

Connect

Represent

At Work 2023

Inform

Influence





Foreword

Nuclear energy gained momentum in 2022, with an increasing number of individuals and organizations recognizing its potential. The combination of an urgent climate crisis, volatile energy prices and the fragility of the fossil fuel supply chain – exacerbated by the war in Ukraine – has demonstrated that efforts to promote energy security and sovereignty, as well as a clean energy transition, are inseparable. Governments, the finance community and the public in general are now realizing that nuclear energy can propel the drive to net-zero emissions and be one of the essential pillars of a more secure energy system.

World Nuclear Association, along with our members and key partners, has been at the centre of this transformation. Externally, we have worked tirelessly to bring nuclear energy to the global energy debate so that scenarios, policies, markets and financial schemes recognize its essential contributions. At the same time, we have continued to provide a reality check and to support the industry as it ramps up and gets ready to deliver the promise of new nuclear with the speed and at the scale required.

Last year we were able to return to in-person events, enabling members to connect at the World Nuclear Fuel Cycle conference and World Nuclear Symposium in London, as well as the World Nuclear University Summer Institute held in Spain. World Nuclear Association is proud to connect organizations from the global nuclear industry, facilitating dialogue and collaboration, whilst advocating for nuclear energy and ensuring that the point of view of the industry is represented in all relevant forums – nuclear and non-nuclear – around the world.

We have driven the conversation in a wide range of areas: supporting sustainable finance initiatives and policies to recognize the benefits of nuclear in accordance with environmental, social and governance (ESG) standards and the United Nations Sustainable Development Goals, and working together with regulators, international organizations and standards setting organizations to optimize the way we design, license and regulate nuclear power plants, large and small, for more effective deployment of new nuclear internationally.

The year 2022 was also one of firsts, with the *World Nuclear Performance Report* translated into Chinese and World Nuclear News service streaming a monthly podcast to reach new audiences. The Association

continues to inform on all things nuclear through our Information Library, World Nuclear News and our ongoing engagement with the media. We also coordinated a group of international organizations, professional societies and industry associations monitoring the status of the nuclear facilities in Ukraine and communicating factual and authoritative information on the situation.

The Association contributed to impactful publications, such as the United Nations Economic Commission for Europe (UNECE) Carbon Neutrality Toolkit, which has been key to influencing policymakers in all continents on the sustainability credentials of nuclear energy. The 27th UN Climate Change Conference (COP27) in Egypt saw great visibility for nuclear energy with a large #Atoms4Climate pavilion that featured a comprehensive programme of events, panels, and interviews, and facilitated interactions with delegates and other NGOs. This initiative brought collaboration between the Association, the International Atomic Energy Agency (IAEA), Nuclear4Climate, other nuclear associations, and the industry to deliver a great programme and engage beyond the nuclear sector.

Now in 2023 the industry has the opportunity to further demonstrate the important contribution of nuclear power to decarbonization, energy security and sovereignty, and a just and equitable energy transition for both developed and developing countries. To reach this, the rate of construction of new nuclear reactors must increase, and the operating lifetime of existing nuclear reactors must be extended as much as feasible. As we celebrate the 20th anniversary of World Nuclear University in 2023, we will also continue working to inspire, attract and develop the global workforce needed to deliver the growth of nuclear.

For the coming year, we hope for peace and prosperity as we continue helping the global nuclear industry deliver affordable 24/7 clean energy for all.



Sama Bilbao y Leon
Director General



Bohdan Zronek
Chairman

World Nuclear Association today

World Nuclear Association is the only organization with a global mandate to promote nuclear energy and represent the companies that constitute the worldwide nuclear industry.

Our mission is to enable the growth of the global nuclear sector by connecting companies and individuals across the nuclear value chain, shaping and representing the industry's position in major world forums, providing authoritative information and influencing key audiences, organizations and media.

Our ambition is to grow the contribution of nuclear energy in the global energy mix, in order to build a cleaner, more equitable world, in which everyone has access to 24/7 low-carbon affordable energy and a high quality of life. The *Harmony* goal quantifies this ambition, with at least 25% of global electricity being provided by nuclear energy before 2050 to help meet the demand for sustainable energy.



We **CONNECT** leaders and experts across all aspects of the nuclear industry to enable them to collaborate, conduct research, develop best practices and shape joint positions.



We **REPRESENT** the nuclear industry in major global forums that influence the development, deployment and operation of nuclear energy.



We **INFORM** key audiences on nuclear energy in an authoritative, trustworthy, credible, comprehensive and accessible manner.



We **INFLUENCE** decision-makers, organizations and media to position nuclear energy as an essential contributor to sustainable development.

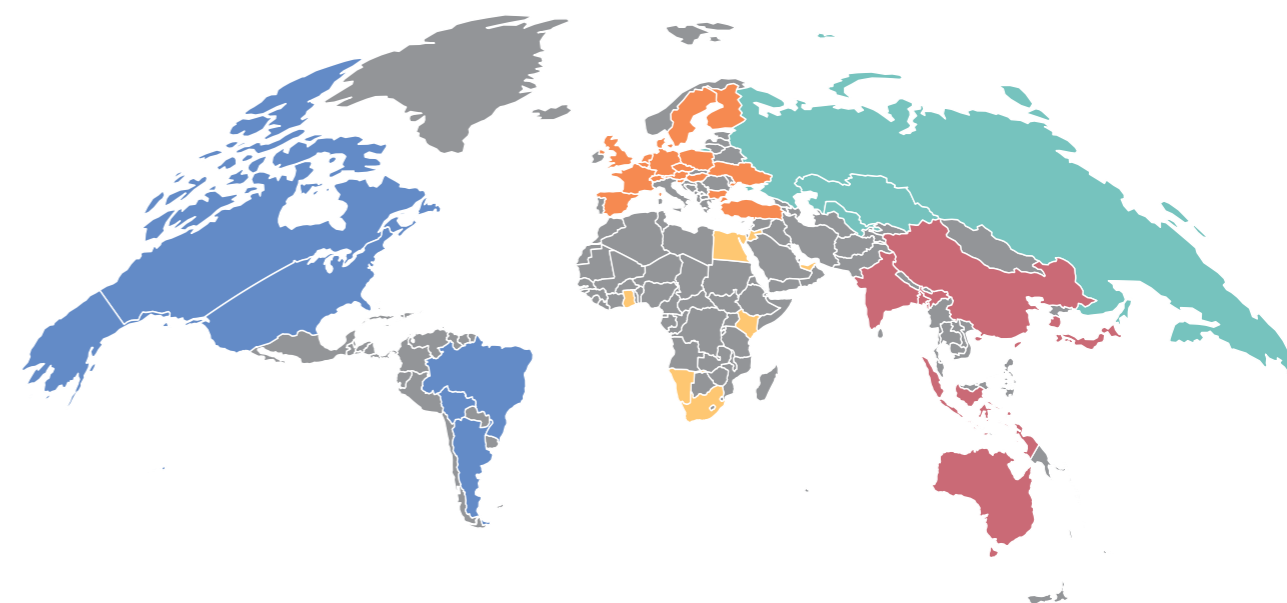
Global network of member companies

Our membership, made up of **189** companies from **42** countries, covers all aspects of the global nuclear industry, including: major reactor vendors; nuclear utility companies; uranium mining, conversion, enrichment and fuel fabrication companies; nuclear engineering, construction and waste management companies; R&D organizations; and companies providing services to the nuclear industry in areas such as transport, law, insurance and finance.

