



Proceedings of the 5th MDEP Conference on New Reactor Design Activities

International Cooperation – Past, Present, and Future

**24-25 April 2023
Antalya, Türkiye**





MULTINATIONAL DESIGN
EVALUATION PROGRAMME

**Proceedings of the 5th
MDEP Conference on New
Reactor Design Activities**

International Cooperation:
Past, Present and Future

24-25 April 2023
Antalya, Türkiye

Table of contents

Acknowledgements	2
1. Introduction	3
2. Opening	4
3. Keynote speech.....	6
4. Main sessions	7
4.1. Session 1: MDEP key achievements and lessons learnt	7
4.2. Session 2: International co-operation framework for new designs	10
4.3. Session 3: Global supply chain management	13
4.4. Session 4: Considerations for expanding international co-operation	15
4.5. Session 5: Challenges for new technologies	18
4.6. Panel discussion session: Perspectives for future co-operation.....	21
5. Conclusions	23
6. Closing remarks.....	24
List of abbreviations and acronyms.....	25

Acknowledgements

The Multinational Design Evaluation Programme extends its sincere recognition to the individuals who played pivotal roles in various aspects of the 5th MDEP Conference on New Reactor Design Activities “International Co-operation: Past, Present and Future”:

Marina Demeshko, Gisela Grosch and Francisco Parra from the NEA, Mehmet Haşim Çevik, Muammer Çakar, Anıl Bölme and the entire NDK Department of External Relations for their invaluable contributions to the preparation, execution, and overall success of the conference.

Francisco Parra, Marina Demeshko and Gisela Grosch from the NEA, for their dedicated efforts in preparing the proceedings.

Special acknowledgements to the conference organisational committee for their support in developing the programme and content of discussion: Julien Collet (ASN), Guenael Le Cann (FANR), Denis Mistryugov (SECNRS), Keiko Chitose (NEA), Natalia Fedotova (SEC NRS), Anıl Bölme (NDK), Thomas Buckenmeyer (NEA), Shane Turner (ONR) and Janne Nevalainen (STUK).

1. Introduction

On 24-25 April 2023, MDEP held the 5th international conference on new reactor design activities in Antalya, Türkiye, organised by NEA and NDK (Turkish Regulatory Authority), that gathered participants from 18 different countries, the International Atomic Energy Agency and the World Nuclear Association. The title of the conference “*International Co-operation, Past, Present and Future*”, reflected the crucial moment in which the discussion took place, as climate change and energy security lead simultaneously towards an increased deployment of nuclear power plants, a large-scale investment on new nuclear technologies and the arrival of newcomers in the nuclear sector.

It is therefore considered crucial for MDEP, a unique framework for regulatory co-operation and harmonisation with a successful 17-year track record, to make its activities well known to nuclear stakeholders, national regulators and industry. MDEP facilitates co-operation and exchange of information during design reviews, provides opportunities for early dialogue with the industry, encourages standardisation and harmonisation on regulatory requirements and practices, produces mutually agreed positions and technical reports, all of which guarantees regulatory readiness aligned with the highest safety standards. MDEP is, finally, an essential framework if countries are to meet their national climate change objectives while improving public confidence in nuclear energy and making sure new reactor models are safe, secure, and environmentally friendly.

Among the topics covered during the 5th MDEP Conference, speakers and audience discussed: MDEP key achievements and lessons learnt, international co-operation framework for new designs, global supply chain management, considerations for expanding international co-operation and challenges for new technologies. The conference was able to achieve its objectives: several areas for future co-operation were clearly identified, important feedback from MDEP member countries was provided, new nuclear design, construction and test results were presented in relation with several technical reports produced within MDEP working groups, and proposals for future actions were clearly set up.

2. Opening

Over a hundred participants were welcomed with opening remarks by the President of the Nuclear Regulatory Authority of the Republic of Türkiye (NDK), Zafer Demircan, NEA Director-General, William D. Magwood, IV, and the Chair of the MDEP Management Board, Deputy Chairman of the Russian regulatory body (Rostechndzor), Alexey Ferapontov.



William D. Magwood, IV, NEA Director-General, delivers his opening speech

Mr Zafer Demircan, President of the Nuclear Regulatory Authority of the Republic of Türkiye (NDK), expressed his confidence that the conference would provide experts a platform to develop new ideas. He stressed the fact that NDK decided to join MDEP since its creation, thus being the first international initiative NDK joined. NDK's participation has been very fruitful, and it has given NDK access to a wide pool of experts that has helped expand its expertise. According to Mr Demircan, MDEP remains the most efficient mechanism to mitigate potential hazards of new technologies.¹

On behalf of the MDEP Management Board, Mr Ferapontov, Deputy Chairman of the Russian regulatory body (Rostechndzor), highlighted MDEP's impressive results in terms of multilateral co-operation, assessment of safety of new design solutions and of first-of-a-kind equipment, innovative materials, new fuel design, among other items. He stated MDEP improves substantially the work of national regulators as well as their regulatory practices. MDEP has also aided vendors and facilities in better understanding the expectations of regulators through their technical reports and common positions. New issue specific working groups are an open possibility for MDEP in order to better understand key safety issues of new

1 [Welcome remarks by Conference Chair, NDK President, Zafer Demircan](#)

designs. Mr Ferapontov concluded that MDEP remains the only international platform that deals with safety specific issues on new reactor designs.²

Mr Magwood, NEA Director-General, thanked the president of NDK and the MDEP Management Board. He congratulated Türkiye for the progress made in the nuclear sector in the past seven years and stated that, throughout the years, the MDEP conferences have proven an efficient mechanism to communicate to stakeholders what MDEP has accomplished; they offer the added value of bringing stakeholders together and industry representatives in particular. One of the key insights that can be drawn from MDEP, according to Mr Magwood, is that harmonisation and standardisation are most efficient when harmonisation efforts are concentrated on specific designs in all their details: this has shown to be the best basis for international co-operation throughout MDEP's history. Documents that were published as a result of MDEP's work such as Common Positions have been incorporated in national documents. Mr Magwood stressed that these are exciting times for the nuclear sector, since the 26th UN Climate Change Conference of the Parties (COP26) meeting in Glasgow when practical plans were demanded from countries to address Climate Change. Policy makers then realised that they were not going to be able to meet their net zero emissions objectives without nuclear energy.³

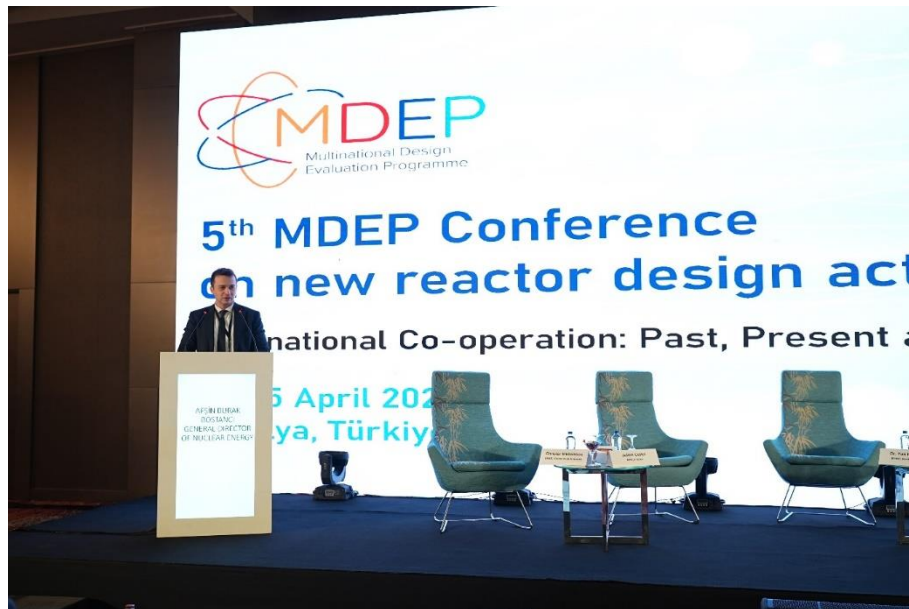
2 [Opening remarks by Mr Ferapontov, Deputy Chairman of the Russian regulatory body \(Rostechnadzor\)](#)

