FISA EURADWASTE 2025

SNETP Forum

Day 2, 13.05.2025

Plenary Session I: Achieving Net Zero by 2050 in Europe (14:00 – 15:30)

Panellists:

- **Ladislav Havlicek,** Director, Ministry of Industry and Trade, CZ
- **Ilkka Poikolainen,** President and CEO, Posiva, FI
- **Brianna Lazerwitz,** Energy Economist, Section Planning and Economic Studies, IAEA
- **Olivier Dubois,** Commissaire ASNR, FR
- **Rafał Kasprów,** Chief Executive Officer – ORLEN Synthos Green Energy sp. z o. o, OSGE, PL

Moderators:

- **Paweł Gajda**, Director of Nuclear Energy Department, Ministry of Industry, PL
- **Youssef Fargani**, French YGN, SFEN JG

Rapporteur:

Said Abousahl, Expert, FR

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SNETP Forum

Day 2, 13.05.2025

Plenary Session I: Achieving Net Zero by 2050 in Europe (14:00 – 15:30)

Positive Nuclear energy context:

- COP28 calls for global efforts to accelerate zero- and low-emission technologies, including nuclear. 22 world leaders sign a declaration to make efforts to triple nuclear energy by 2050.
- Huge demands for electricity (transport, industry, district heat, Data centres,…)
- News recently about blackout in Spain related to the VRES.
- Geopolitical context: sovereignty, competitiveness and security of supply…
- EU future nuclear capacity is about 140 GW (according to the current available info from MS NE and Climate Plans)
- EU taxonomy delegated act, Clean Industrial deal, NZIA, IPCEI, Innovation fund, EIC/STEP technologies, EIB.
- Expected EC Communication on SMRs, Expected EC communication on new PINC
- World bank
- Increasing public support

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Plenary Session I: Achieving Net Zero by 2050 in Europe (14:00 – 15:30)

Key takeaways:

2050, how to get there?

- EU policies and instruments based on neutral technology principle.
- State energy policies need to provide predictable stability for the investors and give guidance on the pathway. *Governments need to support financing and bridge the funding gap by de-risking. (France, Poland,* Czech *)*
- *Business needs to get their and act together (delivering projects on time and on budget), Supply chain, European Business Alliance,..*
- *Regulators need to trim their rules and processes to help save on costs. Harmonizing* European safety regulations (eg. Pre-licencing NUWARD, Czech for Rolls Royce SMR and BWRX-300 ,..)
- *Waste management (learning from POSIVA for DGR, assessing new waste streams for SMRs/ AMRs,),*
- *Fuel manufacturing and supplies need to be diversified. Planning for production of fuels for SMRs/AMRs*
- EU cooperation Platforms: IA SMR, SNETP, IGD-TP…
- Shared European research infrastructure from test equipment and computational platforms
- Central role of Euratom R&T programme
- International cooperation, IAEA, NEA, GIF,…
- Transparency and Public Acceptance, dialogue with local communities, tailored interaction with different locals

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SNETP Forum

Day 2, 13.05.2025

Parallel Session I.1: Preserving safely the European assets, pioneering advances for safe horizons (16:00 - 18:00)

Panellists:

- **Jean-Christophe Huchard,** Directeur Production Amont, EDF, FR
- **Bram-Paul Jobse,** CFO, EPZ, NL
- **Markéta Dohnálková,** SÚRAO, Chair of IGD-TP, CZ
- **Soufiane Mekki,** RWMC/CDLM, NEA/OECD
- **Tomasz Bury,** Silesian University of Technology, Faculty of Energy and Environmental Engineering, PL
- **Christophe Bruggeman,** Deputy Director-General, SCK-CEN, EURADSCIENCE, BE

Moderators:

- **Luis Enrique Herranz Puebla,** CIEMAT, ES
- **Miriam Diaz,** Spanish YGN, Jovenes Nucleares

Rapporteur:

Olli Soppela, VTT, FI

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SNETP Forum

Day 2, 13.05.2025

Parallel Session I.1: Preserving safely the European assets, pioneering advances for safe horizons (16:00 – 18:00)

Key takeaways:

- Ongoing nuclear operations with increased demand for LTO and new build increase the demand of nuclear safety and efficient waste management and decommissioning methods and strategies
- The long-term nuclear waste management facilities need strategic planning that can host future evolution of waste volumes and types
- Technologies develop faster than regulations. It requires innovative collaboration in regulation formulation to enable the safe use of the best available constantly developing practices.
- The new plants need to adapt the latest material life-cycle knowledge and surveillance learnings, enable cost-efficient structural upgrades, and allow the future upgrades on redundant I&C systems to make potential LTO programs possible in the future
- LTO for research infrastructure facilities / Research reactors to extend their capabilities for the next decade.

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SNETP Forum

Day 2, 13.05.2025

Parallel Session I.1: Preserving safely the European assets, pioneering advances for safe horizons (16:00 – 18:00)

Key takeaways:

- Research and development collaboration should continue in the topics of diagnostics and simulation methods, material aging and structural integrity surveillance, fracture and fatigue mechanisms, DGR deployment, long-term behaviour of 3rd and 4th gen reactor fuels, engineering barrier behavior, international waste repositories and digital safety case development through Building Information Models (BIM)

- A lot of learnings from these topics can be found from previous and ongoing projects such as FRACTESUS, APAL, INCEFA-SCALE, ACES, METIS, STRUMAT-LTO, MAGIC-RR, AGE RR, CAMIVVER, DELISA-LTO, EVEREST, EL-PEACETOLERO, FIND, ISIR AGE, iWELD, INNOV,NDE, PASTELS, GO-VIKING; EURAD-2, PREDIS & DORADO

- The ongoing challenges on the way of international harmonization of waste management practices
  - national differences in waste types of classification, differences in acceptance criteria, accepted waste minimization strategies, implemented data management systems and geological differences of the suggested DGR sites.
  - Research, harmonization and collaborative learning to be achieved in all forms of international collaboration.

