

La France à la loupe

Nuclear power in France

The first French nuclear power plant was built in 1956, but it was only after the 1970s oil shock that nuclear power gained an important place in the French energy sector. **Planning Act 2005-781 of 13 July 2005 laying down French energy policy orientations** (*loi fixant les orientations de la politique énergétique française du 13 juillet 2005 – in French only*) **confirmed that nuclear energy was to remain the primary source of electricity supply in France.** The Act also encourages diversification of sources of electricity production through renewable energies (wind power, biomass) and the security of electricity supply from oil, gas and coal. **Nuclear energy accounted for 78.4% of electricity production in France in 2006.**

French nuclear capacity (*parc nucléaire français – in French only*) includes 58 pressurized water reactors (PWRs) that produced 450 billion nuclear kilowatt-hours (kWh) in 2006¹, i.e. 78.4% of total electricity production which is of 574 billion kWh. The lifetime of a third of currently operating nuclear plants will end in around 2020 and, with a view to the renewal of its nuclear capacity, France is about to deploy new-generation reactors that meet requirements in terms of production, environmental protection and enhanced nuclear safety. In April 2007, France started building a **third-generation EPR reactor** (*un réacteur de troisième génération EPR² – in French only*) at Flamanville in the Manche Department. The EPR is to be operational by 2012. France is also devoting research programmes to **fourth-generation reactor technology** (*réacteurs de quatrième génération – in French only*) with a view to those reactors being operational by 2040.

There are a number of reasons for choosing nuclear power: it enables France to ensure its **national energy independence** (France imports less than 50% of its energy resources)

¹ Source: Energy Observatory. Statistics are available at:
<http://www.industrie.gouv.fr/energie/statisti/pdf/reperes.pdf> (*in French only*)

² EPR: European Pressurized Reactor: third-generation PWR developed under Franco-German cooperation.

and **environmental protection** (France is one of the European countries which emits the least greenhouse gases) at **a stable and competitive price**.

| NUCLEAR SAFETY

Nuclear safety covers all accident prevention techniques and applies to all stages of the nuclear process from the design to the decommissioning of nuclear facilities, including transport of radioactive substances.

The French Institute for Radioprotection and Nuclear Safety - **IRSN** is a governmental agency that provides expertise in research into and assessment of nuclear and radiological risks.

The **French Nuclear Safety Authority** (*for documents available in English*) or **Autorité de sûreté nucléaire** (*French website of the ASN*) is an Independent Administrative Authority established by [Act No. 2006-686 of 13 June 2006 on Transparency and Security in the Nuclear Field](#) (*link to the English version of the Act*) also known as the "TSN Act" - [la loi n° 2006-686 du 13 juin 2006 relative à la transparence et à la sécurité en matière nucléaire du 13 juin 2006](#) (*link to the French version of the Act*). The ASN is responsible for monitoring civil nuclear activities in France and protecting workers, patients undergoing radiotherapy, the public, and the environment from risks relating to nuclear activities.

| RADIOACTIVE WASTE MANAGEMENT

Radioactive waste is classified according to its **radioactive intensity** and **radioactive half-life**. The French Nuclear Safety Authority distinguishes between very short-lived radioactive waste whose radioactivity halves under 150 days, short-lived radioactive waste whose radioactivity halves under 30 years, and long-lived radioactive waste whose radioactivity halves after 30 years. The 58 nuclear reactors in France generate **1 kilogram of radioactive waste per inhabitant per year** about 900 grams of which are short-lived low active or medium active waste, 90 grams are long-lived medium active waste and 10 grams are high active waste. 96% of radioactivity is contained in less than 1% of waste.

This nuclear waste is processed by category under the safety and radioprotection conditions³ laid down in the framework law on energy and the public authorities.

ANDRA, the French National Agency for Radioactive Waste Management, has been recording the presence of nuclear waste in France since 1991 and has published an [inventory of this waste and its locations](#) since 2004. ANDRA is also responsible for providing forward information on the volume of waste to be processed within 10 years, 20 years and after.

It should be noted that France is one of the few countries **where all fuel cycle facilities are found** that deal with the following cycle stages: conversion, enrichment, fabrication, reprocessing and recycling of nuclear materials. **France is a benchmark at world level for the control of fuel cycle safety.**

³ Radioprotection means protection against ionizing radiation (ASN definition)

For more information

WEBSITES AND DOSSIERS (in French only, except for ASN and ANDRA sites)

↻ **L'énergie nucléaire : dossier**, Direction générale de l'énergie et des matières premières - Ministère de l'écologie, du développement et de l'aménagement durable,

http://www.industrie.gouv.fr/cgi-bin/industrie/frame23e.pl?bandeau=/energie/nucleair/be_nucle.htm&gauche=/energie/nucleair/me_nuc.htm&droite=/energie/nucleair/2005-nucleaire_monde.htm

