

Nuclear Energy Agency



NEA

NUCLEAR ENERGY AGENCY



Nuclear Energy Agency

The NEA mission

The Nuclear Energy Agency (NEA) is a semi-autonomous body within the framework of the Organisation for Economic Co-operation and Development (OECD), located just outside Paris, France. The objective of the Agency is to assist its member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally sound and economical use of nuclear energy for peaceful purposes. It provides authoritative assessments and forges common understandings on key issues as input to government decisions on nuclear energy policy and to broader OECD analyses in areas such as energy and the sustainable development of low-carbon economies.





William D. Magwood, IV
NEA Director-General

Nuclear energy in the 21st century

Energy is the key element in enabling social and economic development for a growing world population, which is expected to increase by 2 billion in the next 30 years, reaching 9.7 billion by 2050. Worldwide energy demand is expected to increase commensurately with population growth, notwithstanding efforts to improve energy efficiency. Total energy investment during 2022 is expected to amount to 2.4 trillion US dollars internationally.

For a world that hopes to make dramatic reductions in emissions of CO₂, nuclear energy is a vital technology that has already proven its value to economies across the world. Fossil fuels still provide two-thirds of total electricity generation worldwide and power nearly all of the globe's transportation. Nuclear energy, along with renewables and other technologies, can provide a balanced and reliable strategy to decarbonise the industrial, commercial building and transport sectors.

The Nuclear Energy Agency (NEA) is the only intergovernmental body that brings together experts from the countries with the deepest experience and capabilities in the broad range of civil nuclear energy technology and policy issues from the Americas, Europe and the Asia-Pacific to achieve common understanding, positions and projects to advance the state of the art in the application of nuclear energy technologies. Representing the world's best nuclear expertise, NEA membership consists of 34 countries making up 79% of the world's installed nuclear electricity generating capacity. The NEA provides each member country access to the substantial experience of other members and an opportunity to significantly leverage resources.

The NEA framework of standing technical committees, joint international undertakings, and Secretariat-serviced, separately-funded bodies allows the Agency to be flexible and responsive. After more than 60 years of international service, NEA scientific and technical work is at the forefront of knowledge. Through the work of approximately 3 000 experts participating in 83 working parties and expert groups, the NEA conducts work in a wide array of topics, including issuing consensus positions on key issues to provide credible references and examples of best practice. NEA joint projects and information exchange programmes also allow interested members and non-members to join forces in carrying out research projects on a cost-sharing basis.

As the NEA moves through its seventh decade of service, it continues to evolve and adapt, but will always be a cost-effective platform for international co-operation with its focus on both today and the future.

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Véronique Rouyer

Head of the Division of Nuclear Safety Technology and Regulation

Division of Nuclear Safety Technology and Regulation

The goal of the NEA in this sector is to assist member countries in their efforts to ensure high standards of safety in the use of nuclear energy, by supporting the development of effective and efficient regulation and oversight of nuclear installations and activities, by helping to maintain and advance the scientific and technological knowledge base and by addressing safety concerns and supporting efforts to maintain safety performance and regulation at the highest levels. To meet this goal, staff in the division and the Committee on the Safety of Nuclear Installations (CSNI), the Committee on Nuclear Regulatory Activities (CNRA) and their expert groups in these areas work closely to:

- facilitate an effective exchange of safety-relevant information among member countries, in order to identify significant generic issues and trends and to develop common understanding and approaches with a view to anticipate the resolution of such generic issues;
- foster the continuous enhancement of the knowledge base of nuclear safety and the safety expertise capability in member countries, through scientific co-operation and the development of joint projects;
- assist member countries in the resolution of safety issues and strengthen confidence in the solutions and their implementation;
- address safety issues associated with new technologies and reactor designs;
- help maintain an adequate level of capability and competence in member countries necessary to ensure the safety of existing facilities, in particular their long-term operation, and future nuclear facilities and activities;
- enhance the efficiency and effectiveness of the regulatory process and encourage harmonisation of the regulatory processes.



Joint Projects

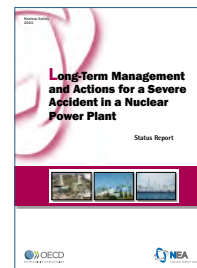
Nuclear safety research

- Analysis of Information from Reactor Buildings and Containment Vessels of Fukushima Daiichi Nuclear Power Station (ARC-F) project
- Advanced Thermal-hydraulic Test Loop for Accident Simulation (ATLAS) Project
- Cabri International Project (CIP)
- Experiments on Source Term for Delayed Releases (ESTER) project
- Experimental Thermal Hydraulics for Analysis, Research and Innovations in Nuclear Safety (ETHARINUS) project
- Fukushima Daiichi Nuclear Power Station Accident Information Collection and Evaluation (FACE) project
- Halden Reactor Project – Fuel and Material
- High Energy Arcing Fault Events (HEAF) Project

- Loss of Forced Coolant (LOFC) Project
- Experiments in Passive Decay Heat Removal and Depressurization Test Facility (PANDA) Project
- Fire Propagation in Elementary, Multi-room Scenarios (PRISME) Project
- Project to address Thermal-hydraulic Safety Issues through Experiments in the Rod Bundle Heat Transfer (RBHT) Facility
- Reduction of Severe Accident Uncertainties (ROSAU) project
- Studsvik Cladding Integrity Project (SCIP)
- Studsvik Material Integrity Life Extension (SMILE) project
- THAI Experiments on Mitigation Measures, and Source Term Issues to support Analysis and further Improvement of Severe Accident Management Measures (THEMIS) project

Nuclear safety databases

- Component Operational Experience, Degradation and Ageing Programme (CODAP)
- Fire Incidents Records Exchange (FIRE) Project
- International Common-cause Failure Data Exchange (ICDE) Project