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SNETP Forum

Day 2, 13.05.2025

Parallel Session I.2: The European Alliance to develop, demonstrate and deploy SMRs by early 2030s (16:00 – 18:00)

Panellists:

- **Peter Baeten,** Director-General, SCK-CEN, BE
- **Olli Kymäläinen,** Technical Director, Fortum, FI
- **Virginie Wasselin,** Chef du service stratégie filières, ANDRA, FR
- **Ghislain Pascal,** Policy Officer, DG ENER, EC
- **Hidde Baars,** Director Government Affairs NL and EU, URENCO, NL
- **Jan Prasil,** Director, Ministry of Industry and Trade, CZ

Moderators:

- **Angelgiorgio Iorizzo,** EC DG RTD
- **Fabio Nouchy,** Italian YGN, Tractebel BE, INYG

Rapporteur:

Ivan Horvatovic, SCK-CEN, BE

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SNETP Forum

Day 2, 13.05.2025

Parallel Session I.2: The European Alliance to develop, demonstrate and deploy SMRs by early 2030s (16:00 – 18:00)

Topics and presentations:

- General overview of European Industrial Alliance on Small Modular Reactors – objectives of the Alliance and the current status
- TWG 2 Technology and R&D&I – Action Plan Update
- TWG 6 Safety and safeguards – Action Plan Update
- TWG 7 Nuclear Fuel and Radioactive Waste Management – Action Plan Update
- Challenges in the SMR/AMR management of radioactive waste
- Implementation of Czech SMR roadmap

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SNETP Forum

Day 2, 13.05.2025

Parallel Session I.2: The European Alliance to develop, demonstrate and deploy SMRs by early 2030s (16:00 - 18:00)

Key takeaways from the discussion:

- **Alliance as a Foundation -** The Alliance provides a strong foundation—now is the time to build on it and deliver results.
- **Clear Political Messaging -** It is essential to communicate clear, unified messages to political stakeholders to ensure alignment and support. (EC Communication SMR)
- **Stakeholder Cooperation -** Effective cooperation across all stakeholder levels is crucial, with a shared goal of achieving standardization when possible. (IPECI, RD, …)
- **Resilience -** For strengthening Europe's resilience, fuel security is central.
- **Dialogue -** Early engagement and dialogue with the SMR developers is crucial. (Safety Regulators, Waste management agencies, Safeguards/security authorities)
- **Acceleration Conditions -** The right conditions must be established at the EU level to accelerate progress (Policy FW, financing instruments,…)

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SNETP Forum

Day 2, 13.05.2025

Parallel Session I.3: Nuclear new build in Europe (16:00 – 18:00)

Panellists:

- **Andrzej Sidło,** Counsellor to the Minister, Ministry of Industry, PL
- **Lou Martinez,** CTO and Executive Vice President of R&I, Westinghouse, ES
- **Juha Poikola,** Manager and Public Relations, Teollisuuden Voima Oy, FI
- **Pascal Charles,** Directeur R&D Production & Ingénierie, EDF, FR

Moderators:

- **Baptiste Pothet,** Framatome, FR
- **Alexandre Havard,** French YGN, SFEN JG

Rapporteur:

Pavel Kral, UJV Rez, CZ

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SNETP Forum

Day 2, 13.05.2025

Parallel Session I.3: Nuclear new build in Europe (16:00 – 18:00)

Topics and presentations:

- An overview of the latest, ongoing and foreseen NPP builds in Europe
- Complex view of designers, utilities and governments
- Europe had been able to build and commission 5-10 NPPs per year
- Negative effect of the gap in NPP construction
- Restart of construction impacted by the FOAK effect
- Lessons learned from construction of the latest units
- Role of governments and EC
- Building new units in pairs has positive effects on construction, the supply chain, and the development of HR.

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Day 2, 13.05.2025

Parallel Session I.3: Nuclear new build in Europe (16:00 – 18:00)

Key takeaways from the discussion:

- **Harmonization needed** – different technical standards in some countries cause modifications of design; the harmonized standard should be technology-neutral
- **Innovations** - focused on simplification and faster construction while maintaining safety characteristics
- **Modularization** – partial modularization even in case of big units
- **Digitalization** – helps in construction and in communication with suppliers
- **Standardized components** – smaller number of types of components
- **Public acceptance growing** – awareness of low carbon source of electricity and heat, importance of open information and independent safety authority (even Green Party supports nuclear in some countries ☺)
- Lessons learned are transferred to the design and construction of **SMRs**.

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SNETP Forum

Day 3, 14.05.2025

SUMMARY

Plenary Session II: Enablers for Innovative nuclear, strengthening the EU strategic competitiveness and autonomy (8:30 - 10:00)

Panelists:

- **Thomas Rief**, Director R&D, Woelfel, DE
- **Ioana Davidescu**, EC DG Competition, BE (invited)
- **Massimiliano Tacconelli**, Director Nuclear and Big Science, Waltertosto, IT
- **Erika Holt**, Principal Scientist, VTT, FI
- **Frederik Reitsma**, Section Head, Nuclear Power Technology Development, IAEA

Moderators:

- **Marta Vázquez,** EMPRE, ES
- **Benoit Erbacher,** IYNC

Rapporteur:

Liisa Heikinheimo, Expert, FI

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SNETP Forum

Day 3, 14.05.2025

Drivers and Enablers from the plenary

1. **Need of resilient low carbon energy supply**:
   - LTE, fuel efficiency improvement, managing external hazards and events
2. **Flexibility and Integration with renewables, non-electricity production**:
   - Load follow capacities, heat&hydrogen systems
3. **Innovation, cost reduction and competitiveness:**
   - To ensure long term operation and sustainability, construction innovations, improved fuel technologies
4. **Supply Chains:** Availability, reassessing and qualification;
5. **Policy and investment frameworks:**
   - Harmonisation of regulations and securing funding possibilities

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6. **Safety and Public Acceptance**

- Continuitiy of research actions contra diversity – continuity is needed.

