

An abstract graphic on the left side of the page, consisting of several overlapping, curved blue lines that create a sense of motion and depth. The lines are rendered with a gradient, appearing lighter where they overlap and darker at the edges.

The Nuclear Energy Agency

Energy is the motor of social and economic development for an increasing world population, which – according to the United Nations – is expected to double to reach 10 billion by 2050. World primary energy demand will increase by some 50 per cent between now and 2020, and fossil fuels will account for nearly 90 per cent of that demand. The use of these fuels, which are not renewable and have other important applications, will be limited in the long term by economic and ethical considerations. Already, today, their use adds to increasingly serious environmental problems around the world, principally global warming caused by an increase in the concentration of greenhouse gases, especially carbon dioxide. In addition to its lower direct impact on the environment, there are two important reasons why nuclear power is being used as an energy source: it increases the security of energy supplies and the stability of energy prices.

Today nuclear energy provides some 17 per cent of all electricity produced worldwide, and it is concentrated mostly in industrialised countries in which nuclear energy accounts for a quarter of the total production. A number of OECD countries are also major nuclear equipment suppliers to other parts of the world where the greatest growth in demand for nuclear energy will likely take place in the years to come.

Nuclear power is being challenged in deregulated electricity markets by its economic competitiveness. Its credibility as a major source of energy also depends on the industry's success in maintaining the highest standards of safety in nuclear plants – notably to prevent a major accident and to minimise possible damaging consequences to man and the environment – as well as to safely manage the nuclear waste, an inevitable by-product of nuclear operations.

These challenges, coming at a time of ever-tighter government budgets, require that interested countries pool their efforts and work together. The Nuclear Energy Agency is there to help make it happen.



Luis E. Echávarri
NEA Director-General



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The NEA: From the Beginning

Concerned with the rapidly increasing energy needs of post-World War II European economic recovery, and particularly the possibilities presented by nuclear power, the Council of the OEEC (the predecessor of the OECD) set up the European Nuclear Energy Agency (ENEA) in February 1958. The Agency's name was changed in 1972 to the Nuclear Energy Agency (NEA) to reflect its growing membership beyond Europe's boundaries.

The first phase of the NEA's programme mainly consisted of laying the foundations for nuclear co-operation, and focused on launching several joint R&D undertakings such as the Halden and Dragon reactor projects, and the prototype Eurochemic plant for the reprocessing of spent nuclear fuels. This period came to a natural end during the late 1960s as the experimental phase of nuclear energy evolved into commercial, industrial development.

By the early 1970s the Agency's role had changed to one where major emphasis was placed on providing a forum for co-ordinating the national nuclear programmes of Member countries, particularly in the health, safety and regulatory areas. As nuclear energy gathered momentum in the 1970s, governments came under increasing pressure from their constituents to give greater priority to the environmental aspects of nuclear energy and to the safety and regulation of nuclear power plants.

Evaluating the role that nuclear energy can continue to play in contributing to a stable, long-term energy supply, as well as its potential contribution to minimising greenhouse gas emissions from anthropogenic activities, are important aspects of today's international co-operation. To the extent that budget constraints have limited national research activities, international co-operation has become even more necessary to facilitate further progress and address major issues in such key fields as safety, radiation protection, waste management and nuclear liability. In addition, such co-operation is needed to ensure the active maintenance of the underlying nuclear energy knowledge base and scientific infrastructure. This is, indeed, the "raison d'être" of the OECD Nuclear Energy Agency.

The NEA: Basic Facts and Figures

The Nuclear Energy Agency (NEA) is a specialised agency within the Organisation for Economic Co-operation and Development (OECD), an intergovernmental organisation of industrialised countries, based in Paris, France. The OECD's fundamental mission is to enable Members to consult and co-operate with each other so as to achieve the highest possible sustainable economic growth, improve the economic and social well-being of their populations, and contribute to development worldwide.

The NEA's current membership consists of 27 countries*, in Europe, North America and the Asia-Pacific region:

Austria	France	Japan	Spain
Australia	Germany	Korea	Sweden
Belgium	Greece	Luxembourg	Switzerland
Canada	Hungary	Mexico	Turkey
Czech Republic	Iceland	Netherlands	United Kingdom
Denmark	Ireland	Norway	United States
Finland	Italy	Portugal	

Together they account for approximately 85 per cent of the world's installed nuclear capacity. Nuclear power accounts for almost a quarter of the electricity produced in NEA Member countries.

