

Forum: Environmental Commission

Issue: Ensuring the safe storage of nuclear waste

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Description of the Problem, Background and General Information

Description of the General Problem

Radioactive wastes contain radioactive material, which is highly toxic and dangerous for all organisms. Radioactive waste is usually a by-product of nuclear power, nuclear fissions and nuclear technology from research and medicine. Radioactivity naturally decays over various time periods according to the element and its use. The main approach to securing and storing radioactive waste has been to isolate it in highly secure storage facilities.

Background on the Use of Nuclear Power and the Issue of Radioactive Waste

Nuclear power has long supplied the world with clean energy. However, it has been proven several times that there are risks associated with this. Many countries still think of nuclear power as a good and viable source of energy. The UN and individual member states consider it of paramount concern to ensure the safety of the citizens of the world. Therefore, the security of nuclear power is very important. Nuclear power is very controversial, as many people have serious concerns regarding the safety of the power plants and especially the disposal of the highly radioactive waste. Many advocates of nuclear power believe that the disposal of waste to secure geographical locations will be sufficient to secure and contain the radioactivity, so that the populations around these locations, all over the world, may enjoy a high sense of security.¹ In the EU, research on how to more securely dispose of radioactive waste is highly prioritised. Thirty-five studies on the safety of the transport of radioactive materials have already been conducted between 1996 and 2004.² There are strict safety and security regulatory frameworks in place, although accidents have happened several times as proved with the Fukushima Daiichi nuclear disaster and the Chernobyl disaster. The International Atomic Energy Agency is responsible for advising countries all over the world about nuclear safety, standards and regulations. It is a powerful player within the nuclear

¹ Nuclear white paper 2008: 'Meeting the energy challenge' – Page 29, 2.145-2.147

²http://webarchive.nationalarchives.gov.uk/20100512172052/http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/nuclear/white_paper_08/white_paper_08.aspx - Page 81 2.112

power sector and dictates the most significant regulations. It has ushered in a new sense of international nuclear security in late years. Many countries have researched heavily in securing nuclear power plants, which has resulted in greatly decreased risks of accidents. The most frequently posed ethical question is, whether it is ethically correct to burden future generations with radioactive waste or not. Radioactive waste is highly toxic for the environment and the spread of radioactive particles, as proven during the Chernobyl disaster has made the area too toxic for humans living there. One of the most significant arguments in support of the nuclear power plants is that it is vital for the continuous welfare and acceptable standards of living of the citizens of the world, that global warming come to a halt. Such advocates would also point out the advanced knowledge on how to deal with radioactive waste and nuclear power plants compared to our knowledge of the impact of global warming. There are no discernable way to reverse the effects of global warming, although agencies such as the International Atomic Energy Agency has the knowledge on how to safely store nuclear waste and provide extensive guidance to many countries, companies and other entities. A pragmatic point of view on nuclear waste is that the problems posed by global warming to future generations could potentially be far worse than handling radioactive waste, which can be safely stored. Nuclear energy has also been noted for being extraordinarily cheap for consumers.³ The low-level wastes are buried in shallow burial sites and restricted from the public to protect their health. Short-lived intermediate-level wastes are most likely buried. This waste comes from decommissioning reactors. Most of the long-lived intermediate-level wastes, which originates from fuel reprocessing, will be stored in the deep underground. Waste facilities have many layers of protection in order to protect people until the radioactivity has been reduced to background levels. Furthermore, since radioactive waste has such destructive capabilities in terms of its detrimental effect on human health and other organism, it is only logical that terrorists could consider to use such material in terrorist attacks. Security around power plants, transport of waste and other radioactive materials, and disposals sites should therefore be attached tantamount importance.