7. **Fuel cycles and Materials strategies;**

- Short term: development of ATFs, EU taxonomy policies support this
- Long term: AWR/SMR development and deployment
- Closing the fuel cycle or open fuel cycle – policy matters

8. **Waste Management:**

- Continuous innovation for waste management along with steps to operate disposal and repositories
- Holistic approach for repository safety and operation – not optimising single parameters.

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Plenary Session II: Enablers for Innovative nuclear, strengthening the EU strategic competitiveness and autonomy (8:30 - 10:00)

9. **Financial support is needed for nuclear innovations to be demonstrated** - eg. EIB, IPCEI
10. **Cross-sectoral and regional collaboration** - sharing competencies and infras.
11. **Eco-systems & adapting from other sectors** - provides faster approaches and efficient use/training of competencies.
12. **Human resources and capacity building**

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Parallel Session II.1: Innovative nuclear fuel cycles and materials strategies (10:30 - 12:30)

Panelists:

- **Lorenzo Malerba,** Profesor de Investigación Materiales, CIEMAT, ES
- **Virginie Solans,** NAGRA, CH
- **Hugues Hinterlang,** Head of EU Public Affairs, Orano Group, FR
- **Paul Schuurmans,** Scientific Adviser, SCK-CEN, BE
- **Szavai Szabolcs,** Head of Department, AEMI, HU
- **Véronique Rebeyrolle,** Fuel BU R&D and IP Senior Manager, Framatome, FR

Moderators:

- **Mykola Dzubinsky,** EC DG RTD
- **Pau Aragon,** Spanish YGN, Jovenes Nucleares

Rapporteur:

Guillaume Tremblay, Westinghouse, FR

Accelerate Fuel Innovation Through a Dual-Track Strategy, Support both:

- Incremental improvements (e.g. ATFs, MOX, HALEU) for near-term deployment in existing reactors to support their long-term operation and will be used as techno bricks for upcoming designs (HALEU & Triso for SMRs and AMRs)
- Game-changing innovations (e.g. multi-recycling, fast reactors, advanced materials) for long-term sustainability and fuel cycle closure, in S&LFRs, and MSRs.
- This requires funding both mature technologies ready for industrialization and exploratory R&D that can deliver breakthroughs.

Invest in Infrastructure and Accelerated Qualification Pathways to reduce time-to-market for new fuels and materials

- Expand access to irradiation facilities and testbeds, hot cells, and modelling tools.
- Support the development of accelerated qualification methodologies in collaboration with regulators and standardization bodies.
- Promote shared EU-wide infrastructure and databases to avoid duplication and foster collaboration.

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Enable a Circular Nuclear Economy, prioritize technologies that:

- Reduce uranium mining and radioactive waste through reprocessing, recycling, and transmutation.
- Support closed fuel cycles using fast reactors and advanced reprocessing
- Develop durable waste forms and optimize repository design using digital tools and lifecycle assessments.
- This aligns nuclear innovation with the EU's sustainability and circular economy goals.

Strengthen Fuel Materials R&D to unlock Advanced and Modular Reactors

Support a new paradigm in materials research:

- Shift from "observe and qualify" to "design and control" using AI, modeling, and high-throughput experimentation.
- Address bottlenecks in high-temperature, corrosion-resistant, and radiation-tolerant materials for Gen-IV reactors (e.g. LFRs, MSRs).

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Ensure Strategic Sovereignty and Industrial Readiness

- Secure European supply chains for critical materials like HALEU and MOX.
- Support industrial-scale demonstration projects to bridge the gap between lab-scale R&D and commercial deployment.
- Foster public-private partnerships and align funding instruments (e.g. Euratom, EIB, IPCEIs) to de-risk
- investments and maintain EU technological leadership.

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SNETP Forum

Day 3, 14.05.2025

Parallel Session II.2: Artificial intelligence and digital technologies for safe and sustainable nuclear activities (10:30 – 12:30)

Panelists:

- **Istvan-Réka Szöke,** Deputy Director, Head of Applied Physics, IFE, NO
- **Jani Halinen,** Head of Nuclear Energy research, VTT, FI
- **Patrick Morilhat,** Director of R&D, EDF, FR
- **Anders Wik,** R&D Manager for Nuclear and Digitalization, Vattenfall, SE
- **Nelly Ngoy Kubelwa,** Division of Nuclear Power, IAEA

Moderators:

- **Eero Vesaoja,** Fortum, FI
- **Keziah Garba,** Women in Nuclear YG

Rapporteur:

Albannie Cagnac, EDF, FR

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SNETP Forum

Day 3, 14.05.2025

Parallel Session II.2: Artificial intelligence and digital technologies for safe and sustainable nuclear activities (10:30 – 12:30)

Topic 1: Challenges of AI in the Nuclear Industry

- Quality and reliability of information: Use trustworthy, relevant, and varied sources.
- Data security: Preference for internal solutions and local infrastructure.
- Regulatory frameworks: Need for updates and harmonization.
- Skill development: Adaptation of workers to evolving job roles.