The NEA works closely with the International Atomic Energy Agency (IAEA) in Vienna – a specialised agency of the United Nations – and with the European Commission in Brussels. Within the OECD, there is close co-ordination with the International Energy Agency and the Environment Directorate, as well as contacts with other directorates, as appropriate.

Staff and Budget

The NEA has a staff of approximately 80. The annual budget for the Main Secretariat is about 56 million French francs and that of the Data Bank about 22 million French francs.

* The NEA Data Bank, a separate entity within the NEA, has a membership of 21 countries (see list page 23).

The NEA Mission

The mission of the NEA is to assist its Member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for the safe, environmentally friendly and economical use of nuclear energy for peaceful purposes. To achieve this, the NEA works as:

- a forum for sharing information and experience and promoting international co-operation;
- a centre of excellence which helps Member countries to pool and maintain their technical expertise;
- a vehicle for facilitating policy analyses and developing consensus based on its technical work.

NEA Areas of Work

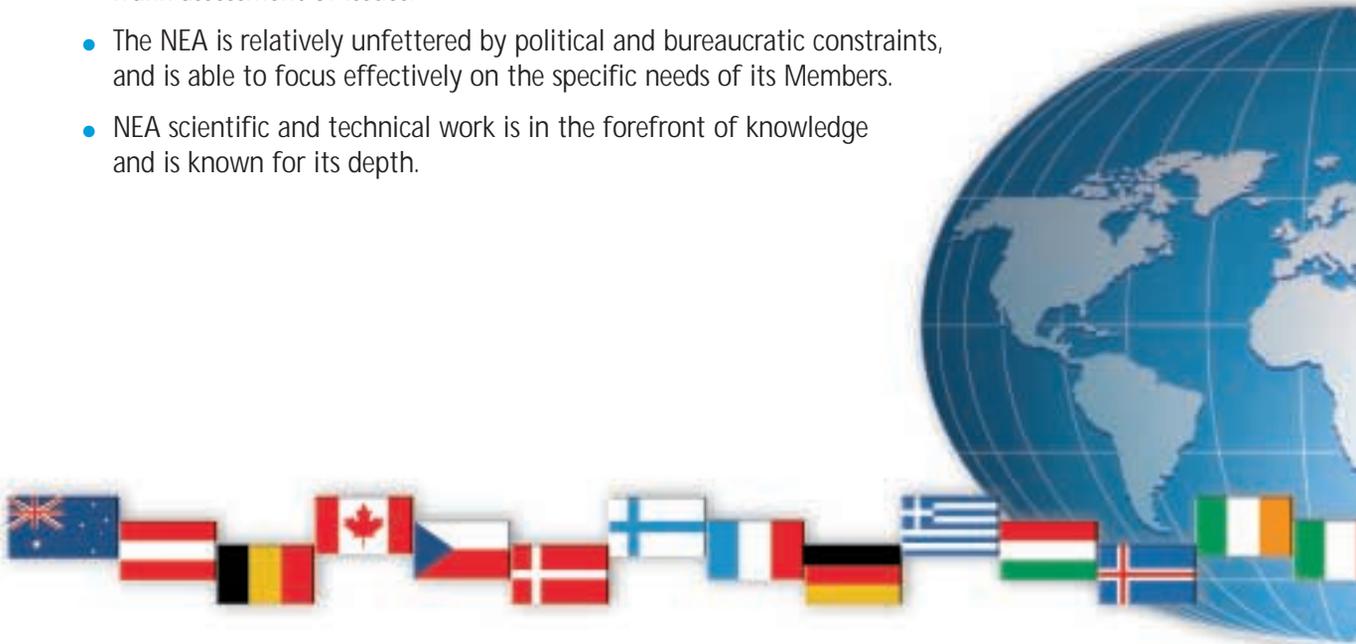
- Nuclear Safety and Regulation.
- Nuclear Energy Development.
- Radioactive Waste Management.
- Radiation Protection and Public Health.
- Nuclear Law and Liability.
- Nuclear Science.
- The Data Bank.
- Information and Communication.