General Information on the Current Use of Nuclear Power

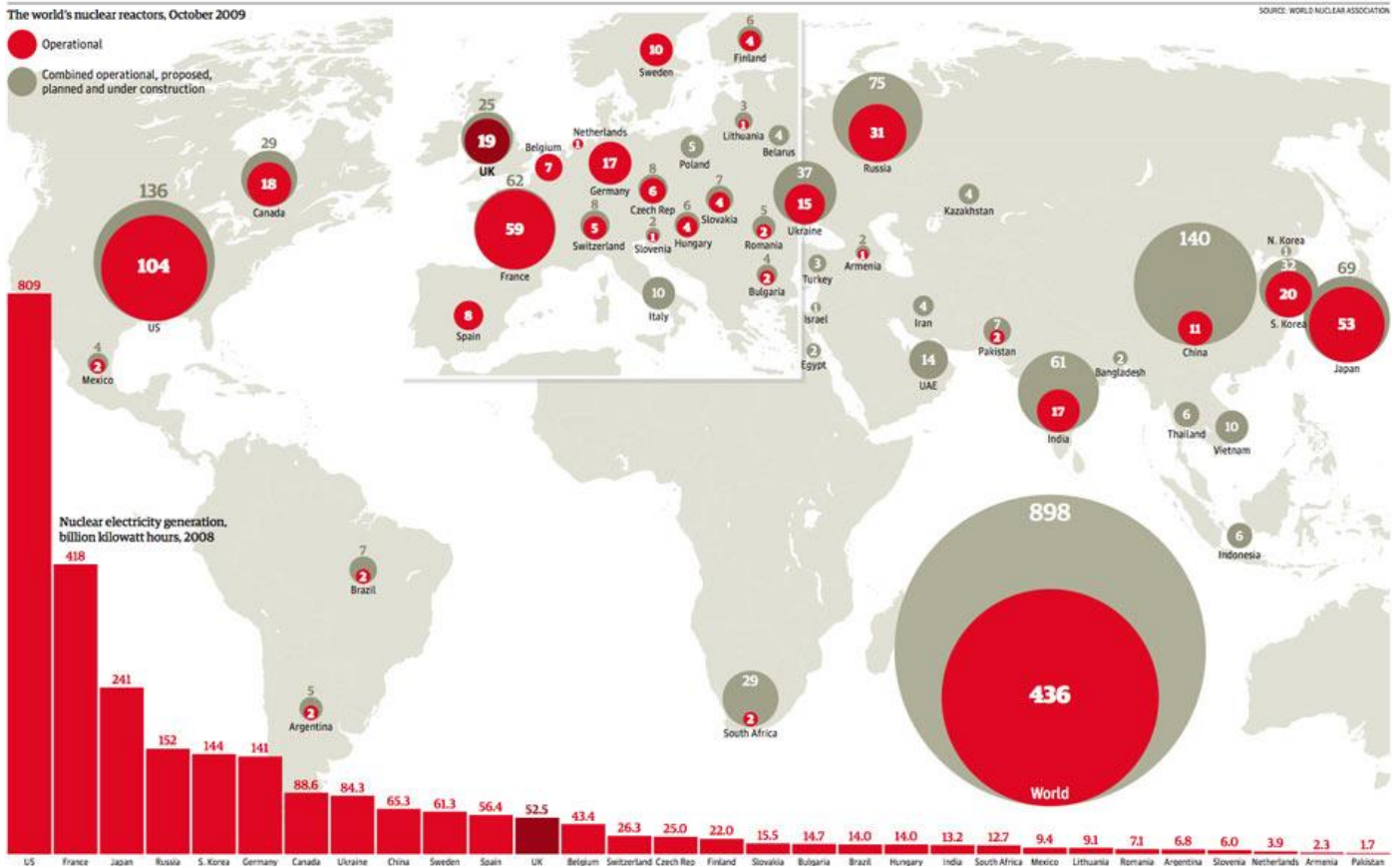
As of May 2014, there are 435 nuclear power plants worldwide in 30 different countries used for electricity generation. Nuclear power supplied 12.3% of the world's electricity production in 2012 (in 2008: 13.5%). In total, 13 countries relied on nuclear energy to supply at least one-quarter of their total electricity. Nuclear power is essential for the economies of many nations, and any proposals

³ Nuclear white paper 2008: 'Meeting the energy challenge' – Page 98, 2.163-2.167

to limit nuclear power or make it more expensive would be met with strong opposition from nuclear power-dependant countries.

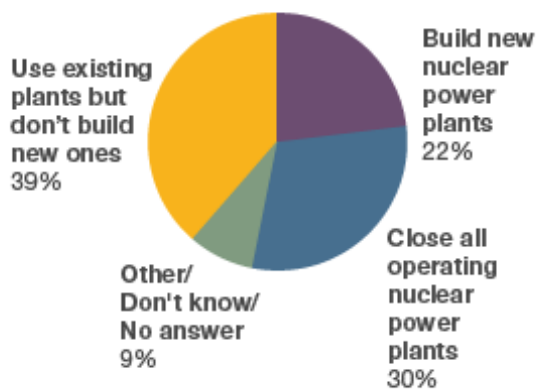
Graphs, Diagrams and Images on Nuclear Power

How the UK compares



Shows the nuclear power plants present around the world. Source: World Nuclear Association.