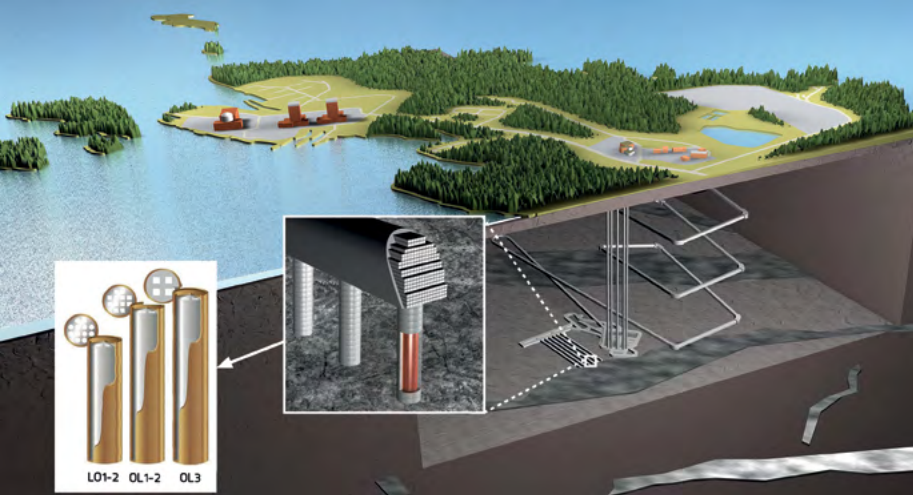
Rebecca Tadesse

Head of the Division of Radioactive Waste Management and Decommissioning

Division of Radioactive Waste Management and Decommissioning

The goal of the NEA in this sector is to assist member countries in the development of safe, sustainable and broadly acceptable strategies for the long-term management of all types of radioactive materials, with particular emphasis on the management of long-lived waste and spent fuel considered as waste, on the decommissioning nuclear installations as well as legacy sites. To meet this goal, staff in the division and the Radioactive Waste Management Committee (RWMC), the Committee on Decommissioning of Nuclear Installations and Legacy Management (CDLM), the Regulators' Forum (RF) and the expert groups in these areas, work closely to:

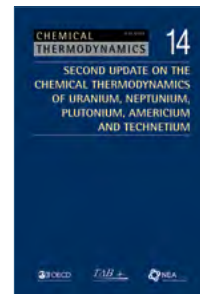
- bring about a shared and broad-based understanding of the management of all kinds of radioactive waste and materials, taking into account technical, environmental, societal and economic considerations;
- identify best practices, technologies and methodologies to ensure effective management of radioactive waste, nuclear legacies and decommissioning, including their costs and financing; facilitate the elaboration and implementation of waste management and decommissioning strategies and methodologies at national and international levels;
- help elaborate common understanding of regulatory approaches in the management of radioactive waste, nuclear decommissioning and legacy management;
- provide for international peer reviews to ensure that best practices are implemented in waste management and decommissioning;
- exchange experiences and share approaches for the engagement of stakeholders and the general public in decision making for the management of radioactive waste and for conducting decommissioning activities;



- explore the implications of the very long time frames involved in radioactive waste management and the related challenges of transferring responsibilities and knowledge;
- identify specific issues of interest in which the involved institutions and other stakeholders can learn from each other, and provide a platform for discussing those issues;
- develop a practical and harmonised regulatory approach for managing of nuclear legacy sites and installations;
- assist NEA member countries in deriving practical interpretation and application of end state to nuclear legacy site management and other existing exposure situations.

Joint Projects

- Co-operative Programme for the Exchange of Scientific and Technical Information Concerning Nuclear Installation Decommissioning Projects (CPD)
- Thermochemical Database Project





Nina Cromnier

Head of the Division of Radiological Protection and Human Aspects of Nuclear Safety

Division of Radiological Protection and Human Aspects of Nuclear Safety

The goal of the NEA in this sector is to support excellence in the area of radiological protection in its member countries by providing timely identification of significant topics and emerging issues, analysing their possible implications for radiological protection practices and regulation, and contributing to the development of innovative approaches for their resolution. Post-accident recovery, particularly those areas related to human health and psycho-social aspects, improvement of national and international emergency management systems and cross-border co-ordination, as well as occupational exposure management, are among other key areas of focus. The NEA also assists member countries in their efforts to enhance focus on the human aspects of nuclear safety internationally, by supporting research and advancing the knowledge associated with key topical areas including safety culture, human and organisational factors, stakeholder engagement, trust building, public communication and capacity building across all sectors of the nuclear industry. To meet this goal, the staff in the division and all NEA committees and relevant working and expert groups in this area, notably the Committee on Radiological Protection and Public Health (CRPPH), the Committee on the Safety of Nuclear Installations (CSNI), the Committee on Nuclear Regulatory Activities (CNRA), the Radioactive Waste Management Committee (RWMC), and the Committee on Decommissioning of Nuclear Installations and Legacy Management (CDLM), work closely to:

- assist policymakers in developing and improving radiological protection policies and human aspects of nuclear safety to best reflect state-of-the-art experience, science and technology;
- identify emerging issues in radiological protection and human aspects of nuclear safety, and facilitate the application of new scientific knowledge for practical uses;
- assess and provide input on key draft recommendations and standards to identify their possible implications in the regulation and implementation of radiological protection and human and organisational factors and norms;



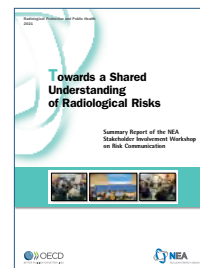
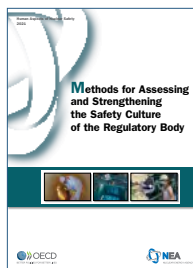
- contribute to reaching a co-ordinated international framework for regulatory issues in radiological protection, including related public health and environmental issues;
- help member countries improve their radiological emergency preparedness and management, as well as their operational radiological protection capabilities;
- assist member countries in tackling the social challenges related to radiological protection and nuclear operations, including effective stakeholder involvement;
- address issues associated with leadership and safety culture, public communications, capacity building and gender balance in the nuclear sector;
- stimulate engagement and dialogue among key stakeholders including nuclear regulatory organisations to better understand stakeholders' perceptions, needs and expectations;
- further explore building trust as part of stakeholder engagement;
- facilitate dialogue among all relevant stakeholders to build understanding of and agreement on long-term strategies in areas such as waste management approaches;
- support member countries' goal to improve gender balance in the nuclear sector.