Topic 2: Potential Benefits of AI

- Research and development: Facilitation of information access and data verification.
- Lifecycle of nuclear facilities: Use for non-destructive testing, document analysis, and supply chain management.
- New reactor designs: Optimization of performance, safety, and efficiency.

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Parallel Session II.2: Artificial intelligence and digital technologies for safe and sustainable nuclear activities (10:30 – 12:30)

Topic 3: Benefits of Digital Twins

- Process simulation: Use for training and maintenance.
- Behavioral analysis and predictive maintenance: Application in both old and new facilities.
- System validation and planning: Use in decommissioning projects and training.

Topic 4: Combining AI with Other Technologies

- Autonomous robots: Integration of AI for image recognition and conversational interfaces.
- XR/VR simulations: Enhancement of immersive training.
- Advanced language models: Assistance in human-system integration.

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Parallel Session II.2: Artificial intelligence and digital technologies for safe and sustainable nuclear activities (10:30 – 12:30)

Topic 5: Future Possibilities and Recommendations

- Data sharing and integration: Importance of open standards and flexible digital architectures.
- Regulatory innovation: Adaptation of frameworks to new technologies.
- Human factors: Maintaining human oversight and avoiding opaque systems.
- Qualification and verification: Robust mechanisms for AI and robotics implementation.

The inclusion of AI in the nuclear sector opens significant prospects, particularly for reactor safety and operational optimization. Recommendations include improving data sharing, adopting a human-centric approach, and regulatory innovation to support new technologies.

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SNETP Forum

Day 3, 14.05.2025

Parallel Session II.3: Solutions to non-electric energy demand including hybrid energy systems (10:30 – 12:30)

Panelists:

- **Józef Sobolewski,** Director for HTR Development, NCBJ, PL
- **Michele Frignani,** Nuclear Technology and Safety, Ansaldo, IT
- **Nicola Rega,** Executive Director, Climate Change and Energy, CEFIC, BE
- **Slavica Ivanovic,** SMR Innovation Project Lead, Tractebel, ME
- **Paul Nevitt,** VP Science and Technology at NNL, UK
- **Stéphane Sarrade,** Direction des Programmes Énergies, CEA, FR

Moderators:

- **Michael Fuetterer,** EC JRC
- **Alexis Amachree,** Women in Nuclear YG

Rapporteur:

Stéphanie Cornet, CEA, FR

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SNETP Forum

Day 3, 14.05.2025

Parallel Session II.3: Solutions to non-electric energy demand including hybrid energy systems (10:30 – 12:30)

Today:

- Non-electric energy demand accounts for nearly two-third of Europe's final energy use: industrial heat, residential and district heating, and transport fuels
- Global need to decarbonize energy : SMR and AMR can be part of the solution
- Euratom is supporting R&D in hybrid energy systems: numerous ongoing projects e.g TANDEM, GEMINI 4,0, EASI-SMR, etc.
- Some industries such as chemical industries, data centers are large energy consumers: SMRs are considered for onsite energy generation.

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Parallel Session II.3: Solutions to non-electric energy demand including hybrid energy systems (10:30 – 12:30)

- Although different technologies are being considered, we are all looking in the same direction in order to achieve net zero goals
- Common questions: when will SMR/AMR be deployed, how much will it cost, what energy market ?
- Investments and support from policy makers are needed
- There are still a lot of challenges to overcome.

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Parallel Session II.3: Solutions to non-electric energy demand including hybrid energy systems (10:30 – 12:30)

Summary

- **Target market for 1st deployment**: district heating as it is already deplyed in some countries Sweden, China, etc.)
- Urgency for a first of a kind
- **Financing:**
  - Mix of public and private funding needed
  - Where is the balance of risks
  - Governments play a key role
  - Need to pool resources together in the EU.

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Parallel Session II.3: Solutions to non-electric energy demand including hybrid energy systems (10:30 – 12:30)

Summary

Human resources and capacity building

- There is a clear need to attract talents in the nuclear sector
- Need to find a new path to allow career changes: from non nuclear to nuclear expertise
- The issue is that it is difficult to guarantee jobs in the sector for the next 20 years
- European countries should join forces to succeed.

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SNETP Forum

Day 3, 14.05.2025

Session II Summary

- Today there are new opportunities for using nuclear energy
- Different customers/needs for the RDI need to be understood
- New technologies and solutions are needed; SMR, AI, Fuels, non-electricity solutions, waste management and disposal...
- Accelerating fuel and materials research means creating a new paradigm to overcome the bottlenecks
- There is not a single path for progress, choosing the most potential ones is also a policy matter (EU and national level)
- Both short term and long term solutions are needed
- Human resources and competencies are needed for all stakeholders.

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SNETP Forum

Day 3, 14.05.2025

Plenary Session III: Empowering future generations and engaging with civil socjety (13:30 – 15:00)

Panelists:

- **Nadja Zeleznik,** Senior Researcher, EIMV, SI
- **Francisco Javier Elorza Tenreiro,** President, ENEN
- **Stefano Monti,** President of ENS, ENS
- **Philippe Charry,** Member TEN, EESC, FR
- **Teodora Retegan Vollmer,** Head Nuclear Chemistry and Industrial Materials Recycling, Chalmers, RO
- **Jana Kalivodova,** Senior Scientist, CVR, CZ

Moderators:

- **Seif Ben Hadj Hassine,** EC DG RTD
- **Lidija Gajinovic,** ENS-YGN

Rapporteur:

Mariusz Dąbrowski, NCBJ, PL

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SNETP Forum

Day 3, 14.05.2025

Communicating the public about nuclear secures positive attitude to take nuclear jobs by young generation

- need to secure public trust and social agreement by transparent and inclusive involvement of different actors - local communities in particular, professionals in nuclear sector should be strongly involved (they are best trusted), important role of NGOs
- need to diversify methods of communication - each case is different and should be treated individually

