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## **ANNETTE PROJECT**

**Advanced Networking for Nuclear Education and Training and Transfer of Expertise**

### **DELIVERABLE D 7.4**

## **Interactions and Feedbacks for the ANNETTE Project**

Nature of the deliverable		
R	Report	X
P	Prototype	
D	Demonstration	
O	Other	

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#### **Dissemination Level**

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PP	Restricted to other programme participants (including the Commission Services)	Yes
RE	Restricted to a group specified by the partners of the ANNETTE project	
CO	Confidential, only for partners of the ANNETTE project	

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## ABSTRACT:

Consolidated data on interactions with and feedback received from communities outside the ANNETTE project are outlined in this report as part of the activities, organized in the frame of WP 7.

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## 1. INTRODUCTION

Interactions with and feedback received from communities outside the ANNETTE (Advanced Networking for Nuclear Education and Training and Transfer of Expertise).project has been an important part of the ANNETTE. Most of the related activities were organized in the frame of WP 7 within the following our tasks:

- interact with technological platforms, EHRO-N and NUGENIA (Task 7.1) ;
- interact with IAEA and networks beyond Europe (Task 7.2);
- interact with ENS, ENEF, FORATOM, ENSREG, WENRA, HERCA and ETSON (Task 7.3), and
- two special events devoted to advanced networking (Task 7.4).

This report presents consolidated data on interactions with and feedback received from communities outside the ANNETTE project. The main actions and their findings are summarized in section 2, followed by the lessons learned and outlook in section 3.

## 2. MAIN ACTIONS AND THEIR FINDINGS

### 2.1 Main Communication tools

A presentation of the ANNETTE project (Deliverable D7.1) has been developed to assist the ANNETTE partners in disseminating information on the ANNETTE project to the stakeholder organizations. Additional presentations were set up in different phases of the work to communicate with Stakeholders; part of this documentation is reported in the web page <http://www.enen.eu/en/projects/annette/bulletins-and-materials.html> of the ENEN website, while a videoclip for illustrating to Stakeholders the concept of Master for CPD is available at <http://www.dimnp.unipi.it/walter-ambrosini/For%20Stakeholders/For%20Stakeholders.html>.

Although the communication tools and initiatives were developed in different work packages of ANNETTE, they were stimulated and harmonised in the general frame of the actions developed in WP7 to keep contacts with the communities outside ANNETTE, End-User Group and the Advisory Board. These groups of stakeholders were also continuously contacted during the development of the project and were also among the recipients of the Monthly Bulletin.

### 2.2. Advisory Board and End-User Group

The composition of the Advisory Group Board and End-User Group, as initially established by a common call by the WP7 and 2 Leaders, is reported in the tables below.

<b>Advisory Board</b>	<b>Reference Person(s)</b>
SNE-TP	Aït Abderrahim Hamid
IGD-TP	Robert Winsley and Jon Martin
MELODI	Andrea Ottolenghi Vere Smyth
EHRO-N	Marcello Barboni
IAEA	John De Grosbois, Maria Elena Urso
GENTLE Consortium	Jan-Leen Kloosterman
ENS	Emilia Janisz

<b>End-User Group</b>	<b>Reference Person(s)</b>
FORATOM	Jean-Pol Poncelet
ENSTTI	Didier Louvat
Westinghouse	Keith Allen
EdF	Abderrahim Al Mazouzi
Ansaldo Nucleare	Alessandro Alemberti
Fortum	Kristina Solderholm
Bel V	Dr. Benoît Bernard

Changes in the specific persons appearing in the above tables occurred, because of personnel turnover, but the representation of the different Institutions and bodies was firmly kept along the ANNETTE project. The members of the Advisory Board and the End-User Group were contacted frequently with information about ANNETTE activities (Monthly Bulletin) and requests for feedback (more is reported in the deliverables of the WP 2 of the ANNETTE project). They were very helpful in distributing information about ANNETTE activities, especially its courses.