International initiatives

- NEA International Radiological Protection School (IRPS)
- NEA Risk Communication Training Course (RCTC)
- NEA Stakeholder Involvement Workshops
- International Nuclear Emergency Exercises (INEX)
- International Mentoring Workshops
- Country Specific Safety Culture Forums

Joint Projects

- Information System on Occupational Exposure (ISOE)
- Halden Human Technology and Organisation (HTO)





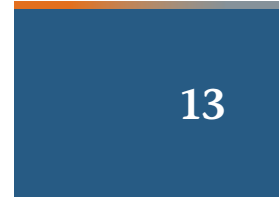
Kimberly Nick

Head of the Division of Nuclear Law

Division of Nuclear Law

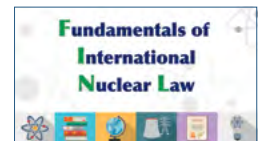
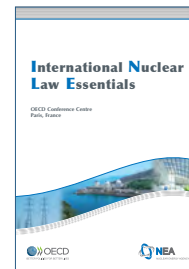
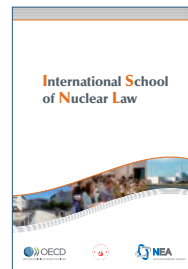
The goal of the NEA in this sector is to help create the sound national and international legal regimes required for the peaceful uses of nuclear energy, including as regards nuclear safety, international trade in nuclear materials and equipment, public engagement, issues of liability and compensation for nuclear damage, and to serve as a leading centre for nuclear law information and education. To meet this goal, the Division of Nuclear Law (DNL) and the Nuclear Law Committee (NLC), with its working parties in this area, work closely to:

- assist member countries in the development, strengthening and harmonisation of nuclear legislation and regulation in areas such as nuclear safety, radioactive waste management and environmental law (as applied to nuclear activities) based upon internationally accepted principles and in line with international binding instruments for the safe and peaceful use of nuclear energy;
- contribute to the modernisation of the international nuclear liability regimes and encourage the strengthening of treaty relations between interested countries to address nuclear liability and compensation for nuclear damage; and
- collect, analyse and disseminate information on nuclear law generally and on topical nuclear legal issues in particular.



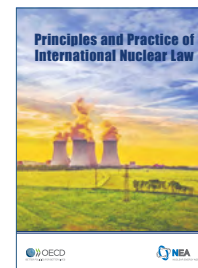
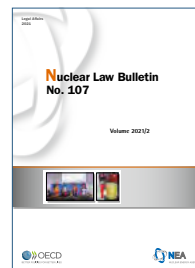
Education programmes

- International School of Nuclear Law (ISNL)
- International Nuclear Law Essentials (INLE)
- Fundamentals of International Nuclear Law (FINL)



International legal resources

- Nuclear Law Bulletin (since 1968)
- Nuclear legislation in OECD and NEA member countries
- Multilateral agreements adherence status
- Nuclear third party liability resources
- Legal resources for nuclear safety





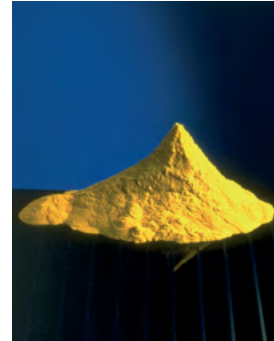
Diane Cameron

Head of the Division of Nuclear Technology Development and Economics

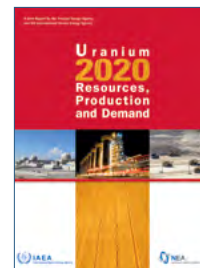
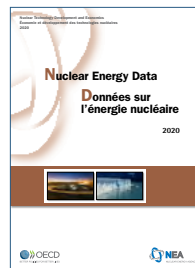
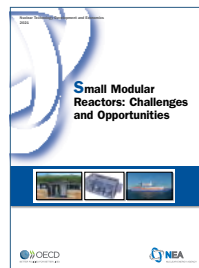
Division of Nuclear Technology Development and Economics

The goal of the NEA in this sector is to provide governments and other relevant stakeholders with authoritative, reliable information and analyses on current and future nuclear technologies, as well as on the role of nuclear energy now and in the future from a sustainable development perspective. These studies cover subjects as key and as diverse as economics, finance, contracting, energy and electricity demand and supply, advances in nuclear reactor design, innovation, uranium, nuclear fuel and fuel cycle technologies. This allows the NEA to advise decision makers on national and international energy policies aiming to provide low-carbon electricity cost-effectively and reliably. To meet this goal, staff in the division and the Committee for Technical and Economic Studies on Nuclear Energy Development and the Fuel Cycle (NDC), with its expert groups in this area, work closely to:

- analyse the economics of nuclear power across the full nuclear fuel cycle as well as at the electrical-system level in the context of changes in electricity markets, social acceptance and technological advances, and assist member countries in evaluating the role of nuclear energy in their energy policies;
- foster international co-operation on the development of innovative nuclear energy systems;
- review the role of nuclear energy in the broader perspective of climate change and sustainable development;
- analyse the contribution of nuclear power to the smooth functioning of low-carbon electricity systems;