By becoming a member of World Nuclear Association, you become part of the international network that is shaping the future of nuclear energy. We provide unique opportunities to help your company and the global nuclear industry to operate at its full potential.

Being a member means you can:

- Raise your company's international profile in the globalized nuclear market.
- Network with industry leaders and technical experts from around the world and from across the nuclear value chain.
- Support the promotion of nuclear energy and the industry's vision in the international arena.
- Influence decisions on topics of strategic importance to nuclear development.
- Develop and share common industry positions and best practices.



Africa and Middle East ● 10 members

Egypt, Ghana, Jordan, Kenya, Namibia, South Africa, United Arab Emirates

Americas ● 57 members

Argentina, Bolivia, Brazil, Canada, USA

Asia-Pacific ● 48 members

Australia, Bangladesh, China (Mainland and Taiwan), India, Indonesia, Japan, Singapore, South Korea

Europe ● 61 members

Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Hungary, Luxembourg, Netherlands, Poland, Slovenia, Spain, Sweden, Switzerland, Turkey, UK, Ukraine

Russia and Central Asia ● 13 members

Kazakhstan, Russia, Uzbekistan

Connect

The Association provides many opportunities for its members to interact and collaborate

Industry cooperation through Working Groups

Working Groups are forums where the Association's members and invited observers share best practices, conduct analysis and develop consolidated positions on a wide range of important industry issues. Working Groups also act as the interface between the industry and organizations that set the policy framework for nuclear power, such as the International Atomic Energy Agency (IAEA) and the International Commission on Radiological Protection (ICRP). Each group is chaired by an expert from a member company and has a Board member assigned as a mentor. Technical and administrative

support is provided by the Secretariat. Working Groups have developed their own programme of work, covering the main topics of interest for members and the whole industry. Task Force groups are occasionally created to deal with emergent topics.

Working Group meetings are held throughout the year and are often combined with other events to maximize opportunities for business networking. In 2022, Working Group meetings were held in January, April (alongside the WNFC conference), and in September (alongside World Nuclear Symposium).



Working Group Structure

Fuel Cycle WGs

Fuel Report

Co-Chair for Utilities: Julien Garrel (EDF)
Co-Chair for Suppliers: Malcolm Critchley (ConverDyn)
Staff Director: Olga Skorlyakova

Used Fuel Management

Chair: Cécile Evans (Orano)
Deputy Chair: Anders Sjöland (Vattenfall)
Staff Director: Aaron Erim

Transport

Chair: Kurtis Hinz (TAM International)
Deputy Chair: Tony Grange (Westinghouse)
Staff Director: Serge Gorlin

International Network for Safety Assurance of Fuel Cycle Industries

Chair: Marcos Luis (ENUSA), Staff Director: Kaajal Desai

Nuclear Deployment & Value Chain WGs

Cooperation in Reactor Design Evaluation and Licensing (CORDEL)

Chair: Tom Bergman (NuScale Power)
Vice Chairs: Nawal Prinja (Jacobs),
Byung-Ryul Jung (KEPCO E&C)
Staff Directors: Allan Carson, Ronan Tanguy

Supply Chain and Long-term Operation

Chair: Laurent-Olivier Coudeyre (EDF)
Staff Director: Nathan Paterson

Economics, Law and Finance

Co-Chairs: Milton Caplan (MZ Consulting),
Chris White (Urenco)

Decommissioning

Chair: Mike Pieraccini (EDF)
Staff Director: Aaron Erim

Cross-Cutting WGs

Radiological Protection

Chair: Marcel Lips (Kernkraftwerk Goesgen-Daeniken AG)
Deputy Chair: Josip Zic (McMaster University)
Staff Director: Sameh Melhem

Security

Chair: Robert Rodger (UK National Nuclear Laboratory)
Deputy Chair: Sam Stephens (Jacobs)
Staff Director: Ronan Cavellec

Workforce & Talent Development

ESG

Members' Forum

Chair: Anna Bryndza, UxC, Staff Director: Kaajal Desai

Advisory Groups

DG Advisory Council

Chair: Clark Beyer (Global Fuel Solutions)
Staff Director: Virginie Ryan-Taix

Communication Group

Chair: Diane Hughes (NuScale Power)
Deputy Chair: Rebecca Astles (Urenco)
Staff Director: Kristina Valen

Innovation Panel

Cooperation Forum for Nuclear Technology Associations

End Energy Users Panel

Emerging Markets Panel

Events that unite the global nuclear industry

World Nuclear Association hosts several high-level events that provide a global forum and commercial meeting place for industry representatives. In 2022, we resumed in-person events, including the annual World Nuclear Symposium and World Nuclear Fuel Cycle conference.

World Nuclear Symposium

World Nuclear Symposium is the annual event that brings together the global nuclear community and takes place every year in September in London, UK. Under the theme *Rising to the energy challenge*, the Symposium programme featured CEOs, nuclear industry experts and speakers from the financial and energy communities discussing the key issues for the nuclear sector, including sessions on sustaining fuel supplies; seizing the opportunity for new build; and financing low-carbon infrastructure. The event also provided networking opportunities between nuclear energy industry professionals through the exhibition, as well as at the welcome reception and gala dinner, which were held at London's iconic venues, the Victoria and Albert Museum and the Natural History Museum.

World Nuclear Symposium 2022 key statistics



The more we make nuclear accessible, financeable and achievable in countries throughout the world, the more nuclear will be considered as a viable option to achieve those carbon transition objectives.

Daniel Dean

Chair of the International Bank for Nuclear Infrastructure (IBNI) - Implementation Organization Strategic Advisory Group, speaking at World Nuclear Symposium 2022



Today at the Symposium, we have seen high-level representatives from the nuclear industry at the table. Thanks to the networking here and listening to the experts we have been able to touch with our hands the fact the nuclear industry is ready to be part of the global decarbonization process.