3 [Opening speech by William D. Magwood, IV, NEA Director-General](#)

3. Keynote speech

Afsin Burak Bostanci, Head of the General Directorate of Nuclear Energy and International Projects of the Ministry of Energy and Natural Resources of the Republic of Türkiye, thanked the participants for coming in person to Türkiye and began his speech discussing the energy policy in Türkiye and its three main goals: securing energy supply, meeting climate change agreements and ensuring safety. These are the axes from which Türkiye expects to meet a demand that has tripled in the last 22 years and continues to grow at a rate of 5% annually. Türkiye has, furthermore, committed to achieving net zero emissions by 2053, by which time nuclear is expected to supply 29% of its energy. In order to meet these ambitious objectives, Türkiye plans to build three new nuclear power plants and small modular reactors. Türkiye is currently negotiating with China the construction of its third nuclear power plant and is discussing with Russia and the United States further international co-operation to enhance its nuclear capacity.

Mr Bostanci also presented NDK's structure and role. He stressed the fact that independence is key for nuclear regulatory bodies and acknowledged the important role regulatory bodies have in terms of protecting the general public and the environment. He stated that NDK needs to increase its capacity in terms of recruiting and training and that NEA programmes, working groups and studies proved to be of huge value to support this capacity building. NEA has systematically contributed to improving NDK's knowledge level and experience. Mr Bostanci finally expressed the confidence that Türkiye's experience will also be a great asset to countries involved in new NPP projects and concluded his presentation thanking stakeholders for the organisation of the event. ⁴



Afsin Burak Bostanci delivers his keynote speech

⁴ [Keynote speech by Mr Afsin Burak Bostanci](#)

4. Main sessions

The conference consisted of panel discussions among high-level representatives of industry and of national regulatory authorities for nuclear safety dedicated to: MDEP Key Achievements and Lessons Learnt, International Co-operation Framework for New Designs, Global Supply Chain Management, Considerations for Expanding International Co-operation and Challenges for New Technologies.

4.1. Session 1: MDEP key achievements and lessons learnt

The objective of this session was to highlight accomplishments, bottom-up approach, interactions with industry, framework, challenges and lessons learnt from all Design Specific Working Groups in MDEP including the final presentations from the EPR, AP1000, and APR1400 Working Groups which have been recently closed. Commissioning and construction experience as related to design issues and future co-operation on operating experience was also discussed.

Session Co-ordinator: *Julien Collet (ASN)*

Chair: *Christer Viktorsson (FANR)*

Panellists:

Julien Collet, ASN, MDEP phase 1 Steering Technical Committee Chair

Yun Ho Kim, KHNP, APR1400

Guenael Le Cann, FANR, APR1400 Working Group

Tapani Virolainen, STUK, EPR Working Group

Mike Corletti, Westinghouse, AP1000

Mr Christer Viktorsson, Director-General of FANR, opened the session stating that MDEP was a pioneer initiative with clear successes, among which six different Design Specific Working Groups offer an eloquent example. He reminded the participants that the report summarising all the outcomes from MDEP's Phase 1 (2006-2021) may be found on the MDEP website⁵ and that all technical reports and common positions are presented in the appendix. Mr Viktorsson, an MDEP Policy Group member, recognised the value MDEP had for the UAE nuclear programme and the safe operation of Barakah NPP. FANR, UAE's nuclear regulator, drew considerable benefits from MDEP during the licensing of APR1400, in co-operation with Korean stakeholders. Furthermore, MDEP provided substantial benefits for FANR's licensing process. Because the Fukushima accident took place during the construction of Barakah, the siting process was supported by IAEA's advice. In conclusion, MDEP helped FANR to be more efficient and effective as a new Regulatory Body.

Mr Viktorsson reported on the COP28, which will take place in Dubai, from 30 November to 13 December 2023. FANR will participate actively in the discussion. Having an effective regulatory process is key for government in their energy policy, in order to introduce CO₂-free electricity production. He encouraged all to join COP28. Finally, Mr Viktorsson highlighted some of the factors that make MDEP stand out among other international initiatives: most importantly, the possibility of working on specific designs and projects and the fact that a big part of its publications are open to the public. This element makes its products publicly beneficial.⁶

5 https://www.oecd-nea.org/mdep/annual-reports/MDEP_Phase1_SummaryReport7613.pdf

6 [Session opening by Mr Christer Viktorsson, Director General of FANR](#)

MDEP phase 1 steering technical committee chair: Julien Collet, ASN

Contrary to the top-down approach to harmonisation that characterises IAEA, the key principle of the STC was a bottom-up initiative for harmonisation by reinforcing co-operation of licensing of safety assessment on different designs. Several achievements were shared by Mr Collet, ASN Director-General and former chair of MDEP STC. On the level of regulatory practices, it was sometimes easier to share with other regulators through MDEP than to wait for the vendors; furthermore, MDEP helped the Regulatory Body to develop a harmonised approach to enable the vendors to conduct a unique First-Plant-Only-Test (FPOT) campaign; understanding on regulatory and practice differences between countries was improved and, regarding the oversight of supply chain, Mr Collet highlighted the protocol of joint inspection developed under MDEP and created by VICWG, an activity that is still ongoing within the CNRA. In terms of harmonisation, common positions were the main tool for this objective. In partnership with WNA, a dialogue with the industry was conducted with harmonisation of Codes and Standards as its main axis. Finally, Mr Collet shared the lessons learnt: harmonisation is a slow and resource consuming process. The best formula for harmonisation involves convergence and reconciliation as shown in one of CSWG's reports. Harmonisation, however, concluded Mr Collet, is not always achievable.⁷

APR1400 experience in communication with MDEP: Yun Ho Kim, KHNP

Mr Kim, principle researcher at KHNP Central Research Institute, introduced the APR1400 WG, established in 2012. He presented the group's major activities and explained the Post LOCA in Vessel Debris Effect. The main benefits drawn from this WG involved the regular communication channel that was established between the regulator and the vendor. Among the lessons learnt, the following were mentioned: the importance of harmonisation on some key topics like Codes and Standards, the Value of Common Positions for harmonisation and, finally, the fact that MDEP could be part of the nuclear renaissance with advanced countries and newly embarking countries, a mission for which KHNP is keen to continue supporting MDEP's efforts. As benefits of MDEP, Mr Kim identified: sharing up-to-date information, sharing regulatory positions and sharing best practices. As comments for the future, Mr Kim highlighted that discussions should start during the standard design stage so vendors can take into account critical licensing issues before the design is fixed.⁸