Views on use of nuclear energy for electricity generation*

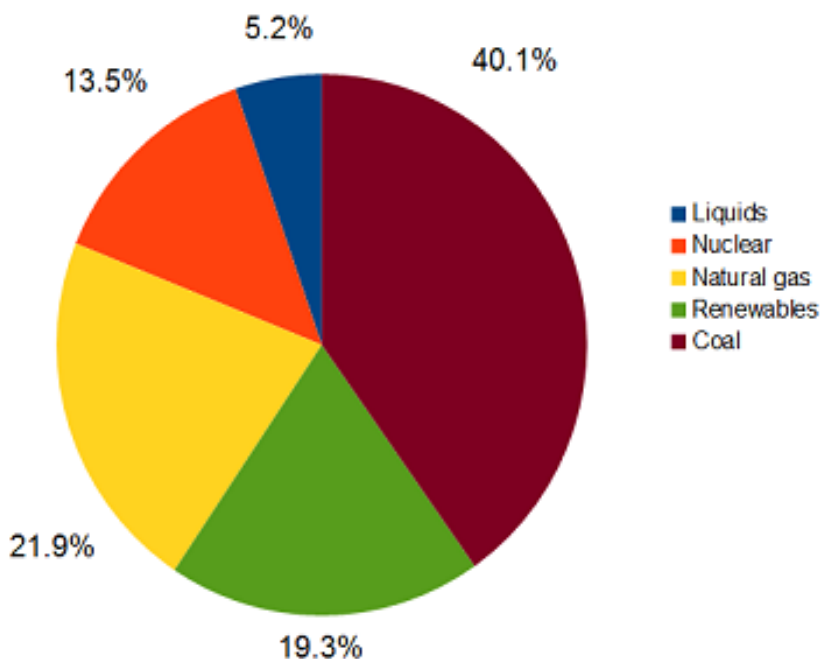


Source: BBC Global Poll conducted by Globescan.com

*Average of 12 countries (Brazil, China, France, Germany, India, Japan, Mexico, Pakistan, Russia, Spain, UK and USA), 2011

World Electricity Generation by Source

Data source: Energy Information Administration, 2008 data



Shows the distribution of the energy supply of the entire world.

	By Volume	By Radioactive Content
High Level Waste	3%	95%
Intermediate Level Waste	7%	4%
Low Level Waste	90%	1%

High level waste is the waste produced from a nuclear reactor, after which it had used the nuclear fuel left. Low-level waste is contaminated items like tools and clothing from power plants' employees and is the majority of radioactive waste produced. The intermediate-level wastes include used filters, steel components from the reactor and effluents from reprocessing. (Source: World Nuclear Association)

Definition of Important Key Terms

- **Radioactivity** - Radioactivity is the process in, which a nucleus of an unstable atom loses energy by emitting ionising radiation. Any material which emits such radiation (alpha particles, beta particles, and gamma rays) is considered radioactive.
- **Nuclear waste disposal** – The disposal of waste products produced through numerous process, such as nuclear power generation.
- **Nuclear power plant** - A nuclear power plant is a thermal power station. The nuclear reactor is its heat source.

Timeline of Nuclear Developments (Historic and Recent)

- **1932**
 - Chadwick studies deuterium (heavy hydrogen), which is an isotope of hydrogen used in nuclear reactors.
 - John Cockcroft teams up with Ernest Walton to split the atom with protons accelerated to high speed.
- **1937**
 - The Westinghouse Corporation builds the 5-million-volt Van de Graaff generator. It could be used as a particle accelerator in atom smashing.
- **1939**
 - Physicists Otto Hahn, Fritz Strassmann, Lise Meitner and Otto Frisch split uranium atoms (fission).
- **1942**
 - Enrico Fermi at the University of Chicago create the first controlled and self-sustaining nuclear chain reaction.
- **1939-1945**
 - The U.S. Army's top-secret Manhattan Project under the direction of physicist J. Robert Oppenheimer attempt to develop the first transportable atomic bomb.
- **1945**
 - To force the Japanese into surrender during World War II, the United States drop atomic bombs on Hiroshima and Nagasaki.
- **1946**
 - First nuclear-reactor-produced radioisotopes for peacetime civilian used at Brainard Cancer Hospital in St. Louis.