Action proposals

- while communicating put stress on positive aspects of nuclear (e.g. nuclear medicine and therapy, energy security and climate protection, space applications (RTG)),
- while talking about negative cases in nuclear industry stress that they happen in any other technology development activity and, in fact, no technological activity has zero risk - one can only minimise its chance, but one has to accept it; try to handle psychological aspects ("fear of nuclear") appropriately; put stress onto the voluntary and involuntary risk and peoples' attitude about it in relation to different life activity

Making nuclear attractive to best young talents, securing their brilliant future

- need to make nuclear workers some ambassadors of the nuclear sector, secure their involvement in public debate (cf. above)
- need to identify the young generation motivations to take this job
- need to make it future perspective like in Asia

Action proposals

- isolate different young generations motivations: work on innovation, new thinking, responsible job, income aspirations, flexible working hours, nice community etc.
- secure active involvement of nuclear companies to provide appropriate knowledge about the nature of work in nuclear
- Make more NPP deployment (last 25 years only 6 units in EU)!!! - growing nuclear facilities will surely put some positive imagination for young generation (planing 10-20 year perspective for nuclear plants to be constructed may not be convincing vs. very fast growing IT sector or genetics, for example)

Making nuclear skills and knowledge transmitted to younger generations

- need to keep nuclear expertise alive due to the age gap in the market (no big nuclear investments since more than 20 year
- need to replace retired generation of nuclear professionals

Action proposals

- develop "on-the-job" training (trainee-apprentice relation) due to the involvement of industrial entities
- develop direct interaction of this type also on the level of academia and research institutes
- make the training even in advance, despite the nuclear facility is yet under construction or future (not too far future plan), secure some "bridge" financing based on some non-nuclear or pre-nuclear tasks (construction of smaller reactors may be quicker)

Benefitting from European networking in nuclear education

- need to keep some common standard of nuclear training and jobs (e.g. in the context of standardising projects submitted to European SMR Industrial Alliance)
- need to strengthen European skills against other regions

Action proposals

- "Pact for skills in nuclear" to realize at European level
- Securing the budget! (undergraduate and postgraduate level), ensuring fair access to funding through EU-wide education and training programmes

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SNETP Forum

Day 3, 14.05.2025

Parallel Session III.1: Addressing social, ethical, and cultural factors towards Sustainable Development Goals (15:30 – 17:30)

Panelists:

- **Florian Rauser,** Vice-President, Federal Office For Radiation Protection, BFS, DE
- **Alena Mastantuono,** Vice-President of TEN, EESC, CZ
- **Tanja Perko,** Researcher, SCK CEN, BE
- **Emilia Janisz,** Consultant Clean Air Task Force, PL
- **Myrto Tripathi,** President, Voices of Nuclear, FR
- **Marco Ricotti,** Professor, Dipartimento di Energia, Politecnico Milano, IT

Moderators:

- **Jessica Johnson,** Communications & Advocacy Director, nucleareurope UK/BE
- **Hugo Bernat,** Belgian YGN, BNS-YGN

Rapporteur:

Alexis Geisler-Roblin, NTW, FR

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SNETP Forum

Day 3, Parallel Session III.1

Sustainable Development Goals (SDGs)

- SDGs are not only a label: important effort for transitioning is occurring in many fields and place, notably for phasing out of coal
- SDGs are socio-technical topic, many human dimensions to be taken into account
- Sustainability is based on three pillars of social, economic and environmental, and it always need to take into account security questions, affordability and concenrtation possibilities. Conflict between different SDGs can exist.
- Now is the only way to treat the climate long term, because of climate tipping points, as a gram of CO2 avoided today is more important that a gram of CO2 avoided tomorrow.

Recommendations:

- Allow more social and human sciences to study those dimensions
- When addressing SDGs, making sure that all actors have the capacity to participate, no one left aside, all stakeholders included

Circular economy

- The first objective is to minimize the waste and maximize efficiency. Yet circularity can be more expensive sometimes.
- Possible contribution of nuclear to build world of circular economy, through GenIV projects
- Past incidents may remind that even if all aspects are not perfect, nuclear energy can still be a good balance with advantages
- Harpers EURATOM project identified all dimensions of circular economy in nuclear, under social, legal and environmental aspects

Recommendations:

- Contribute to the coal phasing-out projects, notably the Polish one, while anticipating the repurposing of existing jobs

Mining

- All human activities have mining consequences. Nuclear require little mining, because uranium is dense. ISL technique reduces impacts.

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SNETP Forum

Day 3, Parallel Session III.1

Medical uses

- 40 to 50% of cancer treatment go through radiotherapy.
- Millions of EU citizens are treated with radiation each year
- Yet comparing medical radiation with reactors radiation can be inappropriate, as two different objects and contexts

Recommendation:

- Build a shared framework based on radioprotection pillars (justification, optimization, limitation) for addressing different radiation types

Climate justice

- The areas most affected by climate change are the least responsible of climate change, so countries more responsible should be more involved in offering solutions
- Climate justice is future justice, as teaching children of today is adaptation and thinking about children of tomorrow is mitigation.
- Climate activism and SDGs can be seen as risk management strategy

Recommendation:

- Propose a unified methodology of risk management strategy based on SDGs over the different EU institutions

Societal issues

- Result of the poll: central societal issue identified is misinformation and disinformation, coupled with societal polarisation!
- Misinformation, disinformation can be considered as manipulation via communication of partial truths seeming believable.
- In terms of security in a conflict, a NPP cannot be stolen and may continue to produce local stability, but it can also be weaponised.