APR1400WG key achievements and lessons learnt (2012-2021): Guenael Le Cann, FANR

During his presentation, Mr Le Cann, Safety Assessment Manager in FANR, Chair of the APR1400 Working Group, provided an overview of the status of nuclear power plants in the UAE. Construction of four APR1400 units began in 2012, with the first unit operational since 2020 and three units currently in operation as of 2023. Mr Le Cann highlighted the key achievements of the technical expert subgroups within the WG, specifically focusing on topics such as Accident and Transients and Severe accidents. The APR1400WG, which consisted of KINS, FANR, and NRC, brought several benefits to the UAE, including a balanced and harmonised design review for the APR1400, a better understanding of each member's regulatory decisions, and the sharing of information and reports generated by the WG. However, challenges were observed, such as changes in group composition and limitations in sharing sensitive information. Additionally, different licensing stages and project maturity levels among members posed further challenges. Looking ahead, Mr Le Cann emphasised the importance of discussions to conduct better reviews by addressing key challenges and ensuring stakeholders and decision makers are convinced of the design's safety. The work of the technical expert subgroups allowed members to focus on significant safety issues, and Mr Le Cann expressed his expectation of future collaboration and the reactivation of the APR1400WG.⁹

EPR working group: Tapani Virolainen, STUK

During his presentation, Mr Tapani Virolainen, Director of Nuclear Reactor Regulation and former chair of the EPRWG and representative from STUK, provided an insightful overview of the group's history since

7 [MDEP phase 1 Steering Technical Committee Chair: Julien Collet, ASN](#)

8 [APR1400 Experience in Communication with MDEP: Yun Ho Kim, KHNP](#)

9 [APR1400WG Key achievements and lessons learnt \(2012 - 2021\): Guenael Le Cann, FANR](#)

its establishment in 2008. He shared information about the composition of the group and its subgroups, offering valuable context information. Mr Virolainen expressed his appreciation for the outcomes generated by the EPRWG and emphasised the importance of the reports issued by the group. Additionally, he highlighted the significant value derived from the existence of a platform that facilitates dialogue between regulators and industrial stakeholders. Key successes of the EPRWG, as highlighted by Mr Virolainen, include the recognition of the benefits drawn from shared information, which has fostered an environment of openness and promoted co-operation and agility in addressing challenges.¹⁰

AP1000 plant technology & MDEP interface: Michael Corletti, Westinghouse

During the conference, Mr Michael Corletti, Senior Director of Licensing & Advanced Reactors Engineering at Westinghouse Electric Company, highlighted the key objectives of the AP1000 design and provided insights into its development sequence. He emphasised the value of collaboration between regulators and vendors to enhance effectiveness and efficiency. Mr Corletti emphasised that the timing of design completion was crucial for the project's success. Additionally, he highlighted the benefits of MDEP, including fostering good communication between regulators on key topics, providing vendors a platform to address common issues, ensuring design standardisation across country boundaries, and assisting in establishing a common safety basis for the plant.¹¹

Panel discussion and Q&A

Participants highlighted various benefits they derived from MDEP. For new regulatory bodies like FANR, MDEP provided an opportunity to share information with other regulators and identify major safety concerns. It was particularly helpful for understanding the Korean regulatory framework and developing a programme based on a design licensed in an experienced nuclear country. Tapani emphasised the value of discussions with regulatory partners, identifying key concerns, and discussing approaches to address them. While MDEP achieved collaboration objectives, harmonisation proved challenging. However, the participants recognised the importance of identifying areas of synergy and maintaining communication even if full harmonisation was not achieved. Regarding the operating phase, there was interest in extending discussions and collaboration similar to MDEP during this phase. Although discussions during the operating phase would be less intensive, maintaining a forum for discussion was seen as valuable. Mr Le Cann expressed his intention to maintain collaboration with Korean partners during the first phase of operation. Mr Kim also highlighted the value of discussions during the commissioning phase and supported maintaining collaboration during subsequent phases.¹²

10 [EPR Working Group: Tapani Virolainen, STUK](#)

11 [AP1000 Plant Technology & MDEP Interface: Michael Corletti, Westinghouse](#)

12 [Panel discussion and Q&A](#)



Question from the audience: Jean Joubert, NNR

4.2. Session 2: International co-operation framework for new designs

The objective of this session was to inform decision makers on future activities of the HRP1000 and the VVER Design Specific Working Groups. Panellists shared important challenges, lessons learnt, knowledge management considerations and insights. The session included recommendations on a new framework aimed at expanding the scope of activities and extending membership to embarking countries.

Session Co-ordinator: *Janne Nevalainen, STUK*

Chair: *Retfalvi Eszter, HAEA*

Panellists:

Adriana Politi, HPR1000WG Chair, ARN

Mao Qing, CGNP

Pei Wei, NNSA

Oya Özdere Gülol, VVER Working Group Chair, NDK

Sergey Egorov, Atomenergoproect JSC

Katalin Petőfi-Tóth, HAEA

Summary of key HPR1000WG activities, feedback and future perspectives, Adriana Politi, ARN

Ms Politi, HPR1000WG Chair and Senior Nuclear Safety Analyst of Licensing and Nuclear Reactor Control within the Argentine Nuclear Regulatory Authority, is responsible for the long-term operation of Atucha 1 NPP in Argentina and of licensing processes of HPR1000. She presented the activities and accomplishments of the WG as well as the benefits obtained from MDEP. The WG included two technical expert subgroups: one on internal and external hazards and another one dealing with severe accidents. Discussion within this WG also included Fukushima Daiichi accident lessons learnt, unique design features affecting safety, FPOT and High-Integrity-Components (HIC). The group's activities spanned from 2018-2022 and comprised Argentina, China, South Africa and UK, countries that are in different stages regarding HPR1000. UK exited the group towards the end of 2022. Meetings took place twice a year and ten WG meetings were held in total. Preparation of common positions, creation of a comparison table of different HPR designs and reports on the status of HPR in each country, were some of the subjects that were worked on. The WG produced 4 common positions and 3 technical reports on: Fukushima accident lessons learnt, principle 1 of the Vienna Declaration, internal and external hazards and severe accidents. The contents of each of these reports and positions were outlined on the presentation. There

was consensus that discussions within the WG helped all the parties and provided fruitful insights, as well as an effective and useful platform.¹³

Expectations from HPR1000 vendors, licensees and/or operators: Mao Qing, CGNP

During the session, Mao Qing, Chief Engineer of China Nuclear Power Engineering Company Ltd. (CNPEC), one of China General Nuclear Power Group (CGN)'s key subsidiaries, presented the successful launch of the First-of-a-Kind (FOAK) HPR1000 reactor by the end of March 2023. He shared the history of CGN, which dates back to 1987 when the first NPP was built, but it was in 2010 when CGN started using its own designs. Mao Qing discussed the rigorous testing process, including laboratory tests, mock-up tests, and tests with the real reactor during the commissioning phase. Over 200 simulations using performance simulation tools were conducted, resulting in excellent performance values for FOAK, surpassing the original design values. The presentation also highlighted the HPR design assessment; assessments were made and certificates were obtained from ONR, EUR, and IAEA (GRSR). Mao Qing expressed his confidence in the MDEP working groups, stating their usefulness in the past and anticipated future collaboration. During the Q&A session, Ms Retfalvi inquired about the differences between the Chinese and UK versions of HPR1000. Mao Qing explained that there were 95 design modifications made for the UK HPR1000. Abel Gonzalez asked the speaker to outline the process of homogenisation requested by the Chinese government for the two reactor options of HPR1000. Mao Qing stated that both CNNC and CGN worked on the HPR1000 design and, although the two versions are very similar, they are not identical. The joint venture between the organisations produced a document outlining key goals and parameters that both projects had to follow. A common ground of parameters for the two versions of the design to consider and to be aligned with was thus established with the goal of homogenisation.¹⁴

