International Symposium

on

Artificial Intelligence and Nuclear Energy

Programme Summary

Key Themes and Topics

- **Powering Data Centers with Nuclear Energy**: Explore the potential of nuclear power to meet the energy demands of AI technologies and data centers, including in a hybrid energy context.
- **Opportunities and Challenges for AI in the Nuclear Sector**: Delve into the transformative potential of AI in enhancing operational efficiency, optimizing power generation, and advancing next-generation reactors.
- **Regulatory Frameworks, Safety and Security Protocols**: Discuss the regulatory considerations, safety and cyber-security measures, and the importance of early regulatory engagement for integrating AI and nuclear technologies.
- **Current State of Play**: Highlight the adoption of AI solutions in the nuclear sector, recent commitments to restart NPPs by the AI industrial community, and investments by AI companies in nuclear startups.

Expected Outcomes

- Promote efficient and effective clean energy solutions through the synergistic use of AI and nuclear power, including in a hybrid energy mix.
- Foster new partnerships and collaborative projects that drive safe and secure innovation and sustainability in the energy sector.
- Compile observations and recommendations as a basis for a framework of cooperation between the AI and nuclear sectors under the auspices of the IAEA.

Programme

Opening Session

- **Welcome Address**: Set the stage with an environmental scan and outline event objectives.

- **Strategic Overviews**: Keynote addresses, integrating strategic overviews relevant to the topical issues of each panel. Presentations to include policy topics as appropriate.

Panel-1: Nuclear Power for Data Centers

- **Current Situation**: Discuss recent commitments to power purchase agreements, investments in NPP restart projects, and nuclear reactor technology startups.
- **Future Projects**: Highlight new nuclear projects aligned to supply energy to data centers and long-term energy supply potential in the context of national and international obligations pertaining to safety, security, safeguards, liability, transport, insurance, etc.
- **Q&A**

This panel will comprise executives responsible for data center energy related strategies and nuclear industrial sector executives from companies whose business strategies are to serve these needs (i.e. utilities, vendors of existing technologies, SMRs or other advanced nuclear designs). The discussion will begin with recent commitments to power purchase agreements, investments in NPP restart projectsrestarts and investments in nuclear reactor technology startups. The discussion will continue by considering announced new nuclear projects specifically aligned to supply firm and cost-effective energy to data centers. The panel will examine the potential longer-term energy demand and supply links between the two industrial sectors. Discussions will highlight national and international harmonization

efforts pertaining to safety, security, safeguards, liability, transport and insurance. The session will conclude by each panel member being invited to share one or two concise observations and recommendations based on those observations.

Panel-2: AI in the Nuclear Sector – Today, Tomorrow, and Beyond

- **Current Situation**: Share experiences of AI solutions already deployed in the nuclear sector, strategic decisions, challenges, benefits and lessons learned.
- **Future Outlook**: Discuss near-term solutions (next 5 years) and long-term visions for AI in nuclear.
- **Q&A**

This panel will comprise nuclear sector and AI executives who will begin by sharing experiences of AI solutions already deployed in the nuclear sector, touching on the strategic decisions, challenges, benefits, applied cyber security measures, and lessons learned. The discussion will then move on to near-term solutions expected to be deployed in the next five years and conclude with a longer-term vision for AI in nuclear, again at a strategic level. The session will conclude with each panel member sharing one or two concise observations and recommendations based on those observations.

Panel-3: Nuclear Capacity Deployment Consistent with Safety, Security and Safeguards Objectives

- **Current Situation**: Summary of the status of international activities to rapidly deploy new nuclear capacity.
- **Future uses of AI for Nuclear Power Capacity Deployment**: Discuss recent experiences and future outlooks for responsible, AI driven activity, process and programme acceleration in the nuclear sector.
- **Q&A**

This panel will be made up of nuclear sector and AI sector executives. The discussion will begin by reviewing and highlighting non-nuclear sector experiences, move on to recent experiences linked to nuclear sector applications of AI, and conclude with a look into the future. The session will consider responsible AI-driven activities, process, and project acceleration in the nuclear sector; specifically, the components of capacity deployment separate from the construction project itself. The session will conclude with each panel member sharing one or two concise observations and recommendations based on those observations.

Panel-4: NPP Project Management Optimization: Recent Achievements and Future AI Advancements

- **Current Situation**: Discuss ongoing improvements in construction and life extension project management and how AI applications are transforming project implementation.
- **Future Uses of AI for Construction**: Strategic considerations of how AI use might improve project implementation.
- **Q&A**

This panel comprises executives from companies constructing or recently constructed NPPs, including SMRs as well as executives from AI organizations working to deliver engineering project improvements. The discussion will begin with summaries of improvements in NPP capital engineering project implementation. It will continue with the consideration of current AI use cases in NPP project implementation and move onto solutions foreseen in future projects, including the deployment of advanced NPPs and SMRs. The panel will discuss strategic considerations of how AI use might improve project implementation as well as national and international obligations pertaining to nuclear safety, nuclear security, safeguards, liability, transport, insurance, etc. The session will conclude with each panel member sharing one or two concise observations and recommendations based on those observations.

Panel-5: Nuclear Supply Chains: Current Approach and Expanded use of AI

- **Current Situation**: Summarize the status of the global supply chain, including ongoing efforts to improve reliability, resiliency and security, including minimizing the risks on digital components of supply chains. Share AI based solutions currently used in nuclear supply chains and their impact.
- **Expanded Use of AI to further improve the nuclear sector supply chain**: Strategic considerations of how expanded AI use could improve the nuclear supply chain.
- **Q&A**

This panel comprises executives from organizations in the supply chain, including for new plants, advanced reactor and SMRs as well as executives from AI organizations addressing supply chain improvement. Discussions will consider the current status of the nuclear supply chain, recent major efforts to deliver improvements and how AI solutions could further improve and ensure supply chain reliability, resilience and security. This could involve significant reduction of counterfeit, fraudulent, and suspect items (CFSI) risks, optimized logistics, streamlined quality assurance, and augmented business processes. As above and as a Symposium-wide, cross-cutting theme, panelists will consider national and international obligations pertaining to safety, security, safeguards, liability, transport, insurance, etc. The session will conclude with each panel member sharing one or two concise observations and recommendations based on those observations.

Closing Session

- **Summary**: Summarize key points from each panel, including the observations and recommendations and highlighting audience questions and comments.
- **Closing Remarks**.