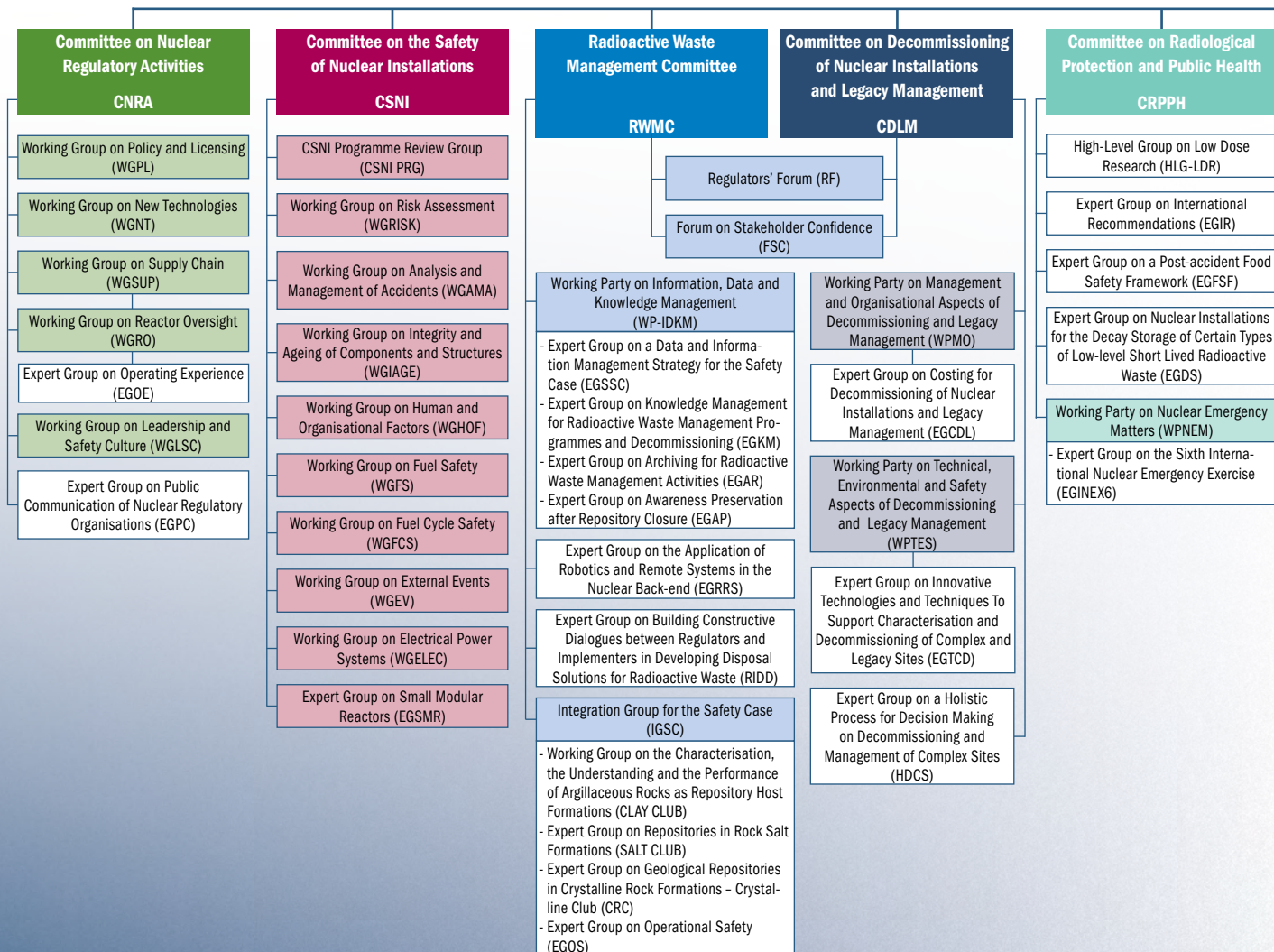


- assess the availability of nuclear fuel, including uranium resources, and the infrastructure required for the development and deployment of existing and future nuclear technology, identifying any eventual gaps;
- review the role of research and development in new nuclear technologies and their impact in energy generation and non-power applications;
- assist member countries, upon request, in addressing emerging concerns related to nuclear technology and radioactive materials, including the stable supply of medical radioisotopes;
- engage within and outside the OECD framework to establish a communication network aimed at providing factual information on nuclear issues.



Structure of Nuclear Energy Agency Committees and Subsidiary Bodies*

Steering Committee



for Nuclear Energy

NEA High-Level Group on Stakeholder Engagement, Trust, Transparency and Social Sciences (HLG-SET)

NEA High-Level Group on Improving the Gender Balance in the Nuclear Sector (HLG-GB)

Nuclear Law Committee NLC

Working Party on Nuclear Liability and Radioactive Waste Disposal Facilities (WPLDF)

Working Party on the Legal Aspects of Nuclear Safety (WPLANS)

Working Party on Nuclear Liability and Transport (WPNTL)

Committee for Technical and Economic Studies on Nuclear Energy Development and the Fuel Cycle NDC

Working Party on Nuclear Energy Economics (WPNE)

Joint NEA/IAEA Group on Uranium (UG)

Working Group on Hydrogen Value Chains (H2-VAL)

Working Group on Small Modular Reactor Economics (SMR-ECON)

Nuclear Science Committee NSC

Programme Review Group (PRG)

Working Party on International Nuclear Data Evaluation Co-operation (WPEC)

- Expert Group on the High Priority Request List for Nuclear Data (EGHPRL)
- Expert Group on the Recommended Definition of a General Nuclear Database Structure (EGGNSD)

Working Party on Scientific Issues of Advanced Fuel Cycles (WPFC)

- Expert Group on Reactor Coolants/Components Technology (EGCoCoT)
- Expert Group on Fuel Recycling and Waste Technology (EGFRW)
- Expert Group on Advanced Fuel Cycle Scenarios (EGAFCS)
- Expert Group on Innovative Fuel Elements (EGIFE)

Working Party on Materials Science Issues in Nuclear Fuels and Structural Materials (WPFM)

- Expert Group on Fuel Materials (EGFM)
- Expert Group on Structural Materials (EGSM)

Working Party on Nuclear Criticality Safety (WPNCS)

- Technical Review Group for the International Criticality Safety Benchmarks Evaluation Project (ICSBEPTRG)
- Technical Review Group for the International Assay Data of Spent Nuclear Fuel Database (SFCOMPOTRG)

Working Party on Scientific Issues and Uncertainty Analysis of Reactor Systems (WPRS)

- International Reactor Physics Experiments Evaluation Project Technical Review Group (IRPhETRG)
- Expert Group on Reactor Fuel Performance (EGRFP)
- Expert Group on Reactor Core Thermal-hydraulics and Mechanics (EGTHM)
- Expert Group on Reactor Systems Multi-Physics (EGMUP)
- Expert Group on Physics of Reactor Systems (EGPRS)

Management Board for the Development, Application and Validation of Nuclear Data and Codes MBDAV

Joint Evaluated Fission and Fusion (JEFF) Nuclear Data Library Co-ordination Group