Regulatory practice on the FOAK HPR1000: Pei Wei, NNSA

Mr Pei Wei, NNSA Deputy Director of Division of Nuclear Safety Power Regulatory Department, focused on the inspection process of the First-of-a-Kind HPR1000, for which he served as the responsible officer on behalf of NNSA. He discussed the project's status, regulatory experiences, and challenges, emphasising the safety and reliability of the HPR1000 design, for which China holds intellectual property rights. The NNSA conducted 64 inspections, highlighting 112 requirements, and strengthened co-operation with the IAEA and NEA. Mr Pei highlighted the role of MDEP in providing an efficient platform for addressing new design issues and shared NNSA's formulation of nuclear safety review principles specific to the HPR1000. He also mentioned China's cybersecurity standards and the need for international co-operation to promote technological progress in this area, particularly in light of supply chain challenges and the lack of specialised international standards for nuclear power plant cybersecurity.¹⁵

Summary of key MDEP activities, feedback from members and future perspectives: Oya Özdere Güloğ, VVER Working Group Chair, NDK

Ms Güloğ, Group Head in Nuclear Regulatory Authority of Türkiye since 2020 and project manager of Akkuyu NPP, who is responsible for licensing nuclear facilities and has 20 years of experience in the Turkish Regulatory Body, presented the activities and prospects of the MDEP VVER Working Group (VVERWG). The working group focuses on reviewing new VVER designs, such as VVER1200 and VVER1000 from different countries, and exchanging experiences on licensing processes. They draft common positions on safety issues, analyse regulatory requirements, hold regular meetings, oversee technical expert subgroups, visit VVERs under construction or in commissioning state, and produce comparison tables for different countries. The VVERWG currently consists of four members: Hungary, Turkey, Russia, and China, with India and Finland having previously been part of the group. Representatives from Rostechnadzor and SEC NRS represent Russia, while NNSA and NRSC represent China. The working group has produced technical reports and common positions, including those related to the Core Catcher and the Hydrogen Passive Autocatalytic Recombiners (PAR), with a new technical report expected for publication in 2023. Workshops and visits to VVERs have been conducted in Russia,

13 [Summary of key HPR1000WG activities, feedback and future perspectives, Adriana Politi, ARN](#)

14 [Expectations from HPR1000 vendors, licensees and/or operators: Mao Qing, CGNP](#)

15 [Regulatory practice on the FOAK HPR1000: Pei Wei, NNSA](#)

China, and Finland, and a common position on Fukushima led to specific requirements in Russia. The benefits of MDEP highlighted by Russia include increased transparency and information sharing through joint workshops with industry stakeholders, while NNSA emphasised the value of the comparison table, and Turkey appreciated the close contact with the industry.¹⁶

Russian industry benefits from MDEP and VVERWG activities and further expectations: Sergey Egorov, Atomenergoproect JSC

Sergey Egorov, Director of Science and Innovation at Atomenergoproect (Rosatom), highlighted the benefits of the VVER Working Group in providing common positions on various issues. He emphasised the need for maintaining a balance between regulations, design materials, and the actual facility, ensuring that requirements set by the authority board are reflected in the project. The project's life cycle should also be taken into consideration. The common positions of the VVERWG have focused on construction, analysis of critical incidents, Fukushima lessons, design aspects like the Core Catcher, and the implementation of procedures and testing equipment. Mr Egorov stressed the importance of shaping regulatory positions through the work of the working group and incorporating them into regulations. The three technical reports produced by the VVERWG provide detailed requirements and comparisons. Visual representation of design solutions is crucial, and Mr Egorov expressed the desire for the successful implementation of Core Catchers. He emphasised the need for continued collaboration and knowledge sharing among participants. Mr Egorov outlined seven promising areas of co-operation, with the establishment of a Probabilistic Safety Assessment Working Group being a priority. The main goal is to create a mechanism that allows representatives from Russian design offices and operators to communicate with regulatory authorities of countries constructing nuclear power plants based on Russian designs.¹⁷

Katalin Petőfi-Tóth, HAEA - Regulatory perspective on VVER licensing

Ms Petőfi-Tóth, nuclear safety inspector involved in the oversight of the new NPP units at Paks site, emphasised the expanded role of the Hungarian regulator and provided a detailed overview of the main licensing steps. She mentioned that the Hungarian Atomic Energy Authority (HAEA) is currently working on developing a new oversight concept, incorporating the lessons learnt from MDEP and the licensing of VVER reactors. She further explained the key features of this new approach, as outlined in slide 11 of her presentation. During the Q&A session, an audience member inquired about the status of VVER reactors in relation to the Vienna Declaration. Ms Petőfi-Tóth responded that the common position is currently being developed and is nearing completion.¹⁸

16 [Summary of key MDEP activities, feedback from members and future perspectives: Oya Özdere Gülol, VVER Working Group Chair, NDK](#)

17 [Russian industry benefits from MDEP and VVERWG activities and further expectations: Sergey Egorov, Atomenergoproect JSC](#)

18 [Katalin Petőfi-Tóth, HAEA - Regulatory perspective on VVER licensing](#)



From left to right: Adriana Politi (ARN), Mao Qing (CGNP), Pei Wei (NNSA), Oya Özdemir Güllü (NDK), Katalin Petőfi-Tóth (HAEA), Sergey Egorov (Atomenergoproect JSC)

4.3. Session 3: Global supply chain management

The objective of this session was to discuss practical challenges with the global supply chain, consider the industry's perspective and the regulatory efforts on supply chain issues.

Session Co-ordinator: Guenaël Le Cann (FANR)

Chair: Oğuz Can (NDK)

Panellists:

Jeremy Hubert, ASN

Moongon Lee, KHNP

Afşın Burak Bostancı, MENR of Türkiye

Keiji Matsunaga, Toshiba Energy Systems Solutions Corporation

Nathan Paterson, WNA

Erdem Çakır, NDK

As the chair of the session, Mr Oğuz Can outlined several key challenges associated with the supply chain. These challenges include ensuring a strong safety culture, ensuring conformity of components and materials, and customer design criteria satisfaction. Additionally, Mr Can mentioned the future challenges that the industry will face in relation to Small Modular Reactors.

Vendor Inspection Co-operation Working Group (VICWG): Jeremy Hubert, ASN

Jeremy Hubert, Nuclear Safety Inspector at ASN (Nuclear Safety Authority) in France and Vice-Chair of the Supply Chain Working Group (WGSUP), discussed the history of VICWG, the father group of WGSUP under CNRA. He highlighted the main achievements of VICWG, including vendor inspection co-operation, common positions on key challenges like safety culture and counterfeit, fraudulent and suspect items (CFSI), and the development of an IAEA TECDOC on commercial graded items. Mr Hubert reported on the transfer of activities previously conducted under VICWG to CNRA's WGSUP. The main objectives of the new working group are to provide a framework for regulators and TSOs to discuss and facilitate the identification of commendable practices. The main challenges identified are enhancing vendor inspection, better coordinating supply chain regulation, and better collaborating with non-regulatory stakeholders. Mr Hubert provided a list of international inspections conducted under the VICWG/CNRA umbrella and emphasised the value of stakeholder engagement with WGSUP/VICWG, including

organisations like IAEA and WNA. He also promoted an upcoming workshop on the supply chain scheduled for the end of 2023, outlining the topics to be discussed during the event.¹⁹