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Day 3, 14.05.2025

Parallel Session III.2: Cooperation to attract and retain skills and competencies and preserve knowledge and expertise (15:30 – 17:30)

Panelists:

- **Michèle Coeck,** Director, Nuclear S&T Academy, SCK CEN, BE
- **Brian Eriksen,** Team Leader EHRO-N, Euratom Coordination, EC JRC, NL
- **Gabriel Pavel,** Executive Director, ENEN, RO
- **Nawal Prinja,** Technology Director, Amentum, UK
- **Jochen Ahlswede,** Head of Research/International Department, BASE, DE
- **Thibaud Reysset,** Project Director, I2EN, FR

Moderators:

- **Alexandru Tatomir,** BGE, DE
- **Iñigo Gayo de Leon,** Jovenes Nucleares YG, ES

Rapporteur:

Laurent Billet, EDF, FR

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New Skill Needs in the Nuclear Sector

- Development of new generations of reactors (GEN III+, SMR (light-water), AMR (Gen IV))
- Increasing importance of digital technology, ICT, AI
- Need for specific skills in waste storage and disposal (technical and communication)

Recommendation

- Identify upcoming workforce and skill needs at sectorial, national and European level through harmonized improved and multimodal data collection

Bridge the gaps between supply and demand for academic and professional training

- Qualitative gaps (adapt and upgrade existing education and training programs to integrate new competences)
- Quantitative gaps (growth in the nuclear sector workforce to be estimated having in mind various nuclear development scenarios in different countries with new designs and unknown workforce needs, generational gap due to a pause in nuclear programs from 2000 to 2020 and upcoming retirements in 5 to 10 years)

Recommendations

- Intensify international cooperation in nuclear education and professional training (European dimension programs to foster mobility of workers, harmonization of training and diplomas)
- Support for creation and strengthening of national/regional platforms for education and professional training (cf. French model)
- Intensify cooperation between industry, universities, and research institutions
- Develop a European approach in workforce planning and enhance information sharing on national gap analyses

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Attractiveness of Nuclear Sector to Younger Generations

- Civil society has a diminished image of the benefits of nuclear in terms of:
  - Benefits for society (fight against global warming, sustainable safe and clean energy, medical applications)
  - Quality of jobs and career paths

Proposals

- ✓ Promote nuclear at all levels from early level of education (already at the age 15-16!) to general population to help young learners envision a future in this sector
- ✓ Promote the advantages and qualities of working in the nuclear sector (recognition, collegial environments, career progression, flexible work possibilities)
- ✓ Increase the share of social sciences and humanities in the basic nuclear education curriculum

Use of AI in Knowledge Management

- Nuclear projects span over a century, making it difficult to maintain knowledge and expertise over this period
- Search tools are integral to effective knowledge management and preservation and new AI tools are available

Proposal

- ✓ Establish industry best practices for deploying AI tools in the nuclear sector (knowledge transfer, staff training, quality control through lessons learned, code compliance assurance)

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Parallel Session III.3: Success stories in Research, Development and Innovation (R&D&I) in the EU (15:30 - 17:30)

Panelists:

- **Mariano Tarantino,** Head of Nuclear Energy Systems Division, ENEA, IT
- **Petri Kinnunen,** Research and Quality Manager, VTT, FI
- **Héloïse Goutte,** Directrice scientifique énergies, Euratom STC, CEA, FR
- **Alfons Weisenburger,** Group leader, KIT, DE
- **Marta Serrano,** Head of the Materials for Energy Department, CIEMAT, ES
- **Maria Śmietanka,** National Contact Point Department at the National Centre for Research and Development, PL

Moderators:

- **Abderrahim Al Mazouzi,** SNETP, FR
- **Olli Soppela,** VTT, FI

Rapporteur:

Ferry Roelofs, NRG, NL

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Key Take Away Recommendations:

- Collaboration is imperative to accelerate R&D&I
- Collaborative EU projects are playing a key role (e.g. in advanced R&D&I reactor progress), but management of and collaboration in such projects brings complexities. Facilitation by the EU of the collaborative framework projects could speed up the RD&I processes
  - Concerted Action tool is very effective to sort out (legal) issues when initiating collaboration in large partnerships.
  - More time should be allowed between publication of the call and the deadline for submission
  - It would help if the EU assists in management of the background, foreground, IP rights, and export control. Develop a common European approach/office to deal with this.
  - The administrative burden of current EU projects is too high. Lowering this would help.
- Combine analytical, numerical (incl. AI, digital twins) and experimental activities.
- Successful research requires large nuclear infrastructure, e.g. thermal irradiation facilities (thermal and fast) and fuel cycle demonstration facilities (manufacturing, reprocessing, spent fuel management).
- The budgets allocated to RD&I of nuclear fission safety should increase if Europe wishes to keep up with developments in Asia and the US

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Key Take Away Recommendations:

- Recommendations from the panel in setting up and managing EU projects:
  - Cross research activities (incl. fusion-fission) are drivers for innovation acceleration
  - It may take several decades from first idea to final product. Continuation in funding is required.
  - Collaboration requires to combine different views and languages. To this respect, the journey of a project is as important as the destination (result).
  - Successful proposals make very clear who is interested in the results of a project and what is the common goal (impact).
  - People (Leaders!) are key. However, a good researcher is not necessarily a good project manager and does not have legal etc. expertise, but he/she should know at least a bit about the other fields.
  - Consultancy companies acting as project office are sometimes needed, but ensure that a proposal still has sufficient content. Projects written by them often look “fancy”, but are “empty”.
  - Attract young people to the project. Ask for their ideas. Let them make mistakes. Support their natural motivation to novelty. Introduce them in the community, conferences, and collaborations.
  - Transnational access to experimental infrastructure is important.
  - Experimental and modelling uncertainties both need to be addressed.
  - Big nuclear infrastructure (research reactors/demos) are hard to achieve financially on the EU level. Smaller projects are the continuous source of support.