Lorenzo Santini

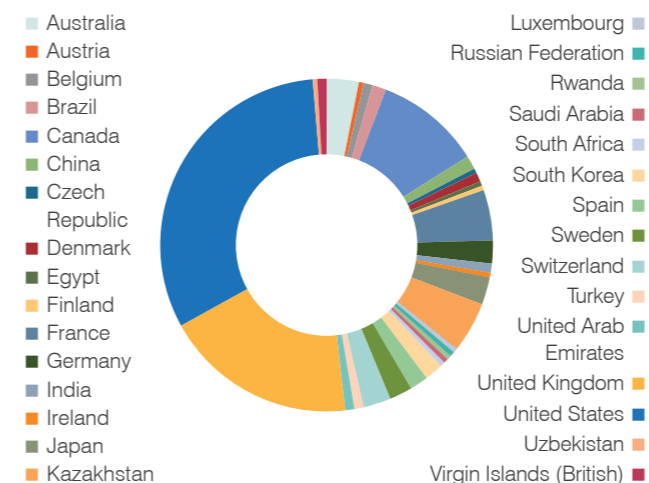
Director, Nuclear Business Development, Worley, speaking at World Nuclear Symposium 2022

World Nuclear Fuel Cycle

The World Nuclear Fuel Cycle (WNFC) conference, run annually in collaboration with the Nuclear Energy Institute, provides an international forum to discuss issues affecting the nuclear fuel cycle, such as security of supply, international trade and uranium market dynamics, with leading industry experts providing insights to help participants navigate the complex fuel marketplace. WNFC is normally held in a different location each year, enabling people from all continents to attend, and in 2022 it was held in London, UK.



Where are WNFC delegates from?



2023 events

- 17-18 April**
Working Group Meetings, London, UK, and virtual
- 18-20 April**
World Nuclear Fuel Cycle, The Hague, the Netherlands
- 4-6 September**
Working Group Meetings, London, UK, and virtual
- 6-8 September**
World Nuclear Symposium, London, UK

INSAF's visit to Romans-sur-Isère fuel fabrication facility

In March, the International Network for Safety Assurance of Fuel Cycle Industries (INSAF) Working Group held a meeting and a technical tour at Framatome's Romans site in France. Members of the Working Group found it an invaluable opportunity to share knowledge and best practices on safety aspects of fuel fabrication plants.



Connecting professionals through World Nuclear University innovative programmes

In September 2023, World Nuclear University (WNU) will celebrate the 20th anniversary of its founding. The internationally-recognized World Nuclear University inspires and develops the competencies of future leaders in the nuclear industry.

World Nuclear University delivers innovative, world-class programmes in leadership, communications and professional development, and facilitates international partnerships to encourage equity, inclusion and diversity of thought.



Summer Institute

The World Nuclear University Summer Institute is a unique five-week immersive leadership development programme that brings together the future leaders of the industry to interact with senior executives, hear from experts, and work together in diverse, international peer groups. The programme is mentored by experienced leaders from across the global nuclear sector. In 2022, the Summer Institute took place in Valencia and Madrid, Spain, including a week of technical tours at different nuclear facilities across the country.

70 fellows

50+ industry leaders

35 countries

44% women

20 IAEA



The best part of the Summer Institute journey was getting to know those who were on it with us – long-lasting friendships, which will be cherished throughout our careers. The programme challenged us in ways we never expected, and in turn has given us an opportunity to grow both as individual leaders, and as a united collective.

Elias Dagher

Environmental Risk Assessment Specialist,
Canadian Nuclear Safety Commission



Alumni Winter Camp

The Summer Institute Alumni Winter Camp, created in 2022, is tailored to support the development of the Summer Institute alumni community and to facilitate continued professional growth. During the four-day programme hosted by Swissnuclear, alumni worked together in small working groups on real-life challenges in the host country, presenting to a panel of senior leaders. The alumni represented 10 different Summer Institute cohorts.



Looking ahead to 2023

World Nuclear University has several programmes planned, and various initiatives coming soon to mark the exciting milestone of its 20th anniversary.

January

Strategic Leadership Academy: our virtual, two-week programme is designed to expand the knowledge and awareness of the critical issues in plant lifetime management and long-term operation through expert presentations and innovative group challenges.

June/July

The Summer Institute 2023, our immersive leadership development programme, will be hosted in Osaka, Japan and will feature a technical tour to Fukushima.

September

WNU 20th anniversary celebration event (invitation only).

October

School on Radiation Technologies: the two-week in-person programme will be hosted by NECSA in South Africa.

December

Winter Camp, in collaboration with Swissnuclear (to be confirmed): a special event supporting our elite Summer Institute alumni community.



Represent

Representing the nuclear industry in key international forums

In 2022, World Nuclear Association continued to represent the global nuclear industry at various committees, as well as several events.

International Atomic Energy Agency

World Nuclear Association participated in numerous International Atomic Energy Agency (IAEA) working groups and initiatives.

Nuclear Harmonization and Standardization Initiative

The Association promotes the views of the nuclear industry through being an ongoing active participant in six of the seven specific working areas of the Nuclear Harmonization and Standardization Initiative (NHSI), which was established by the IAEA to bring together policymakers, regulators, designers, vendors, and industrial approaches to small modular reactors (SMRs).

Throughout the year, the Association organized nuclear industry-wide workshops to gather viewpoints, consolidate joint positions and provide input to the initiative. The Association represented the industry at the inaugural NHSI meeting in June, and continues to represent it across all the working areas, including a lead role on aspects of codes and standards. The NHSI represents an opportunity to share the Association's wealth of experience and expertise from our 15 years' work on harmonization, with the aim to increase cooperation and develop a coordinated plan for a streamlined approach to reactor licensing.

Bringing the industry viewpoint to nuclear safety and security standards

The Association participates in the IAEA Safety Standards committees relating to nuclear safety (NUSSC), waste (WASSC), radiation (RASSC), and transport (TRANSSC). The Radiological Protection and the Waste Management and Decommissioning Working Groups provided significant input for a draft Safety Guide, *Application of the*

Concept of Clearance (DS 500), and to a working group assessing the long-term strategy for the IAEA Safety Standards. In both cases, many of the Association's recommendations were accepted.

The Association has been instrumental in raising awareness of difficulties in the global shipment of radioactive material and the creation of the IAEA Denial of Shipment working group. In its first meeting in January 2023, the working group, chaired by the Association, developed an ambitious action plan to help facilitate nuclear transport including reinvigorating the global network of national focal points for denial of shipment.

Sharing SMR experience

CORDEL was invited to present on two occasions to the Small Modular Reactor (SMR) Regulators' Forum, which brings together leading nuclear regulators to identify, enhance understanding of, and address emerging challenges in SMR regulatory discussions.



Contributing to forward-looking nuclear energy programmes

The Association represents the industry in four IAEA technical working groups, which provide advice, recommendations, and formulate guidance for the IAEA's activities across various programmes:

- Small and Medium Sized or Modular Reactors (TWG-SMR).
- Nuclear Power in Low-Carbon Energy Systems (TWG-NPLCES).
- Nuclear Fuel Cycle Options and Spent Fuel Management (TWG-NFCO).
- International Radioactive Waste Technical Committee (WATEC).

We also contribute industry data and nuclear capacity projections for the annual IAEA report, *Energy, Electricity and Nuclear Power Estimates for the Period up to 2050*.