Tatiana Ivanova

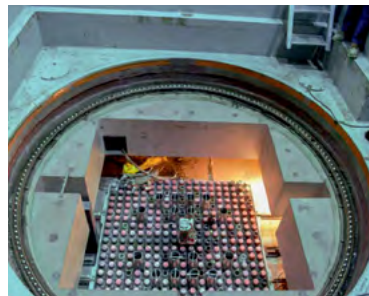
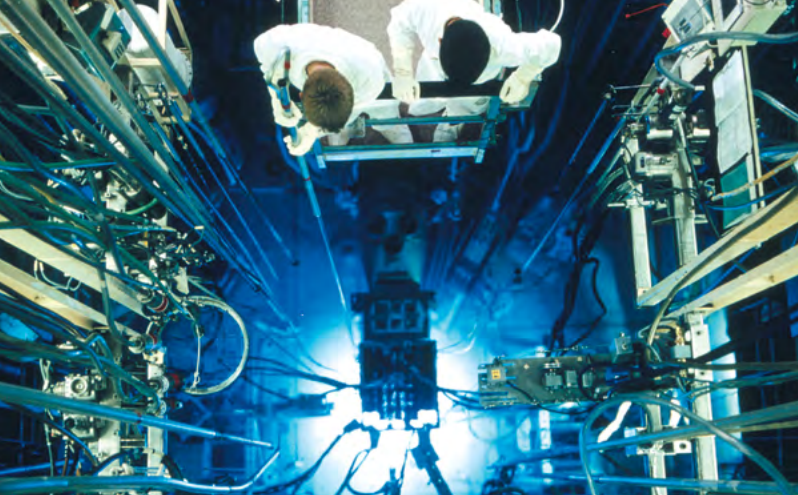
Head of the Division of Nuclear Science and Education

Division of Nuclear Science and Education

The goal of the NEA in this sector is to help member countries identify, collate, develop and disseminate the basic scientific and technical knowledge required to ensure the safe, reliable and economic operation of current and next-generation nuclear systems. To meet this goal, staff in the division, together with the Nuclear Science Committee (NSC) and its numerous Expert Groups, work closely to:

- advance the existing scientific knowledge needed to enhance the performance and safety of current nuclear systems;
- build a solid scientific and technical basis for the development of future generation nuclear systems;
- support the preservation of essential knowledge in the field of nuclear science, including in reactor physics, fuel cycle physics and chemistry, criticality safety, material science, radiation shielding and nuclear data;
- support member countries' goal to develop essential skills capabilities through education and training of a new generation of experts for the nuclear sector;
- organise international standard problem exercises (benchmarks) to form consensus on the state-of-the-art in computational methods, including sensitivity and uncertainty analyses;
- work closely with the NEA Data Bank to support the evaluation and collection of integral experiments data and relational databases to be used for validation purposes in different application areas.

The Division of Nuclear Science and Education fosters horizontal co-ordination with the Data Bank, with a particular focus on the validation of modelling and simulation systems - the rigorous demonstration of their predictive capabilities against high quality, peer-reviewed experimental data collected by the NSC.



Data evaluation, preservation, and management (in co-operation with the Data Bank)

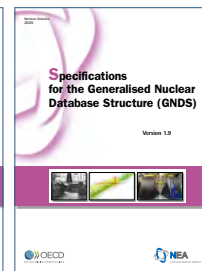
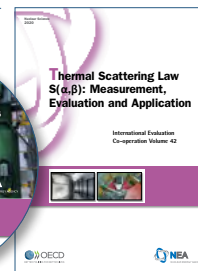
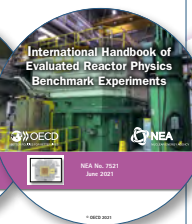
- International Criticality Safety Benchmark Evaluation Project (ICSBEP) and accompanying database for ICSBEP (DICE)
- International Database of Spent Nuclear Fuel Isotopic Assay Data (SFCOMPO-2.0)
- International Experimental Thermal-Hydraulic Systems Database (TIETHYS)
- International Fuel Performance Experiments Database (IFPE) and accompanying database for IFPE (DATIF)
- International Reactor Physics Experiment Evaluation (IRPHe) Project and accompanying IRPHe Database and Analysis Tool (IDAT)
- High-Priority Request List (HPRL) for Nuclear Data
- Shielding Integral Benchmark Archive and Database (SINBAD)

Joint Projects

- Framework for Irradiation Experiments (FIDES) and its Joint Experimental Programmes (JEEPs)
- Nuclear Education, Skills and Technology (NEST) Framework and associated Projects
- QUENCH-Accident Tolerant Fuel (ATF) Project
- Thermodynamic Characterisation of Fuel Debris and Fission Products Based on Scenario Analysis of Severe Accident Progression at Fukushima Daiichi Nuclear Power Station (TCOFF) Project
- Thermodynamics of Advanced Fuels – International Database (TAF-ID) Project

Global Forum

- Global Forum on Nuclear Education Science, Technology and Policy and its Working Groups



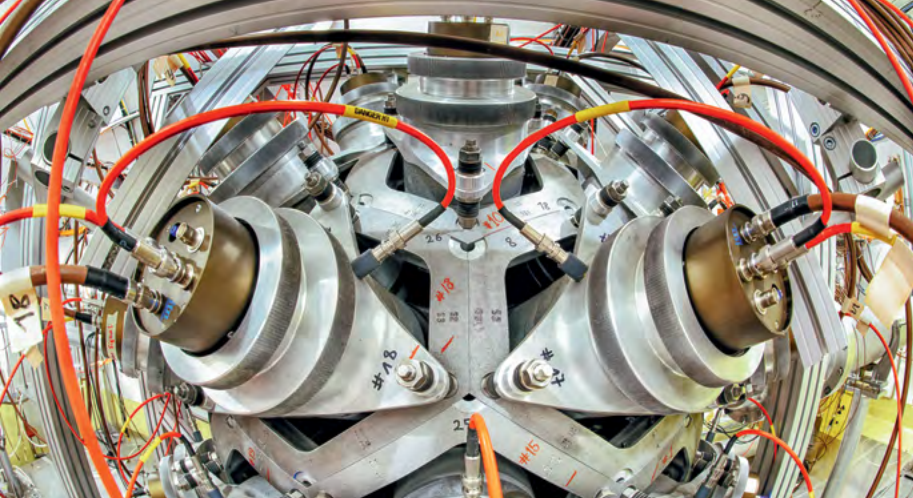


Michael Fleming
Head of the Data Bank

The NEA Data Bank

The goal of the NEA in this sector is to serve as the premier international centre of reference for basic nuclear tools, including computer codes, nuclear data and experimental benchmarks, used for the analysis and prediction of phenomena in the nuclear field. The Data Bank provides a direct service to its users by making these products available on request and by offering the means and methods needed to support their development, application, and validation. To meet this goal, staff in the NEA Data Bank are integrated into the Division of Nuclear Science and Education and governed by the Management Board for the Development, Application and Validation of Nuclear Data and Codes (MBDAV), and work to:

- maintain and provide professional dissemination services for the premier international collection of verified and validated nuclear data, computer programs, integral experiments and NEA Joint Project outputs;
- support the development, verification, validation of tools, and knowledge transfer, for the modelling of nuclear systems;
- facilitate open communication and actively seek feedback from clients, through training events, user fora and stakeholder workshops;
- provide support for data and knowledge preservation efforts through development, population, maintenance, and technical integration of databases;
- provide centralised support the Standing Technical Committees of the NEA in the informatic management and development of data, code, and integral experiment projects.



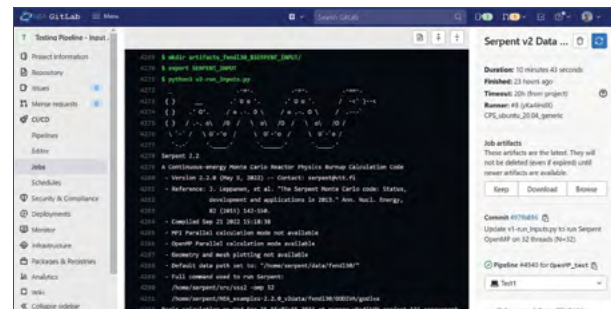
NEA Data Bank participating countries

- Argentina, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Japan, Korea, Mexico, Netherlands, Norway, Poland, Portugal, Romania, Russia (suspended), Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Türkiye, and the United Kingdom



Nuclear data development, preservation and knowledge management

- The Joint Evaluated Fission and Fusion File (JEFF) nuclear data library
- The EXFOR international nuclear reaction database
- The Java-based Nuclear Information System (JANIS)
- The NEA GitLab for software, data and benchmark projects
- The NEA Canvas eLearning and training platform



NEA initiatives in research and innovation

NEA Framework for Irradiation Experiments (FIDES)

Over the past three years, the NEA has engaged with nuclear safety regulators, technical support organisations, research institutions and industry in order to help member countries mitigate the experimental gap created by the closure of research facilities, including the Halden reactor in Norway. After extensive discussions within the NEA community, in co-ordination with the NSC and the Committee on the Safety of Nuclear Installations (CSNI), the Agency launched the Framework for Irradiation Experiments (FIDES).

The first FIDES Agreement came into force in March 2021 with 27 organisations, representing safety, industry and R&D organisations from 12 member countries and the European Commission. Some academic organisations will participate in FIDES as third parties.

The FIDES programme of work for the 2021-2024 period includes four Joint Experimental Programmes (JEEPs) that cover a wide range of experimental needs:

- Programme for quantifying thermomechanical clad load mechanisms during light water reactors slow transients, or Power to Melt and Manoeuvrability (P2M). It will be performed at the BR2 reactor at the Belgian Nuclear Research Centre (SCK•CEN) in Belgium and at the post-irradiation examination LECA Facility at the French Alternative Energies and Atomic Energy Commission (CEA) in France.
- Programme studying fuel rod behaviour under Loss-of-Coolant-Accident (LOCA) conditions (LOCA MIR) will be performed at the MIR.M1 reactor at the Research Institute of Atomic Reactors (RIAR).
- In-pile Creep Studies of Accident Tolerant Fuel (ATF) Claddings (INCA) will be performed at the LVR-15 material test reactor in the Research Centre Rez, Ltd. (CVŘ), Czech Republic.
- High burn-up Experiments in Reactivity Initiated Accident (HERA) will be performed at the Transient Reactor Test (TREAT) Facility at the Idaho National Laboratory (INL) in the United States and at the Nuclear Safety Research Reactor (NSRR) at the Japan Atomic Energy Agency (JAEA) in Japan.

FIDES members recognise that storing experimental data in an organised manner is vital for effective collaboration within FIDES and support the project that seeks to elaborate the process and mechanisms of data quality assurance (QA), analysis and preservation within the Framework.



FIDES will support the experimental needs of nuclear safety regulators, technical support organisations, research institutions and industry by establishing a global network of research facilities in order to perform high-priority experiments to verify the safety and performance of fuels and materials. It will help preserve the remaining facilities as well as the related experimental know-how for future generations.

NEA Nuclear Innovation 2050 (NI2050) Initiative

The NEA launched the “Nuclear Innovation 2050” (NI2050) initiative to encourage new co-operative approaches among its member countries for the purpose of furthering research and the deployment of innovative nuclear technologies that contribute to a sustainable energy mix. The initiative also provides a broad umbrella for a number of NEA activities, such as ongoing science and safety related projects, as well as work being carried out jointly with the International Energy Agency (IEA) on the electricity market and post COP21 developments.

Multilateral approaches can create the confidence needed for the worldwide deployment of innovative technologies through the identification of priorities, the establishment of solid common foundations based on scientific validation of technologies and the definition of shared qualification methods to support robust licensing processes. The NEA already offers a broad platform for discussion through its various specialised committees.

Because safety in particular is a priority to be “built in” at the early design stages of any technological evolution, some level of interaction with authorities and regulators is necessary early on and continuously during the process of innovation. International collaboration among safety bodies is probably one of the most effective ways to get early insight into the safety aspects of any innovation without compromising regulatory independence.

An emerging theme under the umbrella of NI2050 is the potential for disruptive technologies and digital innovations to enhance safety and performance in the nuclear energy sector. This includes advanced technologies already developed and used in other industrial sectors including, inter alia, 3-D printing, robotics, drones, augmented reality, and the Internet of Things.