Korean Perspective on Supply Chain Management: Moongon Lee, KHNP

Mr Lee, Senior Manager of KHNP, focused during his presentation on the challenges faced by the supply chain in ensuring the stability and safety of nuclear power plant operations. He highlighted the specific approach taken by KHNP in managing the supply chain, considering the unique dynamics of the power plant industry, which involves a dual flow of demand and supply. He highlighted the priority given by KHNP SCM (Supply Chain Management) to “Procurement” for stability and safety of NPP’s operation and maintenance. KHNP SCM is a supply chain management system unique to nuclear power plants that comprehensively manages suppliers and internal purchasing processes to ensure timely supply of quality products at reasonable prices in line with nuclear safety. KHNP SCM is different from manufacturing companies where items are produced and sold to the final customer. KHNP SCM’s customers are maintenance teams.²⁰

Supply Chain Localization and Skills Development in Türkiye: Afşın Burak Bostancı, MENR of Türkiye

During his presentation, Mr Bostancı emphasised the growing electricity demand in Türkiye and the challenges associated with developing a national supply chain capacity in the nuclear sector, as the country is relatively new to this industry. He also discussed the regulatory aspects of managing the supply chain and mentioned that 1000 suppliers have been certified. He highlighted that the development of the nuclear supply chain not only presents opportunities for employment but also has a positive impact on various economic sectors.²¹

Toshiba Energy Systems Solutions Corporation: Keiji Matsunaga

During his presentation, Mr Matsunaga, Senior Fellow of Power Systems Division, Toshiba Energy Systems & Solutions Corp, provided an overview of Toshiba’s extensive involvement in the nuclear supply chain, which included their participation in decommissioning activities. He also highlighted the projects related to innovative reactors developed by Toshiba. Additionally, Mr Matsunaga discussed several key equipment examples supplied by Toshiba. However, he acknowledged certain challenges that the industry faces, such as the monitoring system of suppliers, the utilisation of commercial grade items, and the implementation of additive manufacturing.²²

WNA Supply Chain Working Group: Nathan Paterson, WNA

During his presentation, the speaker initially introduced the World Nuclear Association and provided an overview of the Harmony initiative. He then proceeded to discuss the efforts of the Supply Chain Working Group, which focused on various key areas. These areas included the development, localisation, and business environment of the nuclear supply chain, specific considerations related to small modular reactors such as infrastructure needs, industrial innovation including advanced manufacturing and digitalisation, and fostering a quality culture based on an optimised use of industrial grade items. Additionally, he emphasised the value of co-operation between the Supply Chain Working Group and the Vendor Inspection Co-operation Working Group over the past years, highlighting the significance of their collaborative efforts in advancing the goals of the nuclear supply chain.²³

Certification of Nuclear Safety Equipment Manufacturers: Erdem Çakır, NDK

In his presentation, Mr Çakır provided an overview of the regulatory framework concerning the supply chain in Türkiye. He explained that equipment manufacturing in the nuclear industry requires a licence from the regulator and emphasised that the Nuclear Regulatory Authority (NDK) conducts vendor inspections themselves, while also authorising third-party inspections. Mr Çakır further elaborated on

19 [Vendor Inspection Cooperation Working Group \(VICWG\): Jeremy Hubert, ASN](#)

20 [Korean Perspective on Supply Chain Management: Moongon Lee, KHNP](#)

21 [Supply Chain Localization and Skills Development in Türkiye: Afşın Burak Bostancı, MENR of Türkiye](#)

22 [Toshiba Energy Systems Solutions Corporation: Keiji Matsunaga](#)

23 [WNA Supply Chain Working Group: Nathan Paterson, WNA](#)

the responsibilities and roles of the licensees in the supply chain. In order to ensure compliance and effectiveness, he emphasised the need for a regulatory framework that provides clear requirements for both manufacturers and licensees, thereby fostering a robust and accountable supply chain ecosystem.²⁴

NHSI Initiative of IAEA: Keynote Speech, Mikhail Chudakov

During his speech, Mr Mikaeil Chudakov, Deputy Director General of IAEA, discussed IAEA's development of the Nuclear Harmonisation for Safety Initiative (NHSI), which based on several reasons. The primary objective of the initiative is to establish shared regulatory and industrial approaches for Small Modular Reactors (SMRs). The NHSI programme consists of two tracks, which are focused on creating a framework for information exchange and conducting international pre-licensing regulatory reviews. Additionally, the initiative aims to leverage existing regulatory reviews to optimise the regulatory process and reduce the time required to bring SMRs to market, all while ensuring the highest standards of safety.²⁵



Jeremy Hubert (ASN) delivers a presentation on the VICWG

4.4. Session 4: Considerations for expanding international co-operation

Session Co-ordinator: Anil Bekir BÖLME (NDK)

Chair: Orion Phillips (NNR)

Keynote speakers:

Irina Sokolova, Rostechнадзор, Regulatory perspective on working with new embarking countries
Sergey Egorov, Atomenergoproect JSC - Design evolution and changes during the construction

Regulatory perspective on working with new embarking countries: Irina Sokolova, Rostechнадзор

Ms Sokolova discussed the important role MDEP has to embark and assist newcomer countries working alongside and providing input to the IAEA mandate. Training activities, for example, international schools on Nuclear and Radiological Leadership for Safety, for drafting regulations, for nuclear energy management, can be executed without any changes of MDEP mandate. She introduced, as an example, the comprehensive modular training programme. She suggested to have a two-plus-two approach (regulator and industry) as an effective method to use MDEP activities and products for co-operation with the embarking countries and

²⁴ [Certification of Nuclear Safety Equipment Manufacturers: Erdem Çakır, NDK](#)

²⁵ [NHSI Initiative of IAEA: Keynote Speech, Mikhail Chudakov](#)

stated that MDEP common positions are an important source for lectures. Finally, she stated that Rostechndzor currently cooperates with embarking countries through mechanisms such as workshops, technical visits, topical technical meetings and joint inspections, always under the premise of an intergovernmental agreement on co-operation in the field of peaceful use of atomic energy and intergovernmental agreement on co-operation in the construction of a nuclear facility.²⁶

Design Evolution and Changes during Construction: Sergey Egorov, Atomenergoproect

Mr Egorov stated that designs should be changed and adapted to differing Codes and Standards. External factors can also cause design changes, such as additional protection measures for airplane crashes, for example, which were implemented after 11 September, as well as changes in the design thread. Maintaining an equilibrium between design requirements, design documents, and physical plant information is mandatory. Additionally, site-specific design should consider national culture-specific elements. Therefore, procedures should also be modified for the construction phase based on localisation. He introduced aspect-focused designs and concluded that MDEP provides a unique opportunity to address these issues.²⁷



Irina Sokolova (Rostechndzor) delivers a presentation on regulatory perspectives in working with new embarking countries

The objective of this session was to provide a strategic look (beyond 2023) considering a new audience for MDEP. MDEP members shared their perspectives on expanding international co-operation to include new embarking countries and preparations for regulatory oversight, as well as to hear on their feedback on and expectations from the programme.