In 2022, the Association was a member of the steering committee for the upcoming report on *Status and Trends in Spent Fuel and Radioactive Waste Management*.

OECD Nuclear Energy Agency

Throughout 2022, we continued our contribution to the work of the OECD Nuclear Energy Agency (OECD-NEA). Much of this was via the working groups that fall under the Committee on Nuclear Regulatory Activities (CNRA), notably the Vendor Inspection Cooperation Working Group (VICWG) and the Working Group on Codes and Standards (WGCS). We also participated in the Committee for Technical and Economic Studies on Nuclear Energy Development and the Fuel Cycle (aka the Nuclear Development Committee, NDC) and the Committee on Radiological Protection and Public Health (CRPPH).

In addition, CORDEL contributed to the following workshops:

- In-Service Inspection – on the harmonization of certification of non-destructive examination personnel.
- Advanced Construction and Manufacturing Methodologies for New Nuclear Build – on advanced manufacturing techniques.

International Commission on Radiological Protection (ICRP)

Throughout 2022, World Nuclear Association intensified its collaboration with the ICRP in the context of potential changes to the radiological protection system. The Association participated in the 6th International Symposium on the System of Radiological Protection (ICRP2021⁺), which took place in Vancouver, Canada in November. The overarching theme of ICRP2021⁺ was the need to review and refine the system of radiological protection over the coming decade to ensure it remains fit for purpose for the next generation. Members of the Association's Radiological Protection Working Group presented the nuclear industry's viewpoint regarding the review of the radiological protection system. The Association's position paper on *Managing Low Dose Radiation Exposure* was also presented.

International Ministerial Conference on Nuclear Power in the 21st Century

We contributed to the IAEA *International Ministerial Conference on Nuclear Power in the 21st Century* in Washington, DC, USA, explaining how the nuclear industry can contribute towards achieving net-zero at speed and scale, as well as how the regulatory regime could support this accelerated deployment of nuclear projects. Sama Bilbao y León participated in the conference alongside other high-level leaders, including: Rafael Mariano Grossi, Director General, IAEA; William Magwood, Director General, OECD Nuclear Energy Agency (OECD-NEA); Mohamed Al Hammadi, President, World Association of Nuclear Operators (WANO) and CEO, Emirates Nuclear Energy Corporation (ENEC); and Keisuke Sadamori, Director for Energy Markets and Security, International Energy Agency (IEA).



United Nations Scientific Committee on the Effects of Atomic Radiation

The Association provided substantial input data from nuclear fuel cycle facilities to the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) report on *Evaluation of occupational exposure to ionizing radiation (Annex D)*, published in September 2022.

World Association of Nuclear Operators

The Association renewed a memorandum of understanding with the World Association of Nuclear Operators (WANO). Both associations agreed to cooperate in several areas, including emergency preparedness and response, export control, ageing management, capacity building and engagement with newcomer countries.



In October, Sama Bilbao y León represented the Association at the 2022 WANO Biennial General Meeting in Prague, Czech Republic, hosted by CEZ, and provided the vision of the global nuclear industry.

Global Forum for Nuclear Innovation 2022

In July, the Association participated in the Global Forum for Nuclear Innovation 2022 in London, UK. Using an interactive format, the Forum sought to create a cultural shift within the nuclear sector, to enable innovation while keeping a strong safety culture. Sama Bilbao y León provided a keynote speech encouraging all participants to become agents of change to help the nuclear sector accelerate the incorporation of innovation.



Tenth NPT Review Conference

For the Tenth Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) that took place in August 2022 in New York, USA, the Association gathered 20 national and international industry associations supporting the many uses of nuclear technology and radiation to sign a joint statement highlighting the importance of pillar III of the NPT – the peaceful uses of nuclear energy and nuclear technology. This joint statement was presented to Ambassador Gustavo Zlauvinen, President of the Tenth NPT Review Conference by Director General Sama Bilbao y León at a side event attended by NPT delegates and senior industry representatives. This was the first time the industry had the opportunity to interact with the NPT delegates and emphasize the importance of pillar III. This collaboration has spun off the Cooperation Forum for Nuclear Technology Associations, to which the Association will provide secretariat support, that will seek to amplify and synergize efforts of individual associations in various areas such as radiological protection, transport, recruitment and retention, outreach and communications.



We, therefore, call upon the NPT States Parties to:

- *Acknowledge that nuclear energy and technologies are essential to sustainable development and the sound environmental stewardship of our planet and to mitigating climate change.*
- *Support IAEA's activities and actions to expand and sustain access to peaceful uses as well as to promote the safety and security of all civilian nuclear facilities for peaceful uses.*
- *Uphold the right of all States Parties that meet their obligations under the NPT to access peaceful nuclear techniques and applications, and to facilitate the transfer of nuclear technology to those countries.*
- *Recognize that the open and transparent exchange of safety-related information is essential to the peaceful uses of nuclear technology.*
- *Develop the potential of civilian nuclear technologies for peaceful purposes via an integrated approach involving the IAEA, UN agencies, and other multilateral organizations, including the international development banks.*
- *Work in a timely and efficient manner towards the harmonization of regulations that will facilitate broader access to peaceful nuclear technologies.*

From the joint statement signed by national and international industry associations during the Tenth NPT Review Conference

Representing the nuclear industry in the global clean energy dialogue

World Nuclear Association is leading efforts to bring nuclear energy into the global discussions about clean energy, energy security and sustainable development.

Global Clean Energy Action Forum

The 13th Clean Energy Ministerial and the 7th Mission Innovation (CEM13/MI7), renamed this year as the Global Clean Energy Action Forum, took place in Pittsburgh, Pennsylvania, USA in September 2022. This ministerial provided significantly more visibility and recognition to nuclear energy, although nuclear still did not have a principal role in the central programme of the ministerial. Sama Bilbao y León participated in a high-level roundtable, *Advancing Nuclear Deployment for Global Energy Security*, which included: Fatih Birol, Executive Director, International Energy Agency (IEA); David Turk, Deputy Executive Director, IEA; Rafael Grossi, Director General, IAEA; Kathryn Huff, Assistant Secretary for the Office of Nuclear Energy, USA; William Magwood, Director General, OECD-NEA; and ambassadors and industry representatives.

The Association led a side event on *Nuclear Energy's Role in Pathways to Net-Zero* alongside the United Nations Economic Commission for Europe (UNECE), NICE Future and the Canadian Nuclear Association. This event showcased the recently released UNECE Carbon Neutrality Toolkit with an ambitious role for nuclear in the clean energy systems of the future.

We also moderated a panel on *Nuclear in a Sustainable, Secure and Affordable Energy System* during the Advanced Nuclear Energy Business Forum, which was hosted by the Nuclear Energy Institute in coordination with World Nuclear Association, Canadian Nuclear Association, Nucleareurope, and the UK Nuclear Industry Association.