Thank you!

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Day 4, 15.05.2025

Plenary Session IV: Research and innovation supporting safety, security and safeguards (9:00 – 10:30)

Panelists:

- **Valéry Detilleux**, Section Head, Bel-V, BE
- **Ulla Engelmann**, Director Nuclear Safety and Security, EC JRC
- **Javier Dies Llovera**, Commissioner Nuclear Safety Council, CSN, ES
- **Fulvio Mascari**, Researcher, ENEA, IT
- **Akos Horvath**, Director-General Centre for Energy Research, HUN-REN, HU
- **Jean-Christophe Gariel**, Directeur général adjoint, chargé du Pôle Santé et Environnement, ASNR, FR

Moderators:

- **Leon Cizelj,** Jožef Stefan Institute, SI
- **Alessio Iuvara,** Italian YGN, INYG

Rapporteur:

Daniela Diaconu, RATEN ICN, RO

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Day 4, 15.05.2025

Role of EURATOM R&D Programme in research and Innovation for safety, security and safeguards

- JRC R&D programme and R&D infrastructure - and main topics addressing the main SMR aspects - advanced fuel (ATF), materials, safety, approach of 3S by design form the very beginning
- European Co-funding programmes - EURAD, PIANOFORTE
  - Mobilizing specialists, networking different actors (with independent missions and different backgrounds, including regulators and TSOs)
  - Facilitate efficient knowldege management
  - strentening collaboration among scientists, and amomg generations
  - addressing issues according with a long term strategic agenda oriented towards clear objectives and approaching current challenges
- R&D important
  - supporting the licensing, safe deployment and optimization of new facilities answering to our challenges (eg new radioactive waste management facilities, and reactors).
  - not only for the 3S, but also for Sustainability, associated Social aspects and Sccience
  - to keep the European nuclear Industry competitive.

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Day 4, 15.05.2025

Work force and knowledge transfer in nuclear and the importance for safety

- Need for highly educated work force and for more skills
- current and future nuclear projects need for specific skills and an important number of educated human resource
- appropriate nuclear engineering education programmes
- close collaboartion between universities and nuclear organisations,
- nuclear employment platofm - connecting the the offer and job request
- attractivity - financial support to stdents in post university programmes at EU level

Questions

- How to ensure the resources necessary for the existing and future projects?
  - Collaboration at EU level, MOBILITY,
  - Methods to preserve and transfer the unwritten knowlegde at JRC

- How to keep the pace with Asia and US?
  - Industrial Alliance on SMR
  - Strategic Reserach Agendas
  - More advanced research agenda in Radiation Protection

- Is R&D on existing fleet important to be part of the EURATOM R&D programme?
  - Need for R&D in view of life time extention (up to 80 years)
  - Expertise of TSO
- How PIANOFORTE supports KM?
  - Existing strategy and dedicated funds

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SNETP Forum

Day 4, 15.05.2025

Parallel Session IV.1: Pioneering investment and financial models towards innovation and demonstration (11:00 – 13:00)

Panelists:

- **Michel Berthelemy,** Senior Strategic Policy Advisor, OECD/NEA
- **Kornelia Kwapisz,** WiN Polska/OSGE, PL
- **Ximena Vasquez-Maignan,** White Case, ES
- **Wojciech Wrochna,** Secretary of State, Plenipotentiary for Strategic Energy Infrastructure, Ministry of Industry, PL
- **Andrei Goicea,** Policy Director, nucleareurope, BE

Moderators:

- **Michal Tratkowski,** EC DG RTD
- **Ana Gonzalez Felgueroso,** ENS-YGN

Rapporteur:

Jadwiga Najder, European Nuclear Society, PL

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Day 4, 15.05.2025

Parallel Session IV.1: Pioneering investment and financial models towards innovation and demonstration (11:00 – 13:00)

- Public funding a critical tool supporting nuclear projects, especially FOAK builds and in newcomer countries.
- Private investment depends on early success–demonstrated delivery of nuclear projects on time and budget is critical to attract private capital.
- Many current funding instruments exclude nuclear from eligibility, which is in progress of development with policy-makers' effort. Schemes like Horizon Europe, opportunities brought by Net Zero Industrial Act, European Innovation Council, or recently IPCEI bring funds for certain activities.
- Non-monetary benefits like energy security and carbon reduction must be factored into financing models to reflect nuclear's full system value.
- Stakeholder engagement builds project credibility, reducing perceived risk and improving access to favorable financing.

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SNETP Forum

Day 4, 15.05.2025

Parallel Session IV.2: "Innovation beyond technology and high-tech cross-sectoral applications" (11.00-13.00)

Panelists:

- **Arne Larsson**, Radioactive Waste Technology and Decommissioning Services, Cyclife Sweden (EDF Group), SE
- **Hamid Ait Abderrahim**, General Manager, MYRRHA, BE
- **Christoph Hoeschen**, Chair Medical Systems Technology, Chair MEENAS, DE
- **Tobi Menzies**, Secretary, NEMO, UK
- **Michael Huebel**, Director-General, Euratom Supply Agency, ESA, LU
- **Jamila Mansouri**, Head of Propulsion, Aerothermodynamics and Flight Vehicles Engineering Division, ESA, FR

Moderators:

- **Christophe Schneidesch**, Tractebel, BE
- **Krislin Sartakov**, ENS-YGN**,** EE

Rapporteur:

Federica Pancotti, SOGIN, IT

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Day 4, Parallel Session IV.2

Interdisciplinary collaborations and breakthroughs anticipated in the coming decades

- areas where different fields of study and industries intersect, leading to innovative advancements and transformative developments.