Session Co-ordinator: Anıl Bekir Bölme, NDK

Chair: Orion Phillips, NNR

Panellists:

Christer Viktorsson, FANR

Satyajit Ghose, BAERA

Uzman Habib, PNRA

Yusuf Ceylan, NÜTED

Uwe Stoll, GRS

26 [Regulatory perspective on working with new embarking countries: Irina Sokolova, Rostechndzor](#)

27 [Design Evolution and Changes during Construction: Sergey Egorov, Atomenergoproect](#)

Perspective on experience setting up new nuclear energy programmes: Christer Viktorsson, FANR

Mr Viktorsson outlined the history of the establishment of the regulatory body in the UAE and presented the current status of the Barakah NPP. Unit 4 completion stands at 94%, and is expected to begin its operations in 2024. Strong project management and documentation played a crucial role in achieving success. Following the example of the United States, the PSAR was implemented with different organisations, including contractors, who contributed to each chapter. FANR had its priorities, such as understanding potential differences in the regulatory framework and relying on KINS or the USNRC. Mr Viktorsson provided an example of design changes in the UAE and emphasised that FANR received support from KINS and USNRC, establishing a close relationship with the Korean regulatory body. The MDEP prompted FANR to prioritise safety significant issues and its co-operation was distinct from IAEA's co-operation. Currently, there are 10 units of APR1400, six in Korea and four in the UAE. ²⁸

Regulatory perspective on new nuclear programmes in Pakistan: Uzman Habib, PNRA

Mr Uzman Habib thanked NDK and NEA for the invitation to the conference and presented the Pakistan nuclear regulatory body's history, regulatory functions and its scope of action. He then introduced the status of NPPs in Pakistan and licensing stages of nuclear installations from site registration to closure. The major requirement for new NPP designs is the elimination of plant event sequences that could result in large or early radioactive releases to the environment. Furthermore, Mr Habib discussed the enhanced safety requirements in regulatory framework and new design features of K-2/K-3 NPPs. The PNRA has developed its own regulator's Level 1 PSA model of K-2/K-3 to enhance the effectiveness and efficiency of regulatory oversight. He mentioned the importance of feedback and introduced the expectations from the Multinational Design Evaluation Programme (MDEP). The PNRA appreciates the efforts of MDEP and anticipates benefiting from the international experience in regulatory oversight of HPR1000 NPPs. Furthermore, they hope to share their national experience with the global community²⁹.

Perspective from Bangladesh (BAERA) considering VVER designs: Satyajit Ghose, BAERA

Mr Ghose presented the list of IAEA missions related to the nuclear power programme and focused on last year's events (ISSAS, IRRS) and next year's event. He explained the legislative framework and establishment of BAERA in February 2013. As per BAERA Act-2012, authorisation procedure for nuclear installations in Bangladesh comprise 7 steps. Those are: siting, design, construction, commission, operation, decommissioning and release. He presented the licensing approval status of Rooppur NPP. RPV installation at unit 1 took place on 10 October 2021, unit 2 was installed in 2021 and the regulatory framework for licensing was established the same year. He discussed challenges related to resources, for which they received support from external sources, such as the vendor country's regulatory body, TSOs (2 Russian organisations), the Indian regulatory body and IAEA. However, decision making remains BAERA's responsibility. ³⁰

Competence development to support the regulatory body: Yusuf Ceylan, NÜTED

Mr Ceylan presented NÜTED: Nuclear Technical Support Organisation for Turkish regulatory ecosystem. He explained the structure of the Turkish nuclear regulator and the role of NÜTED whose general framework contract was signed in April 2020. For newcomer countries, establishing TSOs remains a challenging objective. TSO supports NDK in inspection and licensing, emergency case coordination and new nuclear projects (Egypt, Uzbekistan and Hungary NPP project as examples). Among the main challenges, Mr Ceylan mentioned: financial difficulties and highly technical knowledge demanded from staff. He summarised the challenges and lessons learnt in four points: lack of human sources in Nuclear, lack of experience with new nuclear technology, Sustainability of the company resources with the different stages of the project and uncertainties regarding the project's schedule. ³¹

28 [Perspective on experience setting up new nuclear energy programmes: Christer Viktorsson, FANR](#)

29 [Regulatory perspective on new nuclear programmes in Pakistan: Uzman Habib, PNRA](#)

30 [Perspective from Bangladesh \(BAERA\) considering VVER designs: Satyajit Ghose, BAERA](#)

31 [Competence development to support the regulatory body: Yusuf Ceylan, NÜTED](#)

GRS Experience in supporting Embarking Countries at NPP construction Stage: Uwe Stoll, GRS

The GRS provides support to not only federal ministries in Germany but also internationally. Mr Stoll outlined the research organisation's tasks and highlighted that Germany's procedures require a higher level of technical knowledge compared to other countries, including the United States. He discussed the four pillars of capacity building and provided examples from the past 20 years. The GRS has supported numerous countries. Mr Stoll specifically focused on one of their longest capacity building projects for the Belarusian Supervisory Authority. In 2009, Belarus did not have any nuclear power plants, but now there are two units in operation. Mr Stoll emphasised that one of the significant advantages of the MDEP is its collaboration with plant suppliers, which enhances the understanding of this sector. This collaboration proves highly beneficial for the project.³²



From left to right: Christer Viktorsson (FANR), Uzman Habib (PNRA), Yusuf Ceylan (NÜTED), Uwe Stoll (GRS)

4.5. Session 5: Challenges for new technologies

The objective of this session was to discuss next steps for regulators in terms of international collaboration for new reactor technologies, Small Modular Reactors (SMR), and advanced reactors. Panellists also shared perspectives on anticipated policy issues, harmonisation goals, challenges for the regulatory bodies related to the new technologies, such as resources and training, regulations, standards, new materials and fuel and supply chain for them, FOAK, etc.

Session Co-ordinator: Denis Mistryugov (SEC NRS)

Chair: Abel Julio Gonzalez (ARN)

Panellists:

Nuclear safety regulators

Tereza Abrman Marková, SUJB, NUWARD (tri-literal perspective)

Douglas Miller, CNSC, Bilateral collaboration on licensing efforts for SMRs and other advanced technologies including participation in SMR Forum, BWRX-300

Alexey Ferapontov, Rostechnadzor, Licensing of new designs (BREST-300, RITM-200 – land deployment)

³² [GRS Experience in supporting Embarking Countries at NPP construction Stage: Uwe Stoll, GRS](#)

SMRs vendors

Tanju Sofu, GIF/RSWG, Basic Safety Approach for Advanced reactors

Ronan Tanguy, WNA/CORDEL, Industry perspective on harmonisation and other challenges for SMRs

Mark Salisbury, Rolls-Royce SMR, Policy and Regulatory Challenges

Han-Gon Kim, iSMR Development Agency, Policy and Regulatory Challenges

Konstantin Artemiev, Rosenergoatom JSC, Floating NPP: licensing, construction, and operation experience

Licensing of new designs (BREST-300, RITM-200 – land deployment): Alexey Ferapontov, Rostechnadzor

During his presentation, Alexey Ferapontov from Rostechnadzor addressed the lessons learnt from licensing new designs of small modular reactors, specifically focusing on the BREST-300 (LFR-type) and RITM-200N (LWR-type) reactors. He emphasised the need for an improved legal and regulatory framework involving all stakeholders in order to effectively assess and evaluate these new designs. Mr Ferapontov provided technical details of the RITM-200N, highlighting its key design features. The introduction of this innovative reactor posed a challenge that required Rostechnadzor to reconsider its regulatory and standardisation documents. The speaker also discussed the case of the BREST reactor, a lead-cooled reactor, sharing the main technical specifications. Again, Rostechnadzor had to adapt its regulatory framework to accommodate this innovative design, and Mr Ferapontov explained the sequence of the licensing process. In conclusion, he emphasised the importance of joint coordinated work between the regulatory body and its TSO, viewing licence conditions as a valuable tool, and anticipating that licensing SMRs will be a significant focus for regulators in the near future.³³