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### 2.3. Special Events

Four networking events have been organized in the frame of ANNETTE WP 7 (two as in-kind contribution of ENEN to the ANNETTE project) as follows:

- ANNETTE Project Open Workshop at NESTet 2016 Conference in Berlin, Germany, May 25, 2016;
- Academic Session celebrating 15 years of the ENEN association, Koninklijke Vlaamse Academie van België, Brussels, Belgium, March 1, 2018;
- ENEN & ANNETTE Stakeholder Event, Stanhope Hotel, Brussels, Belgium, February 28, 2019, and
- FISA 2019 and EURADWASTE '19, E&T networking event, Nuclear Education: A Cause for Concern?, Pitesti, Romania, 4-7 June 2019.

The representatives of European Commission (DG RTD, DG JRC, DG ENER), technological platforms (SNETP, NUGENIA, MELODI, EUTERP), IAEA, OECD/NEA and other interested organizations including Energy for Humanity, Rosatom Tech, GEN-IV International Forum, ENS and FORATOM, were invited to present their views at these special events.

The existing challenges of education and training are acknowledged widely by all nuclear stakeholders, who contributed in different occasions to express their opinion and support the development of specific choices within the ANNETTE project. The anticipated ways to resolve those challenges nevertheless differ very much given the well-known differences in missions and strategies of stakeholders and the market conditions, especially for the nuclear power applications. All of those may namely influence public perception of nuclear power and also the choice of careers by the coming generations. This choice finally influences also the quality and quantity of available education and training establishments and the long-term sustainability and public acceptance of the nuclear power industry.

Further information on the agendas, discussions and conclusions of special events is provided in deliverable D 7.3.

## 2.5 Dedicated interactions with nuclear stakeholders

A comprehensive summary of all interactions, cooperation channels established and lessons learned is one of the objectives of the present deliverable D 7.4.

The status of interactions and cooperation with the nuclear stakeholders in EU and beyond at the end of the ANNETTE project is summarized in the table below:

	ANNETTE/ENEN presented to the leadership	Representatives at ANNETTE/ENEN events	ANNETTE/ENEN representatives in the leadership	Memorandum of Understanding signed with ENEN	Partner in H2020 Projects coordinated by ENEN
SNETP	Yes	Yes	Board		Advisory Board
NUGENIA		Yes		Yes	Yes
MELODI	Yes	Yes	ExecComm		Advisory Board
CONCERT (*)	Yes				
JOPRAD/EURAD	Yes				
EHRON-N	Yes		SAG		
IAEA	Yes	Yes		Yes	Advisory Board
OECD/NEA	Yes			Yes	Advisory Board
ENS	Yes	Yes		Planned	Yes
ENEF	Informal				
FORATOM	Yes	Yes			Yes
ENSREG	Yes	Yes			
WENRA	Informal				
HERCA	Semi-formal				
ETSON	Yes		Board		

(\*) CONCERT Courses were also advertised in the frame of ANNETTE, in spirit of good cooperation among EU promoted initiatives.

## 2.6. Outreach to other stakeholders beyond European Union

Presentations on ANNETTE and ENEN activities were given at the following events outside Europe:

- International Conference on Nuclear Engineering, ICONE 24, Charlotte, NC, USA, June 10, 2016 (organized by American Society of Mechanical Engineers, Japan Society of Mechanical Engineers, Chinese Nuclear Society);
- ICONE 25, Shanghai, China, July 3, 2017;
- Collaborative Seminar on E&T, KONICOF, Seoul, Korea, July 10, 2017;

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- G7 Nuclear Safety and Security Group: International Workshop Sustaining Capacity-Building for Nuclear Safety And Security, Rome, Italy, Oct 11, 2017.
- Meeting of the US Nuclear Engineering Department Heads Organization (NEDHO), ANS Winter meeting 2017, Washington, D.C., USA, Oct 29, 2017;
- ICONE 26, London, UK, July 23, 2018;
- 9th International Symposium on Symbiotic Nuclear Power Systems for 21st Century, Harbin, China, July 9, 2018
- ATOM Expo 2018, Sochi, Russia, May 15, 2018;
- ICONE 27, Tsukuba, Japan, May 27, 2019;
- ANS Global and Top Fuel Conference, Seattle, WA, USA, Sept 24, 2019;
- International Conference “Capacity Building for Nuclear Industry: Education, Research, Safety”), RosatomTech, Obninsk, Russia, June 26, 2019.