World Utilities Congress

We took part in several panel sessions during the Nuclear Energy Leadership Forum at the World Utilities Congress in Abu Dhabi, United Arab Emirates. Sama Bilbao y León discussed the latest developments within the nuclear industry, and how successful new build projects have helped the decarbonization efforts of the countries where they have been built. Nuclear energy was also discussed

within the mainstream Strategic Conference, as Sama took part in a discussion on *The role of nuclear energy in achieving net-zero*



Atlantic Council

The Association has increased collaboration with the Atlantic Council, to enhance the visibility of nuclear energy in its energy work. We contributed to its annual publication, *The 2022 Global Energy Agenda*, which included nuclear energy for the first time.



In March, the Association participated in the Global Energy Forum organized by the Atlantic Council at which Sama Bilbao y León spoke of the important role of nuclear energy in terms of energy security and energy independence, particularly considering the ongoing situation in Ukraine. We also participated in the New Nuclear Capital Symposium 2022 in October. Sama took part in a panel alongside other energy industry leaders discussing financing considerations for building new nuclear projects.



African Energy Week

We participated in several sessions during African Energy Week, including a side event on *Atoms for Africa: Nuclear power and the future of total electrification*. Sama Bilbao y León discussed opportunities for African countries to use nuclear power to end energy poverty while ensuring energy security. This also provided a good opportunity for the Association to open channels of communication with African institutions, including the African Union, African Commission on Nuclear Energy (AFCON) and the African Energy Chamber, to support the continent's ambitions to include more nuclear energy in its future clean energy mix. Sama also participated in the first Africa Leadership Dialogue organized by the International Energy Forum, which included the energy ministers of several African countries.

Singapore International Energy Week (SIEW)

At SIEW we took part in the TechTable event, organized by the Energy Market Authority of Singapore. King Lee, Director, Harmony Programme, presented on nuclear energy's contribution to accelerating the energy transition. He also spoke at the SIEW Thinktank Roundtable on the role of nuclear energy in ASEAN decarbonization and its implications for regional nuclear cooperation.

Highlighting the role of nuclear energy in climate change negotiations

In November, we represented the global nuclear industry at the 27th UN Climate Change Conference of the Parties (COP27) in Sharm El Sheikh, Egypt. We collaborated with the IAEA and other nuclear organizations on the large nuclear-themed #Atoms4Climate pavilion in the central 'Blue Zone'. The pavilion hosted an extensive programme of panels, interviews and presentations discussing nuclear energy.

In the run-up to COP27, the Association launched a website portal with information on COP27 and nuclear energy's contribution to achieving a sustainable net-zero emissions future. During the conference, the Association presented at several side events and extensively covered updates from the conference on the World Nuclear News website and social media.

Sama Bilbao y León spoke at two official United Nations Framework Convention on Climate Change (UNFCCC) side events. One event brought together three United Nations agencies – the IAEA, UNECE and the United Nations Industrial Development Organization (UNIDO) – to highlight the essential role of nuclear energy in achieving decarbonization. The other event included US Secretary of Energy Jennifer Granholm and the heads of several national nuclear trade associations.

We communicate the latest and most authoritative information about nuclear energy to the industry, government, media and academia.

Information channels

Our information channels include the World Nuclear Association website with its Information Library and Reactor Database, World Nuclear News (WNN), and several social media accounts that enable us to deliver accurate information in a timely manner. In addition, the Association produces landmark reports for the nuclear industry.

The Information Library section of the website features over 180 detailed pages covering all aspects of the nuclear industry and is a valuable resource for policymakers, politicians, scholars and the general public. In 2022, the number of views for the Information Library section increased by 4.6%, compared to the previous year.

The Reactor Database presents a global dashboard showing the most recent construction starts and grid connections, and highlights the top-performing reactors worldwide. The Reactor Database draws on the International Atomic Energy Agency's (IAEA's) Power Reactor Information System (PRIS) as well as our own research, to provide statistics and in-depth information on every nuclear reactor around the world.

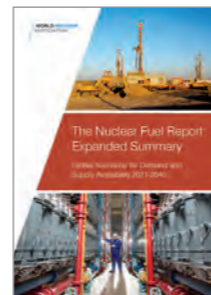
World Nuclear Performance Report

The *World Nuclear Performance Report* provides an up-to-date picture of the nuclear power sector, both for the generation of electricity from reactors in operation today, and reactors currently under construction. In 2022, the Association opened a dedicated website section featuring highlights from the 2022 edition of the report, case studies, and a presentation of the key results from the report's author Jonathan Cobb, Senior Communication Manager.



Working Group reports

In 2022, we released the Expanded Summary of *The Nuclear Fuel Report: Global Scenarios for Demand and Supply Availability 2021-2040*. The Summary outlines the main conclusions of the 20th edition of *The Nuclear Fuel Report* and covers key issues facing the nuclear industry. Both the Expanded Summary and *The Nuclear Fuel Report* are biennial publications produced by the Association's Fuel Report Working Group, released in alternating years.



We also published a report on *Hardware Description Language (HDL) Programmed Device (HPD) Technology in Nuclear Power Plants*, written by the Digital Instrumentation & Control Task Force of the Cooperation in Reactor Design Evaluation and Licensing (CORDEL) Working Group. The report identifies gaps to achieving a consistent approach in industry standards and differences in regulatory approach relating to the use of HPD technology in nuclear power plants.

In addition, we released a report by CORDEL's Mechanical Codes and Standards Task Force on *Advanced Manufacturing of Nuclear Components*, highlighting the benefits that innovative manufacturing techniques can bring to the nuclear industry.

The Association's Radiological Protection Working Group released two position statements: *Managing Low Dose Radiation Exposure*; and *The Need for a Robust Basis for Changes to Radiological Protection Recommendations*. The area of low dose is of particular significance as it covers all public planned exposure as well as the overwhelming majority of occupational exposure.

Reporting on nuclear energy

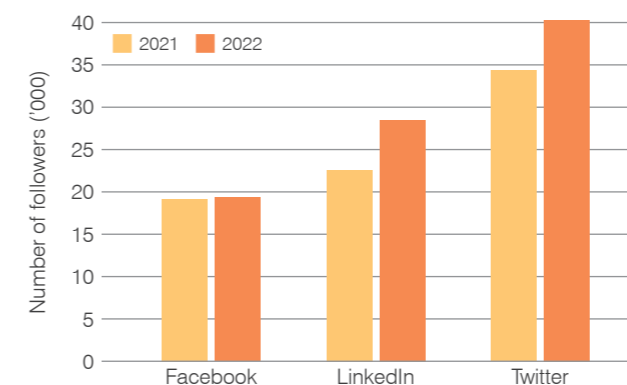
World Nuclear News (WNN) provides comprehensive daily coverage of developments in the nuclear power sector with specialists reporting on the latest news and trends, providing background information, expert commentary and links to authoritative sources. Coverage is shared widely via the *WNN Daily* and *WNN Weekly* free email newsletters, which are sent to subscribers across the world. In May, WNN launched its monthly podcast providing a round-up of the latest nuclear news and interviews with key individuals in the nuclear industry. Director General Sama Bilbao y León featured in the launch episode, where she spoke with WNN Editor Alex Hunt, setting out the opportunities and challenges facing the nuclear energy sector. The podcast, which had over 10,000 downloads by the end of 2022, is accessible on the WNN website and all major podcast platforms.