NUWARD (tri-literal perspective): Tereza Abrman Marková, SUJB

During the session, Ms Tereza Abrman Markova from SUJB participated remotely and discussed the trilateral initiative centred around Nuward. She provided details on the membership and primary goal of the Joint Early Review, which serves as a platform for regulators to assess key topics and share their conclusions. The selected topics for evaluation include safety objective definition, identification of Design Basis Conditions (DBC), utilisation of passive systems, computing tools, twin module integration, and Probabilistic Safety Assessment (PSA) methodology. Ms Markova described the working method of the working group, highlighting the involvement of EDF in the discussions. Following exchanges with EDF, regulators independently share their conclusions. The benefits of this initiative include comparing regulatory approaches, assessing the implementation of requirements, and conducting detailed comparisons and learning in specific areas. Ms Markova also shared some lessons learnt from SUJB, such as the absence of regulatory frameworks prohibiting system sharing between units and the current reliance on probabilistic values for the decision to establish an Emergency Planning Zone. Additionally, she mentioned the potential reconsideration of containment system requirements based on a thermal power of 100MW and the need for refining the requirements on the independent shutdown system if necessary.³⁴

Bilateral collaboration on licensing efforts for SMRs and other advanced technologies including participation in SMR Forum – BWRX-300: Douglas Miller, CNSC

Mr Douglas Miller from CNSC joined virtually to discuss the Canadian regulatory approach to small modular reactors (SMRs). He provided an overview of the numerous SMR projects in Canada, with a specific focus on the case of Darlington where OPG applied for a BWRX-300 commission. Mr Miller emphasised the challenge of harmonisation between regulators and highlighted CNSC's focus on readiness as a crucial element in building trust. He described the tools deployed to support CNSC readiness, including substantial financial support from the state. CNSC aims to conduct effective and efficient licensing for SMRs and discussed the Vendor Design Review approach, along with international collaborations with other stakeholders. Mr Miller also listed several conditions that need to be met for achieving harmonisation.³⁵

³³ [Licensing of new designs \(BREST-300, RITM-200 – land deployment\): Alexey Ferapontov, Rostechnadzor](#)

³⁴ [NUWARD \(tri-literal perspective\): Tereza Abrman Marková, SUJB](#)

³⁵ [Bilateral collaboration on licensing efforts for SMRs and other advanced technologies including participation in SMR Forum – BWRX-300: Douglas Miller, CNSC](#)

Basic Safety Approach for Advanced reactors: Tanju Sofu, GIF/RSWG

Generation IV International Forum was inaugurated two decades ago and served as a collaborative platform for work on six types of non-LWR reactors. Generation IV is nowadays oriented towards addressing climate change and economic development. Mr Tanju Sofu discussed the main objectives and activities of GIF's Risk and Safety Working Group (RSWG) involving the development of safety design criteria and guidelines. To date, they have already defined requirements for Sodium-Cooled Fast Reactor (SFR), Lead-Cooled Fast Reactor (LFR), Gas-Cooled Fast Reactor (GFR) and Very High-Temperature Reactor (VHTR) systems. Mr Sofu also discussed the main outcomes of the "basis of safety approach" for Gen-IV reactors developed by GIF.³⁶

Industry perspective on harmonisation and other challenges for SMRs: Ronan Tanguy, WNA/CORDEL

Mr Ronan Tanguy discussed the work of WNA supporting the industry to deliver new nuclear machinery in an appropriate time and scale. He reminded participants that the objective regarding climate change will call for a fast nuclear development. He reported on the few blockers identified by the WNA. He proposed a definition of what harmonisation consists of: facilitating outcomes from one regulator being reviewed and accepted by other regulators for their processes. He finally presented the various ongoing harmonisation initiatives.³⁷

Policy and Regulatory Challenges: Mark Salisbury, Rolls-Royce SMR

Mr Mark Salisbury discussed the Rolls-Royce approach to design, its innovative standard SMR. He listed the many challenges to deploy such innovative reactors. In particular, he reported on the challenge of Mechanical Codes. Rolls-Royce will leverage all international efforts (IAEA standards, NHSI, WNA). He finally highlighted the benefits of the GDA process to engage discussion with the regulator and identify showstoppers at the earliest stage as possible.³⁸

Policy and Regulatory Challenges: Han-Gon Kim, iSMR Development Agency

Mr Han-Gon Kim presented the development of iSMR, highlighting its main characteristics and key features. He also discussed the challenges associated with its implementation, including political challenges for First-Of-A-Kind-Equipment (FOAKE) construction, licensing of innovative reactors, and international standardisation of SMR regulatory and industrial rules. He noted that the current organisation of the Korean nuclear community may need to adapt to accommodate SMRs, requiring a new approach to licensing.³⁹

Floating NPP licensing, construction, and operation experience: Konstantin Artemiev, Rosenergoatom JSC

Mr Konstantin Artemiev addressed the challenge of floating nuclear power plants (FNPP) and provided the participants with technical details about this design that received operation licence from Rostechnadzor in 2005, began its construction in 2014 and was finished in 2018 entering commercial operation phase in northeastern Russia in the year 2020. Mr Artemiev described some of the extreme weather conditions present in this part of Russia and the main features of the FNPP and its onshore structure. Mr Artemiev highlighted that Russia has 70 years' experience with icebreaker nuclear installations. He also reported on significant milestones in the commissioning of the FNPP, highlighting its progress and achievements.⁴⁰

Mr Abel Julio Gonzalez, the session chair, initiated the discussion by addressing the WNA representative and inquiring about achieving harmonisation. Mr Tanguy responded that harmonisation would be best

³⁶ [Basic Safety Approach for Advanced reactors: Tanju Sofu, GIF/RSWG](#)

³⁷ [Industry perspective on harmonization and other challenges for SMRs: Ronan Tanguy, WNA/CORDEL](#)

³⁸ [Policy and Regulatory Challenges: Mark Salisbury, Rolls-Royce SMR](#)

³⁹ [Policy and Regulatory Challenges: Han-Gon Kim, iSMR Development Agency](#)

⁴⁰ [Floating NPP licensing, construction, and operation experience: Konstantin Artemiev, Rosenergoatom JSC](#)

accomplished through regulators working on pilot projects, allowing them to align design requirements and refine their models. He provided examples of successful initiatives such as the Five Parties Initiative, Nuward design, Russian designs exported to other countries, and collaboration in the Emirates. Tereza Markova emphasised that regulators need to assess whether designs fulfil requirements and make necessary adjustments to legal frameworks or provide clarifications if the requirements are too broad. Douglas Miller highlighted the importance of open discussions and tradeoffs to bridge the differences between countries such as Canada and the US, while considering their specific safety goals.



From left to right: Abel Julio Gonzalez (ARN), Alexey Ferapontov (Rostechnadzor), Ronan Tanguy (WNA/CORDEL), Mark Salisbury (Rolls-Royce SMR) Tereza Abrman Marková, (SUJB – NUWARD), Han-Gon Kim (iSMR Development Agency), Konstantin Artemiev (Rosenergoatom JSC)

4.6. Panel discussion session: Perspectives for future co-operation

The objective of this discussion between MDEP Management Board (MB) and previous Policy Group (PG) members is to reflect on the challenges discussed during topical sessions and highlight areas where more effort is needed to improve the future framework for International Co-operation for VVER and HPR1000 Working Groups considering the needs of embarking countries, including capacity building. Opportunities to further enhance international co-operation and harmonisation goals were also identified. Discussions also addressed the question of how to leverage the future co-operation and resources in order to support new reactor technologies.