Key messages / recommendations:

- Circularity/net zero/sustainability are key objectives for all
- Engagement with society and clear regulations as pre-requisite for innovation.
- Interdisciplinary will push innovation. Sharing results and best practices among different sectors.
- Same issue in different sectors with innovative technologies (i.e. issue on data for AI) to be solved strengthening collaboration

Modularity and sustainability in new nuclear applications

- how recent advancements in nuclear technologies are influencing the future development of floating nuclear power plants and space propulsion systems, including countries that are at the forefront of these technological advancements

Key messages / recommendations:

- Russia and US leading the way, EU to push to be competitive
- Modularity, flexibility during operation, compatibility and even automated assembly (for space), micro power reactors
- Fast decommissioning or multiple purposes power reactor

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Day 4, Parallel Session IV.2

Nuclear waste and materials management in energy and medical field

- valuable lessons learned from nuclear waste and material management that could inform and enhance sustainability efforts across various sectors and cross-sectoral innovations in medical nuclear technologies that have the potential to significantly improve public health and wellbeing.

Key messages / recommendations:

- Focus on design phase to be more circular in the future, clear responsibilities, implement mechanism to avoid future generation of waste
- Different regulations translate in different practices preventing circularity and even innovation (medical radioisotopes management)

Supply of nuclear materials and services across different sectors

- key recommendations for ensuring the security of supply for nuclear materials and services and potential for applying these approaches to other sectors

Key messages / recommendations::

- A sort of bank at EU level for specific isotopes (small quantities needed) / Secure materials for research in space applications
- Guarantee capability of enriching U / Reprocessing to get valuable materials
- Holistic view on the use of materials in different sectors
- Diversification of supply sources, long-term contracts, risk-assessment, supply needs

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Day 4, 15.05.2025

Parallel Session IV.3: European research infrastructures, Open-access and International Cooperation

Panelists:

- **Tatiana Ivanova,** Head of Division of Nuclear Science and Education, OECD/NEA
- **Nikitas Diomidis,** NAGRA, CH
- **Liz Ainsbury,** Professor, Head of Radiation Effects Department and Head of Radiation Dosimetry Department, UKHSA, UK
- **Sander De Groot,** Founder and Technical lead, THORIZON, NL
- **Alice Seibert,** Principal Administrator, Nuclear Safety & Security, EC JRC, DE
- **Roman Romanowski**, Vice President, New Plant Development, Westinghouse

Moderators:

- **Roger Garbil,** EC DG RTD
- **Anna Talarowska,** ENS-YGN

Rapporteur:

Petri Kinnunen, VTT, FI

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Scope:

- Supporting access to key pan-European research infrastructures and promoting international cooperation are critical for advancing nuclear research and development. By fostering strategic partnerships, promoting mobility and exchange, and supporting joint infrastructure initiatives, the nuclear sector can enhance its research capabilities, drive and accelerate innovation for the EU market.

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Setting the Scene – Vision and Strategy:

- The most impactful infrastructures mentioned to be underground facilities for NW issues. The number of these kind of facilities is still surprisingly small by taking into account how much there is waste to be disposed. The main benefit of these facilities is that they provide realistic conditions.
- The key challenges in ensuring the success of these projects was mentioned to be is ensuring the resources and availability of knowledge. The projects last long and it sets its requirements. Also local acceptance is very important. The priorities for the work in these kind of facilities tend to change during decades.

- For OECD NEA the most critical today in building cross-border nuclear research capacities is to get joint projects that combine the resources in the best way and maximise the usage of the results.
- JRC's processes in ensuring equitable and impactful access to European research facilities is done by contributing to the transnational projects and collaborating with e.g., RTD as well as granting mobility grants. Their own OASIS allows access to three sites. Having a fair access is solved by arranging calls and proper evaluation of the proposals.

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Innovation & Infrastructure Access:

- Open access to radiation effects infrastructure to improve collaborative outcomes in health and safety related nuclear research increases visibility and speeds up the findings.
- All projects are going to be shared openly so dissemination is effective. Also there is a database for infrastructure that help in understanding the specific infrastructure features
- Some of the main barriers for SMEs and small companies to access major European research infrastructures are e.g., long and complicated testing sequencies and the lack of vast spectrum available. Also the supportive countries need to be found for economical feasibility. The schedule for all this is extremely slow and and small companies need to act fast.

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Funding, Coordination, and Impact:

- Cooperation across borders improve efficiency in long-term waste R&D as as many programmes have common goals; it is easy to share expertise and knowledge. But the most important part are the differences (societal aspects, boundaries) which leads each player to create its own capabilities. This takes too much capacity. This should be changed.

- The main added value of the European collaboration is that the larger community will benefit of the invested funding. Shared cost shared results.

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Knowledge Transfer and Future Outlook:

- Role of multilateral platforms (e.g., IAEA/ICERR, OECD-NEA/FIDES and NEST, EC/ESFRI) in facilitating hands-on training and knowledge sharing is essential and can be real game changers for young scientist when selecting the career path. Feedback on hands-on experiences have been positive
- The major challenges related to International Cooperation to access unique European infrastructures (eg. Astrophysics, Environment, Health), large data repositories and/or their use by private companies were recognized to especially the IPR issues . They require lots of work.
- Finally the biggest missed opportunities (if open-access and cooperation models are not fully implemented into powerful instruments fostering real science diplomacy instruments to tackle today's societal challenges) would be the loss of huge amount of valuable data that has been collected and is available. Databases require active use and they are offered for use quite easily. E.g. OECD databases are at member states disposal rather flexibly.