# NEA ADVANCED TECHNOLOGY AND NUCLEAR COSTS INITIATIVE

## *NEA Workshop on Digital Transformation: Opportunities and Challenges for the Nuclear Sector*

**27-28 May 2021, 14h00 – 17h30 CEST**

**Virtual event via Zoom**

**To register, please click here**

### Background

Under the oversight of the Nuclear Development Committee (NDC), the Nuclear Energy Agency (NEA) continues to work on collecting the latest technical evidence and industrial experience to support construction costs and risk reductions of new nuclear builds. Accordingly, the NEA published in July 2020 *"Unlocking Reductions in the Construction Costs of Nuclear: A Practical Guide for Stakeholders"* (REDCOST) in an attempt to develop strategies and governing guidelines on how to unlock meaningful cost reductions in the deployment of large Gen-III reactors over the next decade and beyond in OECD countries.

Building on past and recent construction experience, this study identifies eight technological, organisational, regulatory and policy levers to incrementally drive positive learning in new nuclear builds. In particular, three main technology approaches could be rapidly implemented to deliver cost reductions in the short-term:

- Digital transformation;
- Advanced construction methods;
- Seismic analysis;

The NEA is launching the Advanced Technology and Nuclear Cost initiative with the objective to provide decision makers with a clear understanding of the development stage of these technology approaches, their cost reduction potentials and the challenges that may preclude their large-scale deployment. The workshop is the first in a series of three designed to collect recent case studies and practitioners' experience, including future developments in digitalized nuclear systems, while integrating the point of view of regulators. The main findings and recommendations will be published in a final report.

### Contact


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# *NEA Workshop on Digital Transformation: Opportunities and Challenges for the Nuclear Sector*

## Final Agenda

**Day 1 – (14h-17h30)**

### Opening remarks (30')

The digital transformation is currently disrupting the way many businesses and organisations around the world design their products and deliver value. The nuclear industry, that once pioneered the development of advanced simulation and digital technologies, has been lagging behind in embracing the benefits of the digital revolution. The current transformation is an opportunity for the nuclear industry to learn from other regulated sectors (e.g. aircraft industry) to revisit its processes and improve the overall economic performance while ensuring the highest levels of safety.

This workshop aims at assessing in detail to what extent the nuclear industry can harness the full benefits of digitalisation to improve its economic and industrial performance whilst considering three main aspects.

First, the benefits of the digital transformation are not limited to the construction phase. Consequently, the present workshop will explore the opportunities and challenges associated with the digital transformation throughout the whole lifecycle of a nuclear power plant: design, construction, operation and dismantling.

Second, recent experience suggests that the nuclear industry has already embarked on the deployment of digital solutions. This means that mature tools are already available in other industries that could be rapidly implemented without major difficulties. The present workshop will therefore have a strong focus on mature solutions and incremental innovations which are consistent with the near-term learning pace of nuclear power while providing some indications on what future digitalized nuclear systems will look like.

Third, the nuclear sector has unique characteristics in terms of control and oversight of their activities that may require particular attention when deploying digital technologies. At the same time, it is essential to meet regulator's expectations for the digital transformation to succeed. This workshop will assess the specificities of nuclear organisations while integrating the view from regulators in order to identify best practices and potential challenges.

Speakers:

- **William Magwood, IV**, Director-General, OECD Nuclear Energy Agency
- **Fiona Rayment**, Chief Science and Technology Officer at the United Kingdom National Nuclear Laboratory, NNL

## Session 1: Recent progress in the adoption of digital technologies in the lifecycle of nuclear power plants (1h30)

This session will give an overview of the recent progress in the deployment of digital solutions in the nuclear industry at different stages of the lifecycle of nuclear power plants. Different case studies will be analysed in order to estimate cost reduction opportunities and illustrate potential performance improvements in the near-term.

Key questions:

- What are the most mature digital solutions that could be deployed across the lifecycle of nuclear power plants?
- What are the main cost reduction opportunities and performance improvements associated with the digital transformation of the nuclear industry? Can they be quantified?

Speakers:

- **Robert Austin**, Senior Program Manager, Electric Power Research Institute (EPRI)
- **Véronique Remande**, Digital Project Manager, and **Silvano Erlicher**, Technical & Scientific Director, EGIS
- **Cherif Desouky**, Simulator and Digital Technology Manager, and **Stephane Peter Blanchard**, Senior Digital Technology Specialist, Nawah Energy Company
- **Thomas Hassel**, Head of Underwater Technology Centre, Institute of Materials Science, Leibniz University Hanover
- **Alice Caponiti,** Deputy Assistant Secretary for Reactor Fleet and Advanced Reactor Deployment, Office of Nuclear Energy, United States Department of Energy

## Session 2: Changing nuclear organisations and supply chains with the digital transformation (1h30)

This session will address the main organisational and governance aspects related to the digital transformation of the nuclear sector. As with any major transformation endeavour, the digital transformation has a human component (e.g. skills, resistance to change) that has to be properly managed in order to secure the expected benefits. In parallel, working as an extended enterprise could pose unique challenges, especially if digital maturity levels are low for some suppliers. In this sense, the specificities of the nuclear sector have to be considered in this process to identify the most appropriate digital solutions and adequately estimate the extent of the necessary investments and adaptations.