Number of followers

Platform	2022 Followers	Change (%)
World Nuclear Association	Twitter – 40k	up by 17%
	LinkedIn – 22.5k	up by 26.5%
	Facebook – 19.3k	up by 1.5%
World Nuclear News	Twitter – 56.9k	up by 25%
	LinkedIn – 38.7k	up by 30%
	Facebook – 145k	up by 1.5%

World Nuclear Association annual change in the number of followers

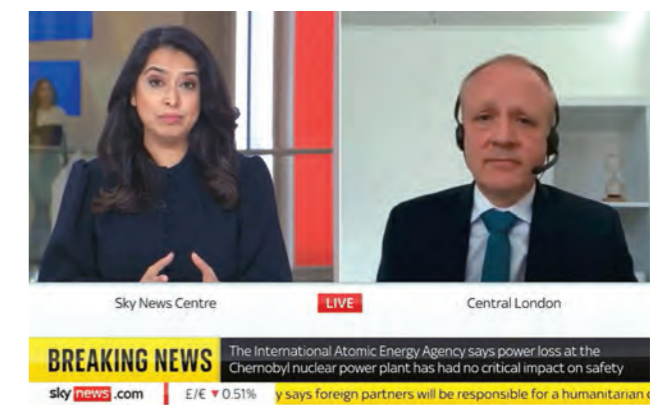


Russia-Ukraine war

The Association has been closely monitoring the situation in Ukraine since the outbreak of the Russia-Ukraine war. We have been in constant communication with the IAEA and WANO, working together to manage the difficult situation. We have also led an group of nuclear organizations to share information and to coordinate common messages. In particular, we have been looking at the impacts of the conflict on nuclear facilities and personnel, and the wider implications for the nuclear industry. We have been addressing media enquiries and updating our web and social media presence to include the latest and most accurate information about the events in Ukraine. The Association has:

- Published an information page on the situation in Ukraine that is updated frequently.
- Reported daily in World Nuclear News on news relating to the conflict.
- Issued several joint statements with other nuclear associations, including one in support of the IAEA initiative to ensure the safety and security of nuclear facilities and staff in Ukraine.
- Launched a new portal on our website gathering the information relating to the conflict.

We have been featured in global media commenting on the matter, including ABC, BBC, Bloomberg, CNBC, Radio 5 Live, Times Radio and Sky News.



Influencing global leaders, governments, and organizations

In 2022, the Association continued strengthening its relationships with prominent international organizations and increased its outreach to potential newcomer regions.



nuclear power economics, in support of the preparation of a new report for the region; and the second in May on nuclear communication, as part of the 12th Annual Meeting of the Nuclear Energy Cooperation Sub-Sector Network (NEC-SSN), which laid the ground for further cooperation in this area. The Association also contributed to a nuclear energy panel during the ASEAN Energy Business Forum (AEBF) and provided input for the seventh *ASEAN Energy Outlook*, which for the first time included information on nuclear energy.

United Nations Economic Commission for Europe

A highlight of our collaboration with the United Nations Economic Commission for Europe (UNECE) was the publication of the Carbon Neutrality Toolkit, which is designed to help policymakers make informed decisions towards the implementation of the 2030 Agenda for Sustainable Development and the Paris Agreement. The Toolkit sets out realistic pathways to achieve carbon-neutral energy systems, including the electrification of all sectors through renewable energy and nuclear power, and the widespread deployment of advanced small modular reactor (SMR) nuclear technologies.

The project resulted in several United Nations publications supportive of nuclear energy, and the UNECE work was referenced by many governments justifying new nuclear development. The Association also collaborated with the UNECE to promote the findings of the Carbon Neutrality Toolkit at the 13th Clean Energy Ministerial and at the COP27 climate change conference.

ASEAN Centre for Energy

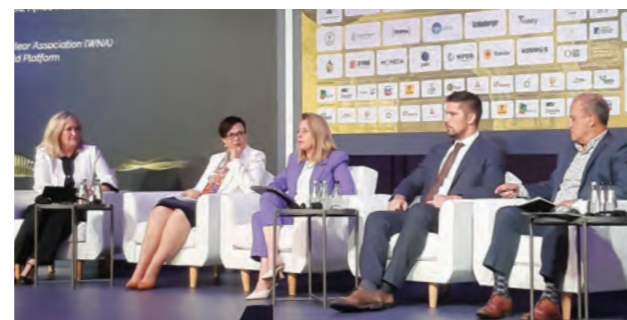
The Association continued its collaboration with the ASEAN Centre for Energy (ACE) through the organization of two workshops: the first one was held in March on

International Monetary Fund

We continued our cooperation with the International Monetary Fund (IMF) to explore the economic benefits of nuclear energy for the global energy transition. During an IMF webinar on *State of Climate Action 2022: Energy, Food Systems, Finance*, Sama Bilbao y León presented the essential role of nuclear technologies to help ecosystems and human systems adapt to the consequences of global climate change.

Cooperation with the African Union

In recent years, several African countries have strengthened their commitment to nuclear energy and expressed willingness to further their nuclear programmes. There is currently one operating nuclear power plant in South Africa and one plant under construction in Egypt.



The Association has been strengthening relationships with key African institutions, such as the African Union's African Mineral Development Center (AMDC), and became an International Observer Organization of the International Framework for Nuclear Energy Cooperation (IFNEC). We are also establishing cooperation with the African Commission on Nuclear Energy (AFCONE).

United Nations Sustainable Development Agenda

Nuclear energy is gaining recognition as a key enabling technology for sustainable development. In 2022, we were the first nuclear organization to join the 24/7 Carbon-Free Energy Compact, and presented the first update on nuclear energy to the UN's Energy Compact Action Network.



Taxonomies for sustainable finance

We have continued to support efforts to influence the ongoing development of the European Union taxonomy for sustainable activities, as well as other national and regional taxonomies around the world.

In June 2022, the European Parliament voted to include nuclear energy in the EU taxonomy, thereby allowing nuclear projects access to sustainable financing options.



The European Parliament's positive vote sends a clear endorsement of nuclear energy to the financial community. The Parliament has listened to the science and recognized that sustainable investment in nuclear energy will help the EU reach net zero by 2050. Now governments, investors, and the industry must act urgently and accelerate the deployment of new nuclear capacity to achieve this goal.

Sama Bilbao y León
Director General, World Nuclear Association

World Nuclear Association responded to the development of the International Sustainability Standards Board (ISSB) global baseline for climate and sustainability reporting standards and has begun working with the ISSB on the future development of nuclear industry sustainability reporting requirements. A sustainable finance task force of member company experts was established to inform the Association of developments in this rapidly evolving area.