### 3. SUMMARY AND OUTLOOK

The dwindling education, training and knowledge management in many nuclear disciplines was interpreted as “a cause for concern” in 2000 by the OECD/NEA report entitled “Nuclear Education and Training: A Cause for Concern?” Many bottom-up initiatives have been started since then, resulting among others in preservation and further development of nuclear education and training. Nonetheless, the long-term sustainability of nuclear education and training seems to be exposed to higher risks than two decades ago.

This and other challenges of contemporary nuclear education and training, including the advanced networking and other activities proposed within the ANNETTE project, have been widely discussed with the nuclear communities beyond the ANNETTE project participants. The existing challenges of education and training are acknowledged widely by all nuclear stakeholders. These included representatives of European Commission (DG RTD, DG JRC, DG ENER), technological platforms (SNETP, NUGENIA, MELODI, EUTERP), IAEA, OECD/NEA and other interested organizations including Energy for Humanity, Rosatom Tech, GEN-IV International Forum, ENS and FORATOM, who were also invited to ANNETTE special events to present their valuable views and feedback.

The anticipated ways to resolve those challenges nevertheless differ very much given the well-known differences in missions and strategies of stakeholders and the market conditions, especially for the nuclear power applications. All of those may namely influence public perception of nuclear power and also the choice of careers by the coming generations. This choice finally influences also the quality and quantity of available education and training establishments, as well as the long term sustainability and public acceptance of the nuclear power industry.

An important generic conclusion that appeared from these discussions is that the many past and existing bottom-up initiatives, including for example development of new courses within EURATOM Fission Training Schemes and developing new teaching technologies provided significant contribution to the preservation and further development of the existing nuclear workforce and higher education and training institutions. They may nevertheless not be regarded as sufficient to attract and develop the new nuclear talents needed for the future development of nuclear power applications. Attraction and development of the best talents to work, communicate and contribute to the specific (safety) cultures in highly technically specialized and multicultural environments will in the future require much stronger cooperation and participation of all interested stakeholders.

Cooperation and coordination of stakeholders with very different missions and cultures (e.g., vendors, utilities, regulators, academia, technical support organizations...) could be facilitated much more efficiently with top-down approaches, including advanced coordination as proposed by the ANNETTE project.

It appears that the top-down approaches would need, at least in some member states, stronger support of the competent regulatory authorities and possibly also governments. It also appears that the competent regulatory authorities are the most challenging to be actively engaged in the on-going discussions about the challenges and opportunities of nuclear education and training, possibly because of their mandate to be independent from any promotional initiative. Some potentially useful top-down approaches will be defined in more detail in the strategic agenda of nuclear education and training to be proposed by the ENEN+ project in the very near future.

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An idea to revive the NESTet conference jointly by the ENS, ENEN and JRC has started to evolve at the ENEN & ANNETTE Stakeholder Event (2019 and will be further elaborated in the months to follow aiming at the NESTet in 2020. NESTet is considered an excellent annual or biannual forum for sharing nuclear research news with importance for nuclear higher education, experiences and expectations of educators, trainers and learners and, last but not least, to facilitate coordination between the nuclear stakeholders to secure future nuclear talents

A clear and urgent need to prepare the Nuclear education strategy for 2050 has emerged at the FISA 2019 event. There must be a clear definition and tracking of the jobs that are needed in order to be able to adapt the current know-how. A high-impact publication, maybe even a memorandum conveying the discussions and the identified issues, should be prepared and made public. This is aiming especially at awareness for the decision makers.

Finally, it is worth mentioning that one the main outcomes of the contacts had with Stakeholders for the ANNETTE project, since its proposal, has been a renewed interest for the missions and the actions of Association. This interest materialised in multiple contacts and MoUs, in an even tighter cooperation in the frame of the following ENEN+ project as well as in a present pending project proposal. This is coherent with the mission of the Association in raising concerns and proposing solutions in relation to the maintenance and development of an adequate workforce in the nuclear fields in the decades to come.