ISSN 0257-9138

EURATOM Supply Agency

ANNUAL REPORT 2007

EURATOM
Supply Agency

ANNUAL REPORT 2007

A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server (http://europa.eu).

Cataloguing data can be found at the end of this publication.

Luxembourg: Office for Official Publications of the European Communities, 2008

ISBN 978-92-79-09437-8

Cover photo courtesy of Foro nuclear (ES)
Printed in Belgium
PRINTED ON WHITE CHLORINE-FREE BLEACHED PAPER

Contents

Overview

Like in the past years, nuclear energy was attracting increasing interest from decision makers during 2007 in the context of policies aiming at security of energy supply, reduction of fossil fuel dependency and mitigation of global climate change. Since fossil fuel prices have increased more substantially on average than in 2006 (the barrel of crude oil reaching above 100$), many countries worldwide were truly considering global warming issues and the need to reduce CO_2 emissions.

At the end of 2007, a total of 436 commercial nuclear reactors were connected to the grid worldwide, operating with a net capacity generating of about 370 GWe requiring some 66 500 tonnes of uranium. From a nuclear perspective, more and more analyses and results from research on life cycle analysis of electricity generation chains – based on quantitative and qualitative indicators concerning economic, environmental and social aspects of electricity generation – demonstrated and constitute support for interest in new nuclear generation capacity. As a result, many countries are moving forward with plans to introduce nuclear power (Poland and Turkey) or considering to increase its share in their energy mix by building new reactors (Czech Republic and Hungary). Also during 2007, there was a national consultation conducted on the role of nuclear power in a low carbon economy in the United Kingdom.

Uranium exploration programmes have intensified over the past years in response to the significant increase of uranium price. Also, some new mines have started or are about to start operation, but further primary production is needed since consumption continues to exceed mining production. Several planned mine expansions and new mines should help to bridge the gap between supply and demand over the period 2010-15, but in the short term the market continues to be tight.

Canada, Russia, Niger and Australia remained the largest suppliers of nuclear materials to the EU. While the increase in prices paid under existing contracts remains more measured (some 6.7 % for long-term contracts) prices for new spot and long-term contracts have increased dramatically (some 127.8 % for spot contracts in 2007), but the amount of uranium delivered under spot contracts represented just 2.4 % of total natural uranium deliveries.

European uranium mining supplied just a minor part of the total EU needs, coming from the Czech Republic and Romania. Production in the Rožňa mine was to be terminated in 2008, but the Czech Government decided in May 2007 to continue mining and extended its lifetime without time limit as long as it remains profitable. Uranium exploration is now ongoing in several other Member States. It is however likely to take several years before new production can start in the EU.

Regarding the enrichment supply capabilities during 2007, a continued expansion is confirmed by now as milestones were reached and decisions announced with respect to new enrichment facilities, and by the end of the year, resolution of the US-Russian Suspension Agreement negotiations were imminent. Both spot and long term prices increased during the year, and upward pressures were still reported in both market sectors at the end of the year.

The quantity of delivered enrichment services has significantly increased during 2007 and the demand for SWUs is forecast to increase due to the continuing trend towards lower tails assays caused by the higher uranium prices. As a result of this and higher electricity prices, enrichment prices are also under upward pressure.

For the second consecutive year starting from 2006, uranium deliveries to EU utilities were higher than the amount of uranium loaded into reactors. This indicates that the positive trend of inventories being rebuilt continues, in response to security of supply concerns and rising prices. The implementation of the diversification policy remains vital for the long-term security of supply of the EU nuclear industry.

Chapter 1
General developments
Main developments in the Member States

Security of energy supplies in general remained one of the key issues on the political agenda, and while supplies of oil and gas get more attention, security of nuclear fuel supplies is no less important, since nuclear provides about 32 % of the electricity in the EU.

On 27 February a notification about construction of a new nuclear power plant at Belene was submitted to the Commission by a Bulgarian investor, as required by Article 41 of the Treaty. Following analysis and extensive discussions with the investor, the Commission concluded that the aspects of the investment in question are in line with the objectives of the Treaty and has decided on 7 December to give a favourable opinion to this initiative.