G7

In the run-up to the G7 meeting in June, the Association and several other organizations: Canadian Nuclear Association, Japan Atomic Industrial Forum, Nuclear Energy Institute, Nuclear Industry Association and Nucleareurope, called upon G7 leaders to maximize the large contribution to decarbonization and energy security of nuclear reactors, and to support the development of nuclear technologies.

International Energy Agency

We contributed to the International Energy Agency (IEA) report: *Nuclear Power and Secure Energy Transitions: From today's challenges to tomorrow's clean energy systems*. The report recognizes today's essential contribution of nuclear energy as an established large-scale energy technology and the second largest source of low emissions and foresees growth in new nuclear.

Governance and Organization

The Director General of World Nuclear Association, Sama Bilbao y León, is responsible for the running of the Association and is ultimately accountable to the Board of Management. The Board holds final approval on proposals made by the Director General, including strategic and budgetary decisions. Currently Bohdan Zronek, Chief Nuclear Officer, ČEZ, serves as Chairman of the Board, Philippe Knoche, Chief Executive Officer, ORANO, holds the position of Vice-Chairman.

The Board of Management

The Board comprises senior executives from member companies who meet twice a year and serve for two years. Every two years a new Vice-Chairman is appointed. After one year's service, the Vice-Chairman takes on the role of Chairman for the next two years, before serving again as Vice-Chairman in the fourth year.

The Board fulfils all statutory duties pertaining to the Association's governance and sets policies and strategic objectives acting on proposals from the Director General.

To ensure balance among the elected members of the Board, each of the three categories of institutional membership – suppliers, generators and general – must be represented by at least two members.

Board members function as mentors for the various Working Groups. This enables the Board to monitor the activities of the groups and to shape their overall agenda.

In 2022, the Board met on 26 April and 7 September; both meetings were held in London (in hybrid format).

There are also two Board subcommittees, whose members serve two-year terms and report directly to the Chairman of the Board:

- The Governance and Nominations subcommittee oversees appointments to the Board and manages Director General and senior staff succession planning.
- The Audit and Finance subcommittee conducts regular reviews of the financial health of the Association and holds in-depth dialogue with the auditor during the preparation of the annual accounts.

Audit

In March 2022, an independent review of the 2021 Annual Report and Accounts was conducted by Taylor Viney Marlow Ltd (TVM).

TVM concluded that the 2021 Annual Report and Accounts give a true and fair view of the state of the Association's affairs on 31 December 2021 in accordance with UK generally accepted accounting practice (GAAP) and they were subsequently approved and signed off by the Chairman and Board of Management on 4 April 2022.

The 2021 Annual Report and Accounts were presented at the annual general meeting (AGM) held on 7 September 2022.

Membership meetings

There is one annual AGM meeting where members are updated on the operations of the Association and can ask the Chairman and Director General questions. At the AGM, the accounts are presented for approval and any fee changes or alterations to the fee structure are put to a vote. Immediately after the AGM, the Members Council takes place, during which significant developments in the Association are presented to the member company representatives in attendance.

Board members

As of April 2023

Chairman



Bohdan Zronek
Chief Nuclear Officer,
ČEZ

Vice-Chairman



H.E. Mohamed Al Hammadi
Managing Director &
CEO, Emirates Nuclear
Energy Corporation



Junjing An
General Manager,
CGN-Uranium
Resources Co.



George Borovas
Partner,
Hunton Andrews Kurth



Malcolm Critchley
President & Chief
Executive Officer,
Converdyn



Tim Gitzel
President & Chief
Executive Officer,
Cameco



Leonam dos Santos Guimarães
Chief Executive Officer,
Eletronuclear



Bryan Hanson
Executive Vice
President & Chief
Generation Officer,
Exelon Generation



Mingang Huang
Chief Economist,
China National Nuclear
Corporation



Philippe Knoche
Chief Executive Officer,
ORANO



Kirill Komarov
First Deputy Director
General, ROSATOM



Hitoshi Mizuta
Executive VP & Deputy
Chief Nuclear Officer,
Kansai Electric Power
Company



Takuma Nagase
General Manager,
Nuclear Fuel
Department,
Marubeni Corporation



In-sik Park
Executive Vice President
of Overseas Business
Division, KHNP



Jean-Michel Quilichini
Director of Nuclear Fuel
Division, EDF



Boris Schucht
Chief Executive Officer,
Urenco



Johan Svenningsson
Country Chairman,
UNIPER Sweden



Jay Wileman
President & Chief
Executive Officer, GE
Hitachi Nuclear Energy



Liudmila Zalimskaya
Chairman of the Board
of Directors, TENEX



Mingguang Zheng
Senior Vice President,
SNPTC

Honorary



Hans Blix
Director General-
Emeritus, International
Atomic Energy Agency



Gerald Grandey
Former CEO, Cameco
Chairman-Emeritus,
World Nuclear Association

Secretariat

World Nuclear Association is made up of an international Secretariat of 40 people, covering a broad range of expertise and experience, who are responsible for coordinating the work that the Association does on behalf of its members. Most of the Secretariat work from the London office, with representatives also based in India and China. The Secretariat is led by Director General Sama Bilbao y León. It is composed of four departments – Industry Cooperation; Communication; Finance and Administration; and World Nuclear University – and one project team for the Harmony programme.