↻ **L'énergie nucléaire en 110 questions**, DGEMP, 2000

www.industrie.gouv.fr/energie/nucleair/pdf/nucleair.pdf

↻ **La description du parc électronucléaire français**, Direction générale de l'énergie et des matières premières, 2005

<http://www.industrie.gouv.fr/energie/nucleair/parc-nucleaire.htm>

↻ **Les principaux acteurs du nucléaire : qui fait quoi**, Direction générale de l'énergie et des matières premières, 2006

<http://www.industrie.gouv.fr/energie/nucleair/acteurs-nucleaire.htm>

↻ **Le lexique sur l'énergie nucléaire en France**, Direction générale de l'énergie et des matières premières, 2006

<http://www.industrie.gouv.fr/energie/nucleair/textes/glossaire.htm>

↻ **Vocabulaire de l'ingénierie nucléaire**, JO, 2006

www.culture.gouv.fr/culture/dgIf/publications/vocabulaires/nucleaire0506.pdf

↻ **Les sites nucléaires en France - carte**, Direction générale de l'énergie et des matières premières

<http://www.industrie.gouv.fr/energie/nucleair/pdf/carte2.pdf>

↻ **Le projet de réacteur EPR en France (*The French EPR reactor project*)**, Direction générale de l'énergie et des matières premières, 2004

<http://www.industrie.gouv.fr/energie/nucleair/epr.htm>

↻ **Le projet ITER (*The ITER project*)**: dossier du ministère de l'industrie, 2006

<http://www.industrie.gouv.fr/energie/nucleair/iter-sommaire.htm>

↻ **Commissariat à l'Énergie atomique**

<http://nucleaire.cea.fr>

↻ **French Nuclear Safety Authority (ASN)**

<http://www.asn.fr/>

English version: <http://nuclear-safety.asn.fr/>

☞ **French Institute for Radioprotection and Nuclear Safety (IRSN)**

<http://www.irsn.org/index.php>

☞ **French National Agency for Radioactive Waste Management (ANDRA)**

<http://www.andra.fr>

☞ **Site de l'Agence pour l'énergie nucléaire (AEN)**, agence spécialisée de l'Organisation de coopération et de développement économiques (OCDE)

<http://www.nea.fr/html/nea/flyerfr.html>

☞ **Inventaire géographiques des déchets nucléaires (*Inventory of nuclear waste disposal locations*)**, ANDRA, 2006, 320 p.

<http://www.andra.fr/publication/produit/LocalisationDechets.pdf>

Résumé de l'inventaire géographique des déchets nucléaires: présentation grand public (*Summary of the inventory for the general public*), ANDRA website, 2006, 38 p.

<http://www.andra.fr/publication/produit/ResumeInventaire.pdf>

☞ **Classification des déchets selon leur filière de gestion (*Waste classification according to relevant management category – available in English*)**. - site de l'ANDRA, rubrique Gestion des déchets, Classification des déchets

http://www.andra.fr/popup.php3?id_article=125&id_rubrique=95

☞ **Les déchets nucléaires : que savoir sur les déchets radioactifs** : French Institute for Radioprotection and Nuclear Safety (IRSN), October 2006.

http://www.irsn.org/index.php?position=dossier_dechets_0

☞ **Associations providing independent information on nuclear issues:**

○ CRIIRAD : Commission de Recherche et d'Information Indépendantes sur la Radioactivité (*Commission for independent research and information on radioactivity – some documents available in English*)

<http://www.criirad.org/>

○ CYPRES : Centre d'information du public pour la prévention des risques industriels et la protection de l'environnement (*Centre for informing the public on industrial risk prevention and environmental protection*)

<http://www.cypres.org/spip/>

REPORTS

☞ **Risques et avantages de l'énergie nucléaire** [Risks and Benefits of Nuclear Energy] .- Rapport de l'OCDE, juin 2007. Disponible en anglais.

☞ **The role of nuclear power in Europe**, Conseil mondial de l'énergie, World energy power, janvier 2007

www.cna.ca/english/Studies/WEC_Nuclear_Full_Report.pdf

☞ **L'état d'avancement et les perspectives des recherches sur la gestion des déchets radioactifs : rapport**, M. Christian BATAILLE et M. Claude BIRRAUX, Office parlementaire d'évaluation des choix scientifiques et technologiques (*Parliamentary office for evaluation of*

scientific and technological options) – National Assembly report no. 2159, French Senate report no. 250, 16 March 2005, 340 p.

<http://www.assemblee-nationale.fr/12/rap-off/i2159.asp>

| PUBLICATIONS

➤ **Situation et perspectives de l'électricité nucléaire**, Nicole Fontaine. - *Regards sur l'actualité* collection, no. 318, la Documentation française, February 2006, pp.19-31

➤ **L'économie de l'énergie nucléaire**, Evelyne Bertel, Gilbert Naudet, Marc Vielle.- EDP sciences , INSTN, coll. Génie atomique, 2004

➤ **Tout sur l'énergie nucléaire : d'Atome à Zirconium**, B. BARRE.- AREVA, 2003, 160 p.