NEA Strengths

The NEA is the only intergovernmental nuclear energy organisation which brings together developed countries of North America, Europe and the Asia-Pacific region in a small, non-political forum with a relatively narrow, technical focus.

- NEA membership represents much of the world's best nuclear expertise.
- By pooling this expertise, the NEA provides each Member access to the substantial experience of others and an opportunity to substantially leverage its resources in this field.
- Homogeneity of NEA membership makes possible a like-minded approach to problems, a climate of mutual trust and collaboration, the full exchange of experience, and a frank assessment of issues.
- The NEA is relatively unfettered by political and bureaucratic constraints, and is able to focus effectively on the specific needs of its Members.
- NEA scientific and technical work is in the forefront of knowledge and is known for its depth.



- The NEA publishes consensus positions on key issues, providing Member countries with credible references.
- The NEA is cost-effective. It operates with a small staff, relying on Member country experts, and provides significant added value.
- The NEA's system of standing technical committees enables the Agency to be flexible and responsive.
 - NEA joint projects and information exchange programmes enable interested Members and non-members to join forces in carrying out research or scientific intercomparison exercises on a cost-sharing basis.
 - The NEA, as part of a larger multi-disciplinary organisation, is uniquely placed to address nuclear energy in the context of broader cross-cutting issues such as sustainable development.



The NEA Committee Structure

The NEA secretariat serves seven specialised standing technical committees under the leadership of the Steering Committee for Nuclear Energy - the governing body of the NEA - which reports directly to the OECD Council.

The standing technical committees, representing each of the seven major areas of the Agency's programme, are comprised of Member country experts who are both contributors to the programme of work and beneficiaries of its results. The approach is highly cost-efficient as it enables the Agency to pursue an ambitious programme with a relatively small staff that co-ordinates the work. The substantive value of the standing committees arises from the numerous important functions they perform, including:

- providing a forum for in-depth exchanges of technical and programmatic information;
- stimulating development of useful information by initiating and carrying out co-operation/research on key problems;
- developing common positions, including "consensus opinions", on technical and policy issues;
- identifying areas where further work is needed and ensuring that NEA activities respond to real needs;
- organising *joint projects* to enable interested countries to carry out research on particular issues on a cost-sharing basis.

STEERING COMMITTEE FOR NUCLEAR ENERGY

Committee on the Safety of Nuclear Installations

Committee on Nuclear Regulatory Activities

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

Radioactive Waste Management Committee

Committee on Radiation Protection and Public Health

Nuclear Law Committee

Nuclear Science Committee

⋮
NEA Data Bank

NEA Joint Projects

The Agency's *joint projects* and information exchange programmes enable interested countries, on a cost-sharing basis, to pursue research or the sharing of data with respect to particular areas or problems. The projects are carried out under the auspices, and with the support, of the NEA. Such projects, primarily in the areas of nuclear safety and waste management, are one of the NEA's major strengths.

Nuclear safety

- [OECD Halden Reactor Project](#)
Project began: 1958. Participating countries: 20. Purpose: nuclear safety research at the Halden Reactor, Norway. Focus is nuclear fuel safety and man-machine interface.
- [OECD International Common Cause Data Exchange \(ICDE\)](#)
Programme began: 1994 (operated by the NEA since 1998). Participating countries: 9. Purpose: collection and analysis of data on common cause failure events occurring at nuclear power plants.
- [OECD-IPSN CABRI Water Loop Project](#)
Project began: 2000. Participating countries: 11. Carried out at the Institute for Protection and Nuclear Safety (IPSN), France. Purpose: investigate the ability of high burn-up fuel to withstand the sharp power peaks that can occur in power reactors due to rapid reactivity insertion in the reactor core (RIA accidents).
- [OECD MASCA Project](#)
Project began: 2000. Participating countries: 17. Carried out at the Kurchatov Institute, Russia. Purpose: provide follow-up to the NEA-sponsored RASPLAV project aimed at resolving remaining uncertainties related to the heat load that the reactor vessel is able to support in the case of a reactor accident involving core melt.
- [OECD SETH Project](#)
Project began: 2001. Participating countries: 14. Carried out at the *Paul Scherrer Institut* (PSI) PANDA facility, Switzerland, and the Siemens Primär Kreislauf, Germany. Purpose: study important thermal-hydraulic phenomena in support of accident management.