Sama Bilbao y León
Director General



François Morin
Director, China



Shah Nawaz Ahmad
Senior Advisor, India, Middle East and South-East Asia



Ronan Cavellec
Senior Advisor



Philippe Costes
Senior Advisor



Virginie Ryan-Taix
Head of Communication



Jonathan Cobb
Senior Communication Manager



Jennifer Corander
Events Manager



Alex Hunt
Editor, WNN



Claire Maden
Consultant Editor, WNN



Brigita Mammetti
Visual Communication Manager



Alec Mitchell
Senior Writer & Analyst



Richard Petrie
Graphic Designer



Warwick Pipe
Deputy Editor, WNN



Henry Preston
External Communication Manager



Stephen Tarlton
Writer & Analyst



Kristina Valen
Marketing & Communication Manager



Joel Watkins
Writer & Analyst

Finance and Administration



Paul Kidman
Head of Finance and Administration



Nicole Hemmings
Receptionist and Office Administrator



Vivien Lotasz
Executive Assistant to the Director General



Carolyn Malet de Carteret
HR Consultant



Ana Rodriguez
Administration Assistant



Binita Shah
Accounts Assistant



Cedric Thenard
IT Project Manager



Serge Gorlin
Head of Industry Cooperation



Allan Carson
Project Manager, CORDEL



Kaajal Desai
Programme Lead, Fuel Cycle



Aaron Erim
Programme Lead, Recycling, Decommissioning & Waste



Eunsung Kim
Visiting Research Officer



Keiyu Maruyama
Visiting Research Officer



Sameh Melhem
Programme Lead, Radiological Protection



Nathan Paterson
Senior Programme Lead, Supply Chain



Olga Skorlyakova
Senior Project Manager



Ronan Tanguy
Project Manager, CORDEL

Harmony programme

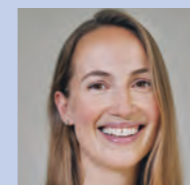


King Lee
Director, Harmony Programme



David Hess
Policy Analyst

World Nuclear University



Isis Leslie
Director



Raquel Heredia Silva
Training Manager



Karyna Zamani
Junior Training Programme Coordinator

Membership

92 Energy Ltd
ABDAN
ABEN (Bolivian Nuclear Energy Agency)
ALARA Logistics
Alpiq Suisse S A
American Lithium Corp.
ARAO-Agency for Radwaste Management
ARMZ Uranium Holding Co
(JSC Atomredmetzoloto)
Australia Nuclear Science and Technology
Organisation
Bannerman Energy Ltd
BATAN The National Nuclear Energy Agency,
Indonesia
BHP Billiton
BofA Securities
Boss Energy Ltd
Buhlmann Rohr-Fittings-Stahlhandel GmbH
+ Co. KG
Bureau Veritas UK Limited
Burgess Salmon
Cameco Corporation
Canadian Nuclear Association
Canadian Nuclear Laboratories
Central Research Institute of Electric
Power Industry
CEZ a s
CGNPC Uranium Resources Co Ltd
China National Nuclear Corporation
Chugoku Electric Power Co Inc
Cimtas Pipe
CIS Navigation
CLP Power Hong Kong Limited
Constellation Energy Generation, LLC
Conuar SA
ConverDyn
Curzon Uranium Trading Ltd
Czech Nuclear Association
Daya Bay Nuclear Power Operations and
Management Co Ltd
Deep Geo Repository Inc.
Deep Isolation Inc
Deep Yellow Limited
Denison Mines Corporation
DIAMO
DMS s.r.o.
Edlow International Company
Electric Power Development Co Ltd (J-POWER)
Electricite de France
Electronics Corporation of India Limited
Eletronuclear
ELINI - EUROPEAN Liability Insurance for
the Nuclear Industry
Emerton
Emirates Nuclear Energy Corporation
Energoatom
ENGIE
ENUSA Industrias Avanzadas SA
EPZ
Euratom Supply Agency
European Mutual Association for
Nuclear Insurance
FinNuclear Association
Fluor BWXT-Portsmouth
Framatome SAS
Fuel Link Limited
GE Hitachi
Global Atomic Corporation

Global Fuel Solutions
Global Nuclear Associates
GoviEx Uranium Inc.
Greenland Minerals and Energy
GSG Corporate Ltd
Heathgate Resources Pty Ltd
Hitachi GE Nuclear Energy Ltd
Hokkaido Electric Power Co Inc
Hokuriku Electric Power Co Inc
Hunton Andrews Kurth LLP
HZC International
Iberdrola Generacion S.A.
IBRAE - Nuclear Safety Institute of
Russian Academy of Sciences
Idaho National Laboratory
Idemitsu Kosan Co Ltd
Imperial College London
Industrias Nucleares Do Brasil S.A.
IsoEnergy Ltd
ITOCHU Corporation
Jacobs Clean Energy Limited
Japan Atomic Power Co, The
Japan Nuclear Fuel Ltd
Japan NUS Co., Ltd
Japan Steel Works, The
Jordan Atomic Energy Commission
JSC Atomenergomash
JSC Atomstroyexport
Kairos Power LLC
Kansai Electric Power Co Inc
KAZATOMPROM
Kenya Nuclear Electricity Board
KEPCO E&C
KEPCO Nuclear Fuel Co., Ltd.
Kernkraftwerk Gösgen-Däniken AG
King's College London (Project Alpha)
Korea Atomic Energy Research Institute
Korea Electric Power Corporation (KEPCO)
Korea Hydro & Nuclear Power Co
Kyushu Electric Power Co
Laramide Resources Ltd.
Last Energy
Lightbridge Corporation
LRQA Group Limited
Marubeni Corporation
McMaster University
Mitsubishi Heavy Industries Ltd
Mitsui & Co. Energy Ltd
MoltexFLEX Ltd
Mozweli (PTY) Ltd t/a Mozweli
Nuclear Engineering
MVM Plc
MZ Consulting
NAC International
Namibian Uranium Association
Nano Nuclear Energy Inc.
National Nuclear Laboratory
"Navoiyuran" State company
New York Nuclear Corporation
newcleo Ltd
NexGen Energy Ltd
NKENT Consulting LLC
North West University
Nuclear Electric Insurance Limited
Nuclear Fuels Corporation
Nuclear Industry Association (NIATR)
Nuclear Power Ghana

Nuclear Power Plant Company
Bangladesh Limited
Nuclear Power Plants Authority (NPPA)
Nuclear Risk Insurers Limited
Nuclear Transport Solutions (NTS)
Nuclear-21
Nucleoeleétrica Argentina S.A.
Nukem Technologies
NuScale Power Corporation
OKG Aktiebolag
Ontario Power Generation
Orano
Orano NCS GmbH
Orascom Construction
Paks II Nuclear Power Plant Private Company
Limited by Shares
PFI LLC
Pillsbury Winthrop Shaw Pittman LLP
Polskie Elekrownie Jądrowe sp z o.o.
PricewaterhouseCoopers
Rio Tinto plc
Rockett Science Inc.
Rolls Royce plc
ROSATOM State Atomic Energy Corporation
Rosca Solutions
Rosenergoatom Concern
RSB Logistic GmbH
Rusatom Overseas
Rusatom Service
Safesea Transport Inc
Seaborg Technologies ApS
Segra Capital Management LLC
Shearman & Sterling LLP
Shikoku Electric Power Co Inc
Siemens Energy Global GmbH & Co. KG
Silex Systems Limited
SNPTC
Sojitz Corporation
South African Nuclear Energy Corporation
(Necsa)
Sumitomo Corporation
Taiwan Power Company
TAM International Inc
Techsnabexport (TENEX)
Teollisuuden Voima Oyj (TVO)
Terrestrial Energy Inc
The University of Manchester
Thomas Thor Associates
Tohoku Electric Power Co Inc
Tokyo Electric Power Company Holdings, Inc.
TradeTech
TradeTech Energy LLC
TVEL Corporation
Ubaryon Pty Ltd
Uniper (Sydkraft Nuclear Power AB)
Uranium Corporation of India Ltd (UCIL)
Uranium Energy Corp.
Uranium Industry a.s.
Urenco Limited
UxC, LLC
Vattenfall
Weland & Tuxhorn AG
Westinghouse Electric Co
White & Case LLP
WMC Energy
World Institute for Nuclear Security - WINS
Worley

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