Key questions:

- What are the main organisational aspects that need to be taken into account to maximise the benefits of the digitalisation in the nuclear sector? Are these aspects being considered in current digital strategies?
- Is the nuclear industry ready to adopt new digital solutions? What are the new key skills, processes and infrastructures that need to be developed?
- What are the main challenges to be considered when undertaking a digital transformation across the whole value chain? How long could this take for the nuclear industry?

Speakers:

- **Vincent Champain**, Senior Executive Vice President, Information Technology, Digital Performance and New Business, Framatome
- **Jennifer Edey**, Vice President Site Services, Bruce Power
- **Olga Tolstunova,** Chief Technology Officer, Vice-president, JSC AtomStroyExport, Rosatom State Corporation Engineering Division
- **Zainab Alquwaitaei,** Information and Communication Technology Director, Emirates Nuclear Energy Corporation (ENEC)
- **Valérie Faudon,** Executive Director, the French Nuclear Energy Society (SFEN)

## Day 2 – (14h-17h30)

### Opening remarks (15')

This opening session will cover the generational issues of digital transformation and the role that the young generation can play in driving change to foster the adoption of digital solutions.

Speakers:

- **Matthew Mairinger**, Canadian Operating Officer, NAYGN, Technical Engineer, OPG

### Session 3: Looking into the future of digitalisation of nuclear systems (1h30)

This session will provide a better understanding of what fully digitalized nuclear systems will look like and the associated design approaches. At the same time, shifting from a labour-centric logic towards data-centric logic unveils a wide range of new cost reductions opportunities. Future developments in digital technologies as well as research examples will be examined.

Key questions:

- What are the main developments in the digitalisation of nuclear systems that can be expected in the near and longer term?
- How could these developments be implemented in new nuclear designs to achieve significant cost reductions?
- What can be learned from other sectors in more advanced stages of digitalisation?

Speakers:

- **Brett Plummer**, Chief Nuclear Officer and Vice President at Point Lepreau Nuclear Power Station at Énergie NB Power
- **Robert Plana**, Chief Technology Officer, Assystem
- **Emilio Baglietto**, Associate Professor of Nuclear Science and Engineering, Massachusetts Institute of Technology (MIT)
- **Nigel Hart**, Head of Digital UK SMR, Rolls-Royce
- **Diane Cameron,** Head of the Division of Nuclear Technology Development and Economics, Nuclear Energy Agency

### Session 4: Digital transformation and nuclear regulators (1h30)

This session will explore the view of regulators regarding the digital transformation. To succeed, the digital solutions have to meet regulatory expectations. On the one hand, there are untapped opportunities in terms simplification and time savings that could lead to a more efficient regulation without compromising safety. On the other hand, new risks may arise requiring additional efforts that could preclude the transformation of some processes. To illustrate these aspects, specific case studies, digital strategies within regulatory bodies and the vision of regulators from other sectors will be analysed.

Key questions:

- What are the main regulatory considerations to be taken into account to enable the wide adoption of digital systems in the nuclear industry?
- How may the adoption of digital tools reshape interactions between licensees and regulators? What are the expectations of regulators? Can regulators and licensees cooperate on digital transformation endeavours and if so, to what extent?
- Are regulators considering digital solutions to regulate more efficiently?
- Are the safety culture mindset and existing procedures compatible with the new operational modes enabled by the digital transformation?

Speakers:

- **Jussi Heinonen**, Director of Strategic Development of Regulatory Oversight, Finland's Radiation and Nuclear Safety Authority (STUK)
- **Marco Merens**, Acting Chief Programmes Coordination and Implementation, International Civil Aviation Organization (ICAO)
- **Michael Rinker**, Director General, Directorate of Assessment and Analysis at Canadian Nuclear Safety Commission (CNSC)
- **Jeanne Johnston**, Branch Chief, Electrical Engineering and I&C Long Term Operations and Modernization Branch, US Nuclear Regulatory Commission (NRC)
- **Susan Brissette,** Founder & Principal Consultant, Wild Matriarch Inc.

## Closing remarks (15')

This concluding session will aim to provide key recommendations for the future NEA report on the opportunities and challenges associated with digital transformation in the nuclear sector.

Speakers:

- **Patrick Ledermann**, Foundation of the National Academy of Technologies of France (NATF), and Chair of the NEA Committee for Technical and Economic Studies on Nuclear Energy Development and the Fuel Cycle (NDC)