide to participate themselves). NEA Secretariat may propose additional experts. The experts will need to have a global long term vision of R&D perspectives and needs in their field in terms of programmes and infrastructures, a deep technical expertise, and a good knowledge of existing roadmaps used as basis.

ToRs for the Advisory Panel

Timeline and location for meetings

Following a first (pilot) meeting of the Advisory Panel of October 2015, a second meeting (to define the mandate, task, methodology, expected outcomes for the expert meetings) was organised in January 2016. The first Experts Meetings should take place between February and April. The Advisory Panel should further meet in May/June and September/October, to deliver the NI2050 “roadmap” and lists of priorities/gaps/synergies for a Final NI2050 Workshop towards the end of 2016/early 2017.

The NEA Secretariat will provide support for the preparation, recording and reporting of all the meetings. Unless otherwise proposed, meetings should be organised in Paris.

Duration of the Advisory Panel

The Advisory Panel is established until the date of the NDC Meeting mid-2017. The NDC will then decide about the future, upon proposal by the NEA Secretariat.

Endorsement by the NDC and Information of the NEA Committees

These Terms of Reference will be presented for endorsement by the NDC (Meeting of January 2016). The progress of the NEA NI2050 Initiative will be reported at each meeting of the NDC, and to other NEA Standing Technical Committees as requested. The NEA Steering Committee will also be informed on a regular basis.