- The U.S. Congress passes the Atomic Energy Act which establishes the Atomic Energy Commission (to replace the Manhattan Project).
- **1948**
 - The U.S. government's Argonne National Laboratory plan to commercialise nuclear power in order to produce electricity for consumers.
- **1951**
 - Experimental Breeder Reactor 1 at the Idaho National Engineering and Environmental Laboratory (INEEL) produces the world's first usable amount of electricity derived from nuclear energy.
- **1953**
 - BORAX-I, the first of a series of Boiling Reactor Experiment reactors, is built. BORAX-I proves that steam formation can protect a reactor against "runaway" events.
- **1954**
 - The U.S. Congress passes the Atomic Energy Act of 1954, which amends the 1946 act to allow the Atomic Energy Commission to license private companies to use nuclear materials and build/operate nuclear power plants. It was designed to promote peaceful uses of nuclear energy, implementing President Dwight D. Eisenhower's Atoms for Peace Program.
- **1955**
 - BORAX-III becomes the first nuclear power plant in the world to provide an entire town with all of its electricity.
- **1955**
 - The USS Nautilus SSN 571, the world's first nuclear-powered submarine, prepares for sea trials.
- **1957**
 - The International Atomic Energy Agency is created with 18 member countries to promote peaceful uses of nuclear energy. Today it has 130 members.
- **1962**
 - The first advanced gas-cooled reactor is built in England. The reactor is too big to be installed aboard ship and is instead used to supply electricity to British consumers.
- **1966**
 - The Advanced Testing Reactor at the INEEL begins operation for materials testing and isotope generation.

- **1969**
 - The Zero Power Physics Reactor (ZPPR) a facility for building and testing a variety of types of reactors becomes operational at Argonne National Laboratory-West.
- **1974**
 - The Energy Reorganization Act of 1974 splits the Atomic Energy Commission into the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission (NRC). ERDA's new responsibilities is overseeing the development and refinement of nuclear power, while the NRC concentrates on the safe handling of nuclear materials.
- **1979**
 - The nuclear facility at Three Mile Island experiences a major failure. It results in a partial meltdown of the core and a release of radioactive material.
- **1986**
 - The Chernobyl nuclear disaster occurs in Ukraine during unauthorized experiments when four pressurized-water reactors overheat. The accident releases radioactive particles into the atmosphere that drift over much of the European continent.
- **1990s**
 - U.S. Naval Nuclear Propulsion Program - The U.S. Naval Nuclear Propulsion Program pioneers new materials and develops improved material fabrication techniques, radiological control, and quality control standards.
- **2000**
 - The fleet of more than 100 nuclear power plants in the United States achieve world record reliability benchmarks, operating annually at more than 90 percent capacity for the last decade. Elsewhere in the world, nuclear power energy production grows, most notably in China, Korea, Japan, and Taiwan, where more than 28 gigawatts of nuclear power plant capacity is added in the last decade of the century.
- **2005**
 - Finland approves the building of one of the world's largest nuclear power plants. The nuclear power industry hopes for a revival. The reactor will not be ready for electricity production before August 2014.
- **2007**
 - Construction starts on France's Flamanville 3 reactor. It was expected to open in 2012, but it was postponed until 2016 due to increasing costs. The 1,600 MW European Pressurised Reactor (EPR) will test a new technology, which could potentially be used to replace France's existing 58 reactors.

- **2011**
 - An enormous 9.0 magnitude earthquake and tsunami on March 11, 2011 triggers the Fukushima nuclear plant disaster, which involves meltdowns that contaminated water and forced mass evacuations.
- **2012**
 - Japan shuts down its last working nuclear power reactor after the nuclear disaster. This is the first time since 1970 that Japan has been without nuclear power. Nuclear power had provided approximately 30 percent of the electricity (before 2011).

Relevant Treaties and UN Resolutions

- Convention on the Physical Protection of Nuclear Material.
- Code of Conduct on the Safety and Security of Radioactive Sources and the Supplementary Guidance on the Import and Export of Radioactive Sources.
- Safeguards Agreements and Additional Protocols.
- Convention on Early Notification of a Nuclear Accident.
- Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.
- International Convention for the Suppression of Acts of Nuclear Terrorism.
- Security Council resolution 1540.
- Security Council resolution 1373.

Position of Involved Countries and Parties

Pro-Nuclear Power Countries – Countries very dependent upon nuclear power such as the United States, France, Sweden and the United Kingdom will defend their economic interests in maintaining such nuclear power plants. They will be advocates of traditional pro-nuclear power arguments and try to further their own nuclear power sector.

Anti-Nuclear Power Countries – Such countries are most likely independent/have a very small dependence on nuclear power and seek to limit the use of nuclear power for civilian use. Countries negatively affected by the nuclear waste of Pro-Nuclear Power Countries will most likely talk about ethics and other alternative energy sources to attack their opponents' stands on nuclear power. The nuclear power disasters are always some of the main arguments used by the Anti-Nuclear Power Countries.

Neutral/Developing Nuclear Power Countries – Countries such as China, which is strongly seeking to develop nuclear power plants will seek to defend pro-nuclear power interests. Many

countries also have a neutral approach to nuclear power and will most likely act in accordance with what will benefit their allies most and harm their opponents the most.