- **Sandia Lower Head Failure Project**

Project began: 1999. Participating countries: 8. Carried out at Sandia National Laboratory, USA. Purpose: study the rupture behaviour of the reactor pressure vessel lower head and, as a result, provide information for the development of severe accident management strategies.

Radioactive waste management

- **Co-operative Programme for the Exchange of Scientific and Technical Information Concerning Nuclear Installation Decommissioning Projects**

Programme began: 1985. Participating countries: 12 (40 projects). Purpose: exchange technical information and experience with a view to ensuring that safe, economic and the best environmental options for decommissioning are employed.

- **Sorption Project**

Phase II began: 2000. Participating countries: 10 (16 organisations). Consists of benchmark exercises co-ordinated by the NEA. Purpose: provide an evaluation of various approaches used to model sorption phenomena in the context of performance assessments of geologic disposal concepts for the disposal of radioactive waste in deep geological formations.

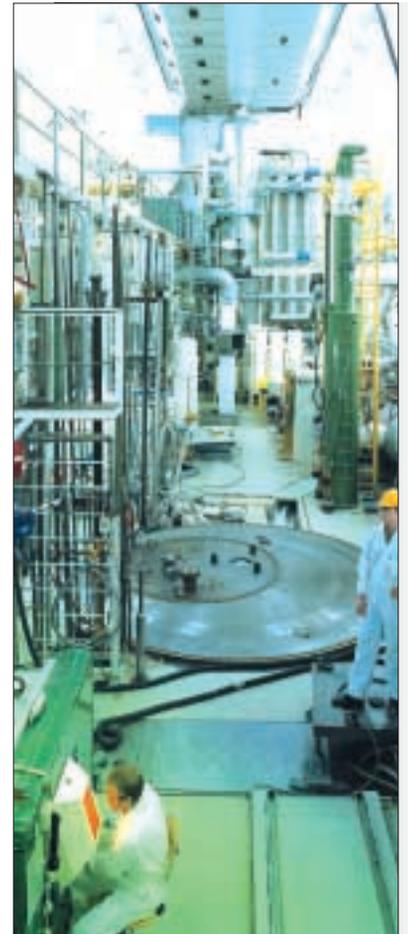
- **Thermochemical Database (TDB) Project**

Phase II began: 1998. Participating countries: 13 (17 organisations). Based at NEA Headquarters. Purpose: provide an internationally recognised and quality-assured chemical thermodynamic database of selected chemical elements for use in the safety assessment of radioactive waste repositories.

Radiation protection

- **Information System on Occupational Exposure (ISOE)**

Programme began: 1992. Participating countries: 26 (422 reactors). Administered by a joint NEA and IAEA Secretariat. Purpose: maintains the world's largest database on occupational exposure to ionising radiation at nuclear power plants.



Specific Areas of Competence

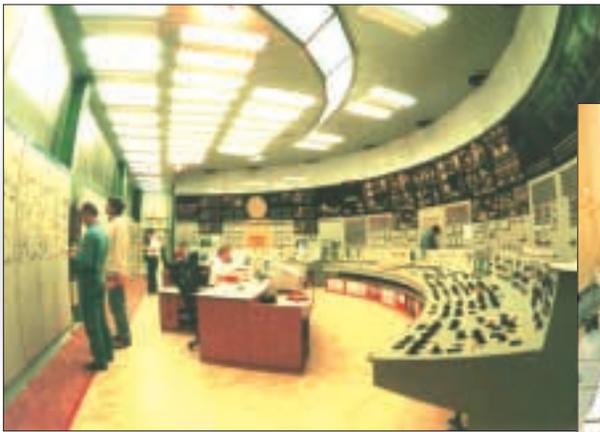


Nuclear Safety and Regulation

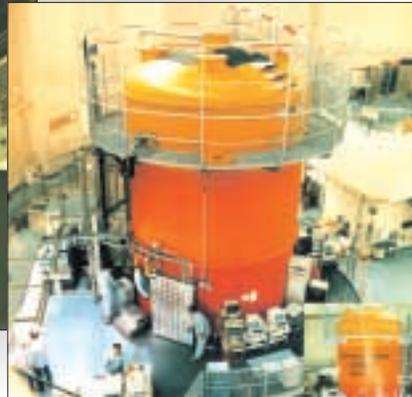
The Mission

To assist Member countries in maintaining and further developing:

- the scientific and technical knowledge required to assess the safety of nuclear reactors and other nuclear installations;
- efficient and effective regulation that is based on current scientific and technical knowledge and gives priority to factors most important to safety.



www.nea.fr/html/nsd/



Main Areas of Work

- **Assuring future nuclear safety competence:** review of needs, development of international approaches, recommendations on ways and means to ensure an adequate level of research capability, organisation of centres of excellence to maintain facilities and expertise.
- **Reactor safety research:** organisation and co-ordination of internationally funded research projects related to the behaviour of reactor systems, pooling of Member countries' financial and technical resources (see NEA Joint Projects on page 12).
- **Risk assessment:** evaluation of the use of probabilistic safety assessments (PSAs) in the operation and regulation of nuclear installations, risk-informed regulations.
- **Analysis and management of accidents:** reactor coolant system accidents, containment system accidents.
- **Operating experience and human factors:** assessments of safety-significant events, research on human and organisational factors, maintenance of the joint NEA/IAEA Incident Reporting System.
- **Structural integrity and ageing:** metal components, concrete structures, seismic behaviour.
- **Fuel safety:** assessments of the technical basis for the use of high burn-up fuel.
- **Regulatory effectiveness and inspection practices:** analysis of experience and practice, identification of emerging research and regulatory issues, safety culture, the impact of deregulation of electricity markets on nuclear safety, communication with the public.

Nuclear Energy Development

The Mission

To provide authoritative, reliable information on nuclear technologies, economics, strategies and resources to governments for use in policy analyses and decision making, including on the future role of nuclear energy within the context of energy policies that contribute to sustainable development.

To contribute to the OECD debate on global issues, such as sustainable development and regulatory reform, bringing NEA expertise and the results of its work into the broader energy, socio-economic and environmental OECD context. To help provide Member countries with consistent and balanced OECD views on nuclear energy.

Main Areas of Work

- **The economics of the nuclear option, and the associated market issues:** market deregulation, capital costs, commercial risks.
- **Technologies concerning the full range of nuclear fuel cycle activities, including decommissioning:** partitioning and transmutation, new reactor designs.
- **Infrastructure to support the nuclear option:** education, research and development.
- **The production, supply and demand of nuclear materials and radioisotopes, and other aspects of their management:** nuclear energy data, reporting on uranium.
- **The potential and expected contribution of nuclear energy in a sustainable development perspective:** economic, environmental and social aspects; external costs.



www.nea.fr/html/ndd/

Radioactive Waste Management

The Mission

To assist Member countries in developing safe management strategies and technologies for spent nuclear fuel, long-lived radioactive waste and waste from the decommissioning of nuclear facilities.



www.nea.fr/html/rwm/

Main Areas of Work

- **Radioactive waste management strategies:** regulatory approaches, geologic disposal, retrievability/reversibility.
- **Safety of geologic repositories:** analysis methodologies, media-specific studies, performance assessments.
- **Peer reviews:** national waste management programmes, safety methodologies, R&D programmes.
- **Decommissioning nuclear installations:** policies, regulation, safety, costs, techniques.
- **Confidence building:** among technical bodies, stakeholders, the public.

Radiation Protection

The Mission

To assist Member countries in the regulation and application of the system of radiation protection by identifying and addressing conceptual, scientific, policy, operational and societal issues in a timely and prospective fashion, as well as clarifying their implications.