By gathering partners around shared priorities, NI2050 aims to accelerate deployment of advanced nuclear technologies, positioning nuclear energy to play a role in the sustainable energy mix of the future.

NEA initiatives in education and capacity building

Nuclear Education, Skills and Technology (NEST) Framework

Ensuring nuclear skills and education is an increasingly important challenge for NEA member countries, all of which need new generations of scientists and engineers for the continued safe and efficient use of nuclear technologies for a wide range of industrial, scientific and medical purposes. In this context, the NEA Nuclear Education, Skills and Technology (NEST) Framework was launched in 2019 in order to build up skills vital for the future of the nuclear sector through multilateral co-operation.

The NEST Framework helps to address important gaps in nuclear skills, capacity building, knowledge transfer and technical innovation in an international context by exposing postgraduate students and young professionals to challenging real-world problems. The goal of NEST is to strengthen links between universities, research institutes, technical safety organisations, regulators and industries.

NEST is implemented through projects and activities, involving over 50 organisations from NEA member countries. Over 200 NEST fellows will be trained by the end of 2022. The current NEST projects explore various technical areas such as safety-relevant phenomena during accidents, advanced robotics and remote technology for decommissioning, radioactive waste management, design of small modular reactors, as well as nuclear medicine and radiological protection.



Global Forum on Nuclear Education, Science, Technology and Policy

Academic institutions across NEA member countries are not only nurturing the next generation of nuclear experts and creating the talent pipeline necessary for the sustainability of the nuclear sector, but also providing solutions to complex and emerging issues and challenges, which affect the nuclear energy sector. The NEA Global Forum on Nuclear Education, Science, Technology and Policy was established in January 2021 to provide a platform for co-operation and exchange among academic organisations, policymakers and key stakeholders in the nuclear energy sector and civil society around the world and to enable academia to provide input into international policy discussions.

The Global forum, led by its Council of Advisors, aims to identify and exchange good practices, facilitate shared activities and co-ordinate joint investigation programmes in the following areas and corresponding working group:

- achieving gender balance in the nuclear sector,
- future of nuclear education;
- future requirements for the competitiveness of nuclear; and
- rethinking the relationship between nuclear energy and society.

The current membership of the Global Forum's Council of Advisors includes over 30 experts from 20 academic organisations representing NEA member countries.

Secretariat-serviced bodies

The Agency continues to serve as Technical Secretariat for international bodies such as the Generation IV International Forum (GIF), the International Framework for Nuclear Energy Cooperation (IFNEC) and the Multinational Design Evaluation Programme (MDEP), and in so doing ensures the complementarity of mandates between these bodies and the NEA.

Generation IV International Forum (GIF)



The Generation IV International Forum (GIF) is a co-operative international endeavour organised to carry out the research and development (R&D) needed to establish the feasibility and performance capabilities of the next generation of nuclear energy systems.

The Generation IV International Forum has 14 members that are signatories to its founding document, the GIF Charter. These are: Australia, Brazil, Canada, the People's Republic of China, France, Japan, Korea, Russia, South Africa, Switzerland, the United Kingdom, the United States and Euratom.

Six systems are being developed in GIF: the gas-cooled fast reactor (GFR), the lead-cooled fast reactor (LFR), the molten salt reactor (MSR), the sodium-cooled fast reactor (SFR), the supercriticalwater-cooled reactor (SCWR) and the very-high-temperature reactor (VHTR). Further information is available at www.gen-4.org.

Multinational Design Evaluation Programme (MDEP)

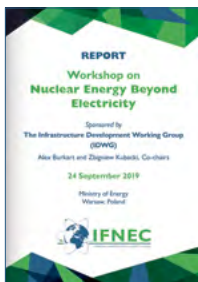


MDEP is a unique multinational initiative conducted by nuclear regulators in order to co-operate on the safety design reviews of new reactors and to identify opportunities for harmonisation and convergence of safety licensing review practices and requirements. MDEP is currently launching a second phase of its programme of work, including two design-specific working groups (VVER and HPR1000) and gathering national regulators' representatives from participating countries with the participation of the

International Atomic Energy Agency (IAEA). Further information is available at www.oecd-nea.org/mdep.



International Framework for Nuclear Energy Cooperation (IFNEC)



The International Framework for Nuclear Energy Cooperation provides a forum for co-operation among participating countries to explore mutually beneficial approaches to ensure that the use of nuclear energy for peaceful purposes proceeds in a manner that is efficient and meets the highest standards of safety, security and non-proliferation.

IFNEC membership includes 34 participant countries, 31 observer countries and 5 international observer organisations (the Nuclear Energy Agency, the International Atomic Energy Agency, the Generation IV International Forum, Euratom and the World Nuclear Association).

There are currently three IFNEC working groups: the Infrastructure Development Working Group (IDWG), the Reliable Nuclear Fuel Services Working Group (RNFSWG), and the Nuclear Suppliers and Customer Countries Engagement Group (NSCCEG). Further information is available at www.ifnec.org.



Daniela Lulache
*Head of the Office of
Policy and Co-ordination*



NEA policy co-ordination

The Office of Policy and Co-ordination maintains effective relationships with various stakeholders of member countries, develops and co-ordinates multilateral collaborations in supporting nuclear energy development and oversees all NEA publications, communications and translations.

- **Internal co-ordination and special projects:** Beyond such core activities as serving as the Secretariat to the NEA Steering Committee and overseeing all NEA public communication activities, the Office of Policy and Co-ordination has overall responsibility for the effective implementation of policies and practices in the Agency. It also acts as the Secretariat for the International Framework for Nuclear Energy Cooperation (IFNEC).
- **Global Relations:** Ensuring complementarity and increasing synergies with the International Atomic Energy Agency (IAEA), the European Commission (EC) and other international bodies as well as non-member countries also serves to maximise the NEA's relevance, visibility and impact.



Emma Leguillon
*Head of the Office of
General Legal Affairs*



NEA administration and general legal affairs

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The Office of Resource Management was established to enhance the Agency's internal management by overseeing all resource matters, including IT.