IAEA – Supports responsible nuclear power as a viable alternative to the heavily polluting fossil fuels.

Questions to Consider (for the Delegate)

- How is your nation affected by this issue?
- What is your nation's view on the topic?
- Did your nation sign any treaties or resolutions regarding this topic?
- How has your nation acted on this issue?
- How is your country currently acting on the issue?
- What does your nation want to do about the issue in the future?
- What are the positions of the key players on this issue?
- Which UN resolutions/treaties on the issue is my country a party to? Why or why not?
- What could future developments of the issue look like?
- Which countries might be my allies, which countries will I have to convince of my principles and ideas?

Useful Links and Sources

Sources

- <http://www-ns.iaea.org/tech-areas/radiation-safety/code-of-conduct.asp> - Code of Conduct on the Safety and Security of Radioactive Sources, and supplementary Guidance on the Import and Export of Radioactive Sources
- <http://www.un-documents.net/a32r50.htm> - 32/50. Peaceful use of nuclear energy for economic and social development
- <http://www.iaea.org/> - International Atomic Energy Agency
- <http://www.world-nuclear.org/info/nuclear-fuel-cycle/nuclear-wastes/international-nuclear-waste-disposal-concepts/> - World Nuclear Association - International Nuclear Waste Disposal Concepts.
- <http://www.iaea.org/Publications/Documents/Conventions/cppnm.html> - Convention on the Physical Protection of Nuclear Material.
- http://www-ns.iaea.org/security/sc_resolutions.asp?l=28 - Nuclear Safety & Security.

- <http://www.un.org/en/globalissues/atomicenergy/> - Atomic Energy.
- <http://www.unep.org/Documents.multilingual/Default.asp?DocumentID=52&ArticleID=70&I=en> – Safe and Environmentally Sound Management of Radioactive Wastes
- <http://www.un.org/earthwatch/radioactivewaste/> - UN – Radioactive Waste.
- <http://rt.com/business/triple-nuclear-renewable-energy-336/> - 'World must triple nuclear and renewable energy' – United Nations.
- <http://nnsa.energy.gov/aboutus/ourhistory/timeline> - (US) National Nuclear Security Administration (NNSA) - Timeline of nuclear developments.
- <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/radwaste.html> -United States Nuclear Regulatory Commission (U.S.NRC) - Backgrounder on Radioactive Waste.
- <http://www.nrc.gov/waste.html> - United States Nuclear Regulatory Commission (U.S.NRC) - Radioactive Waste.
- <http://www.nei.org/Knowledge-Center/Nuclear-Statistics/World-Statistics> - Nuclear Energy Institute - World Statistics - Nuclear Energy Around the World.
- http://www.nuclearfiles.org/menu/timeline/html_index.htm - Nuclear Files – Timeline of the Nuclear Age.
- <http://www.atomicarchive.com/Timeline/Time2000.shtml> - Atomic Archive - Timeline of the Nuclear Age.
- <http://www.world-nuclear.org/nuclear-basics/what-are-nuclear-wastes/> - World Nuclear Association – “What are the nuclear wastes and how are they managed?”

Useful Links for General Preparation for MUNOH conference, Position Paper and Resolution Paper

- <http://www.un.org/documents/resqa.htm> - General Assembly Archive.
- <http://www.bbc.com/news/world/> - BBC World News.
- <http://unbisnet.un.org/> - United Nations Bibliographic Information System.
- <http://www.cfr.org/> - Council on Foreign Relations.
- <http://www.un.org/en/documents/charter/index.shtml> - UN Charter.
- <http://www.globalpolicy.org/index.php> - Global Policy Forum.
- <http://www.unausa.org/global-classrooms-model-un/how-to-participate/model-un-preparation/resolutions/friendly-and-unfriendly-amendments> - Friendly and unfriendly amendments.

- <http://www.unausa.org/global-classrooms-model-un/how-to-participate/model-un-preparation/resolutions/preambulatory-and-operative-clauses> - Preambulatory and operative clauses.
- <http://www.unausa.org/global-classrooms-model-un/how-to-participate/model-un-preparation/resolutions> - Resolutions.
- <http://www.unausa.org/global-classrooms-model-un/how-to-participate/model-un-preparation/position-papers/> - Position papers.

Note from Vice President

Dear Delegates,

Please pay heed to any issued deadlines and such information. If you have any further questions about the issue, please contact me via email (ec@munoh.de) or Facebook (preferably Facebook).

Best regards,

Frederik Nørum, Vice President of the Environmental Commission.