Main Areas of Work



www.nea.fr/html/rp/

- **Regulation and application of radiation protection:** emerging policy and strategic issues, comparative risk assessment, consensus building.
- **Evolution of radiation protection:** forum for input to the International Commission on Radiological Protection (ICRP), interpretative guidance for radiation protection regulation and application, lessons learned.
- **Societal aspects of decision making in radiological situations:** stakeholder involvement processes, stakeholder roles and responsibilities, case studies and lessons learned.
- **Nuclear emergency planning, preparedness and management:** organisation and analysis of nuclear emergency exercises, development of new and innovative strategies.
- **Occupational exposure:** collection and analysis of nuclear power plant occupational exposure data.

Nuclear Law and Liability

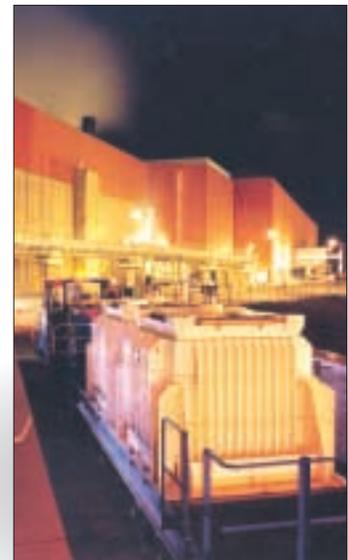
The Mission

To encourage the development of national legislation governing the peaceful uses of nuclear energy and to foster progress towards a global regime of civil liability and compensation for nuclear damage.

Main Areas of Work

- **International nuclear liability regime:** supporting efforts of Member countries to improve the regime, particularly through revision of the Paris and Brussels Supplementary Conventions; supporting efforts to address problems in interpreting and implementing the existing instruments, including the Paris Convention, the Vienna Convention, the Brussels Supplementary Convention, and the Convention on Supplementary Compensation for Nuclear Damage; analysis of issues relating to a global regime.
- **National nuclear legislation:** promotion of legislation based on internationally accepted principles, harmonisation of liability laws.
- **NEA Project support:** providing legal opinions and advice, drafting and interpreting agreements and other instruments.
- **Analysis and dissemination of information:** through publications on national and international developments in nuclear law and the International School of Nuclear Law.

www.nea.fr/html/law/



Nuclear Science

The Mission

To help Member countries to identify, collate, develop and disseminate scientific and technical knowledge used to ensure safe, reliable and economic operation of current nuclear systems and to develop next-generation technologies.

Main Areas of Work

- **Reactor physics:** modelling of reactor stability, neutronic-thermal-hydraulic coupling, physics of advanced reactors, reactor physics experiments benchmark data.
- **Fuel physics and chemistry:** fuel behaviour under normal operating conditions, plutonium disposition and use of MOX fuel, speciation technologies.
- **Partitioning and transmutation:** accelerator-driven systems, fuels and materials, dry reprocessing methods (pyrochemistry).
- **Criticality safety:** burn-up credit for storage and transport of spent fuel, collection and documentation of experimental information.
- **Radiation shielding:** advanced calculation methods, reactor dosimetry, shielding of accelerators and irradiation facilities, benchmark data from experiments.



www.nea.fr/html/science/

The Data Bank

The Mission

To be the international centre of reference for its Member countries* with respect to basic nuclear tools, such as validated computer codes and nuclear data, and to provide a direct service to its users by developing, improving and validating these tools and making them available as requested.



www.nea.fr/html/databank/

Main Areas of Work

- **Computer programs:** collection, validation and dissemination of programs used in all nuclear energy application areas.
- **Nuclear data:** provision of bibliographic, experimental and evaluated nuclear reaction data, worldwide co-ordination of nuclear data evaluation efforts.
- **Thermochemical data:** chemical thermodynamic data for the safety assessment of waste repositories.
- **Database development and management.**

* Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Japan, Korea, Mexico, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom.

NEA Publications and Information



Printed material

The NEA produces a large selection of printed material, part of which is on sale, and part of which is distributed free of charge. The full Catalogue of publications is available free on request from the OECD/NEA Publications Section, 12 boulevard des Îles, 92130 Issy-les-Moulineaux, France. The Catalogue is also available electronically at www.nea.fr/html/pub. Orders may be sent by mail, or placed online at www.oecd.org/publications.



The NEA website

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. A monthly electronic bulletin is also sent free of charge to subscribers, providing updates of new results, events and publications. Sign up at www.nea.fr.



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