- **Human Resources:** Recruitment of well-qualified staff is essential to ensuring the Agency's ability to carry out its mandate and to perform work of the highest quality.
- **Information Technology (IT):** The Agency's IT infrastructure underpins the development and operation of new and innovative services for partners and staff. Current initiatives include a redeveloped NEA website, collaborative spaces for partners and conference management support.
- **Budget and Finance:** The NEA Budget and Finance Office co-ordinates the strategic planning of the biennial Programme of Work and Budget (PWB) and supports the Director-General in all of the Agency's resource management activities.



The Office of General Legal Affairs provides legal advice and support to NEA Management on a wide range of contractual, substantive and procedural matters relating to the Agency's status and activities.



Nobuhiro Muroya
Deputy Director-General for Management and Planning



Making the future happen

The previous pages of this brochure have elaborated on many important aspects of NEA work, all of which are part of a global picture: the evolving nuclear energy system. In an effort to bring together the diverse actors in this system, the NEA has in recent years been encouraging enhanced cross-fertilisation among NEA committees addressing safety, regulation, radioactive waste management, decommissioning, radiological protection, technology development and economics, science, law and the human aspects of nuclear safety. The NEA and its standing technical committees continue to fulfil their mandates in an ever-changing environment.

In parallel to this thematic cross-fertilisation, it became evident that new, multinational, co-operative approaches among NEA member countries should be considered to improve interactions between universities, industry, research organisations and regulatory bodies – with due respect to the distinct responsibilities of each – in an effort to accelerate the deployment of the innovative nuclear technologies needed to meet expectations for the future, particularly in climate change mitigation. This is the goal of multiple activities such as those presented on page 14, which will ultimately help to ensure that nuclear “fits” into the future, as a part of an energy mix together with variable renewables.

Technological evolutions are a powerful driver to attract, train and retain a future generation of skilled engineers and scientists as they provide demanding activities. It was in this spirit that the NEA began developing the Nuclear, Education, Skills and Technology (NEST) Framework, the international initiative presented on page 24, so that promising young people from NEA countries can have an opportunity to hone their skills by addressing real world challenges in a multidisciplinary and multinational context. The Global Forum on Nuclear Education has also provided a platform for co-operation and exchange among academic organisations around the world as presented on page 25. These initiatives meet a growing concern in NEA member countries that are faced with a vanishing expertise in fields important for the safe and effective management of nuclear technology.

During the pandemic digital transformation has accelerated in the majority of sectors, and the same is expected in the nuclear sector. It’s time for the nuclear industry to come into the 21st century, to incorporate digital technologies, while recognising that there are many challenges ahead as presented on page 23.

NEA Membership

Current NEA membership consists of 34 countries:

Argentina, Australia, Austria, Belgium, Bulgaria, Canada, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Norway, Poland, Portugal, Romania, Russia (suspended), the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Türkiye, the United Kingdom and the United States. The European Commission and the International Atomic Energy Agency also take part in the work of the Agency.

The NEA online

In addition to basic information on the Agency and its work programme, the NEA website offers free downloads of hundreds of technical and policy-oriented reports. The professional journal of the Agency, *NEA News* – featuring articles on the latest nuclear energy issues – is available online at www.oecd-nea.org/nea-news/. An NEA monthly electronic bulletin is also distributed free of charge to subscribers, providing updates of new results, events and publications. Sign up at www.oecd-nea.org/bulletin. Visit us on Facebook at www.facebook.com/OECDNuclearEnergyAgency or follow us on Twitter @OECD_NEA.

For more information on NEA publications

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Cover: The Cherenkov blue light of the Cabri reactor, Cadarache, France (IRSN/CEA, France) and different vector graphics (Shutterstock, Lanteria and Song Mi); Page 1: OECD Boulogne Building (NEA/OECD, Fabienne Vuillaume); Page 2: OECD Boulogne Building (NEA/OECD, Fabienne Vuillaume); Page 4: NEA group photo (NEA/OECD, Fabienne Vuillaume); Share of nuclear in electricity production; Teleworking (Photo by Cliff Booth from Pexels); Mentoring (Anazawa Takuya); Page 7: Aerial view of Darlington NPP in Ontario, Canada (OPG); Nuclear fuel assembly spacer grid with guide tubes (AREVA); Page 9: The Onkalo spent nuclear fuel repository (Posiva, Finland); Worker at a power plant inspecting output (Shutterstock, Marcin Balcerzak); Page 11: NEA Deputy Head of RP-HANS Natalie Bonilla participates in the mentoring group of Dr. Carolina Ahnert (Professor Emeritus of Nuclear Engineering at the Polytechnic University of Madrid) with female high school students in Granada, Spain, to share experiences and address important issues for girls entering STEM studies and careers, during the NEA's joint mentoring workshop co-ordinated with WiN Spain and Sociedad Nuclear Española, on 5 October 2021 (Sociedad Nuclear Española); Protective clothing (AREVA, Jean-Marie Taillat); Page 13: Entry into force of the 2004 Protocols to amend the Paris and the Brussels Supplementary Conventions, December 2021; A man pressing a legal advice service button on a transparent screen (Shutterstock, NicoElNino); Page 15: Korea Wolsong Nuclear Power Plant (Korea Wolsong NPP); Uranium "yellow cake" (AREVA); Page 19: View of the Osiris research reactor, Saclay, France (CEA); Top view of the TREAT core, Idaho National Laboratory (INL), United States; Page 21: Neutron Time of Flight EARS 1 experiment, providing data used in the NEA Joint European Fission and Fusion project (Source: CERN); Core tank exterior of the Inherently Safe Subcritical Assembly (ISSA) (Lawrence Livermore National Laboratory, United States); Binary (Pixabay); The NEA GitLab for software, data and benchmark projects; Page 23: Distribution of electrical energy (Shutterstock, Urbans); Researcher (Shutterstock, Kittirat Roekburi); Page 25: Robotic (Shutterstock, PopTika); Workshop (Shutterstock, Matej Kastelic); Page 27: Shin Kori NPP units 3 and 4, Korea, March 2015 (KINS, Korea); Page 28: Stakeholders (Shutterstock, Rawpixel.com); Stakeholders (D. Somsup); Page 29: Legal advice (Shutterstock, SWKStock) and page 30: Vector globe icon of the world (Shutterstock, Art Painter).



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