Session Co-ordinator: Veronique Rouyer (NEA)

Chair: Abel Julio Gonzalez (ARN)

Panellists:

Alexey Ferapontov, Russian Federation MB member, Rostechnadzor

Yue Huiguo, People's Republic of China MB member, NNSA

Tamás Czerovszki, Hungary MB member, HAEA

Zafer Demircan, Türkiye PG member, NDK President

Orion Phillips, South Africa MB member, NNR

Christer Viktorsson, UAE PG member, FANR

Uzman Habib, PNRA

Mr Gonzalez initiated the discussion by raising the topic of the MDEP's success and questioned why a similar approach couldn't be taken for Small Modular Reactors (SMRs). The potential for an online

platform within MDEP to showcase countries' interest in SMRs and organise workshops for vendors to address licensing-related obstacles was suggested by Tamás Czerovszki. Mr Ferapontov stated that light-water reactor SMRs could be the best starting point to create a new working group under MDEP since all SMRs under construction or siting fall into this technology category. Zafer Demircan reminded the audience that SMRs should be seen as instrumental; their purpose is to meet the expected high demand for nuclear reactors in the short and medium-term to facilitate the energy transition and reduce CO₂ emissions in the atmosphere. Orion Phillips expressed concerns about engaging with SMR developers at the right time to avoid pursuing designs that may not have a future. Mr Yue Huiguo stated some of the most important challenges SMR regulation currently faces, such as emergency planning zones, safety analysis models, safety analysis assumptions and engineering validation. He also shared with the audience that NNSA has defined review principles for each SMR technology considered by China. Uzman Habib praised MDEP's working groups and suggested sharing institutional knowledge and offer technical education opportunities. Christer Viktorsson emphasised the need to avoid duplication of work with organisations like IAEA and the importance of capacity building and industry collaboration. The session concluded with a question from the audience regarding the immaturity of SMR designs and Christer's support for a workshop to establish a common mindset among vendors, regulators, and industry players.



From left to right: Abel Julio Gonzalez (ARN), Alexey Ferapontov (Rostechnadzor), Yue Huiguo (NNSA), Tamás Czerovszki (IAEA), Zafer Demircan (NDK)

5. Conclusions



Serhat Alten provides a summary of the key discussion points

Serhat Alten, the Conference Chair, provided a summary of the key discussion points. MDEP continues to offer a unique opportunity for technical and policy discussions, particularly with the inclusion of industry stakeholders and the vast amount of information collected by MDEP that can serve as a repository for new countries. Challenges were discussed related to the varying timelines of national projects and different interests among countries, leading to difficulties in handling sensitive information. Updates of national programmes and licensing approaches were presented as well as updates on the use of TSOs and IAEA support. The applicability of MDEP to other situations, such as the operational phase and SMRs, was also mentioned. In fact, bilateral, multilateral and international co-operation was considered necessary regarding SMRs, to which MDEP can contribute. Ongoing activities of MDEP were presented, including the progress made by the Design Specific Working Group (DSWG), ways to enhance transparency, and the presentation of common position papers and technical reports. Technical visits to NPPs under review were conducted, and regulators found common regulatory issues and positions, facilitating a better understanding of each other's perspectives. However, harmonising industry standards remained a challenge, and there was a call to enhance interactions between industry and regulatory bodies. This is particularly the case regarding SMRs, a field in which there are numerous innovative designs and cutting-edge technologies that need to be reviewed and, at the same time, limited deployment and operational experience to analyse. MDEP was recognised as providing a flexible platform for addressing new designs. Recognising regulatory differences was considered key to develop regulatory agility regarding SMRS. Industry support to regulators during review of a design was considered an asset in order to facilitate the licensing review process. MDEP may also provide input to international school programmes such as IAEA's. Supply chain management was discussed by major providers, with a focus on safety measures. The World Nuclear Association (WNA) presented its views on supply chain management and expressed a commitment to collaborate with the CNRA Working Group. The NDK explained its oversight of supply chain through certification of manufacturing processes. Finally, non-MDEP countries expectations regarding MDEP were presented as well as TSO views on contributions to capacity building.⁴¹

⁴¹ [Conclusions](#)

6. Closing remarks

Mr Ferapontov highlighted the importance of the Conference as it gathered an important number of stakeholders, including national regulators, industry representatives, as well as current and former MDEP members. The conference proved an important step for the continuity of MDEP activities. New information on ongoing NPP projects was presented as well as feedback from former Working Groups. Mr Ferapontov stressed the importance of maintaining dialogue with the industry in order to eliminate misunderstandings related to safety culture and safety requirements. He expressed his confidence that MDEP will remain a unique initiative and that it will continue to efficiently coordinate its activities with NHSI and IAEA. The conference also provided enough material to outline future areas of work. Finally, Mr Ferapontov expressed his gratitude to the organising committee, to the speakers and to the panellists. He specially thanked the host organisation, NDK.

Mr Demircan, as President of NDK, expressed sincere gratitude for all the contributions, presentations, questions and answers. Mr Demircan stated that safety culture has once again been promoted and reaffirmed during the conference and he encouraged participants to bring feedback and insights back to their respective committees. Mr Demircan concluded his speech stating that the purpose of everyone present is to keep people, workers and environment safe.



Group photo with all speakers and organisers of the 5th MDEP Conference

List of abbreviations and acronyms

CNRA	Committee on Nuclear Regulatory Activities (NEA)
CORDEL	Co-Operation in Reactor Design Evaluation and Licensing
CP	Common Position
DSWG	Design Specific Working Group
EPRWG	EPR Working Group
FANR	Federal Authority for Nuclear Regulation (United Arab Emirates)
FOAK	First-of-a-kind
FPOT	First-Plant-Only-Tests
GDA	General Design Approval
GDA	Generic Design Assessment
GSAR	Group on the Safety of Advanced Reactors
HIC	High-Integrity-Components
I&C	Instrumentation and controls
IAEA	International Atomic Energy Agency
LOCA	Loss-Of-Coolant Accident
MDEP	Multinational Design Evaluation Programme
NDK	Nuclear Regulatory Authority (Türkiye)
NEA	Nuclear Energy Agency
NNSA	National Nuclear Safety Administration (China)
NPP	Nuclear Power Plant
ONR	Office for Nuclear Regulation (United Kingdom)
PAR	Passive Autocatalytic Recombiners
PC	Primary Circuit components
PG	Policy Group
PSA	Probabilistic Safety Assessment
RPV	Reactor Pressure Vessel
SDO	Standard Development Organisation
SMR	Small Modular Reactor
STC	Steering Technical Committee
STUK	Radiation and Nuclear Safety Authority of Finland
TESG	Technical Experts Subgroup
TR	Technical Report
UAE	United Arab Emirates
VICWG	Vendor Inspection Co-operation Working Group
VVER	Water-Water Energetic Reactor
VVERWG	VVER Working Group
WGIP	Working Group on Inspection Practices (NEA/CNRA)
WNA	World Nuclear Association
SFR	Sodium-Cooled Fast Reactor
LFR	Lead-Cooled Fast Reactor
GFR	Gas-Cooled Fast Reactor
VHTR	Very High-Temperature Reactor

www.oecd-nea.org/mdep