The Commission continued to monitor the implementation of the Bohunice (SK) and Ignalina (LT) Programmes, together with the European Bank for Reconstruction and Development and the National Agency in Lithuania.

In Finland, construction of the Olkiluoto 3 plant European pressurised water reactor (EPR) continues. Since electricity consumption in Finland is expected to continue to grow and that new base-load capacity will be needed by 2010, environmental impact assessments of proposals to build additional units at Olkiluoto and/or at Loviisa were initiated, and plans to build another reactor at an as yet undetermined location were announced.

Main developments in the EU

Despite significant differences in nuclear energy policy in the EU countries the fact that nuclear power can produce competitively priced base-load electricity that is essentially free of greenhouse gas emissions and can enhance security of energy supply has led several governments to conclude that nuclear energy is a necessary part of the energy mix. This is perhaps best exemplified by the October 2007 Resolution of the European Parliament which characterised nuclear energy as 'indispensable if basic energy needs are to be met in Europe in the medium term'.

50 years of Euratom Treaty

25 March 2007 marked the 50th anniversary of the signing of the Treaties of Rome, the basis of the European Community and the European Atomic Energy Community (Euratom). This anniversary has certainly provided an opportunity to consider the main 'Euratom rules' with a view to better future action.

The results of the activities conducted for 50 years under the auspices of the Euratom Treaty can be regarded as extremely positive. The Treaty has enabled the Community to carry out important activities in a strategic sector, in particular in terms of energy supply for the EU. It is recognised as having made significant achievements in the field of research, the protection of health, safeguarding the peaceful use of nuclear materials and international relations.

Thanks to the Euratom Treaty, the Community is contributing to scientific progress through its support for research and innovation. It ensures the application of high radiation protection standards for the public and accompanies new initiatives in the nuclear field. It provides an overall approach to investments in this sector. It ensures regular and equitable supplies for users of nuclear materials in the Community and strictly safeguards the peaceful use of nuclear materials. It has become an international player in this sector.

The Euratom Treaty has formed the basis of Community activities relating to the nuclear power cycle as well as of other activities which use radioactive substances for research, industrial and medical purposes (research, radiation protection rules, etc). Euratom rules are therefore a factor in the everyday lives of the citizens of all the Member States.

The ongoing debate on the definition of European energy policy centred on competitiveness, security of supply and environmental concerns provides an opportunity to consider future Euratom action. Today, nuclear energy is a reality within the EU and elsewhere. The present race to secure energy resources presents new challenges for this energy source. The Euratom Treaty contains the main provisions which enable the EU to act in this field. Imperfect as it is, the EU, the Member States and the public need it.

In future, the application of the Euratom Treaty must continue to focus on nuclear safety and security. Recent enlargements have strengthened the diversity of the EU landscape in the field of nuclear energy and the need for Community action, as shown by the Nuclear Illustrative Programme (PINC) adopted on 10 January 2007, in particular to ensure the protection of health and the environment and to avoid any malicious use of nuclear materials. Using the resources provided by the Euratom Treaty in this respect benefits all the Member States.

European High Level Group on nuclear safety and waste management

The Commission established a European High Level Group on nuclear safety and waste management (Commission Decision 2007/530/Euratom of 17.07.2007, OJ L 195/44 of 27.07.2007), composed by senior national regulators and senior officials dealing with nuclear safety. The aim of the Group is to develop common approaches in nuclear safety and waste management domains and swiftly identify safety issues for priority handling and recommend actions to be taken at EU level.

The HLG met for the first time in October 2007. Three subgroups were established on 1) Improvements of nuclear safety arrangements; 2) Improvements in the decommissioning, radioactive waste management and spent fuel arrangements; 3) Improvements in transparency arrangements.

European Nuclear Energy Forum

In line with the mandate given by the 2007 Spring European Council, the Commission set up the Forum to facilitate dialogue between different stakeholders (EU governments, Members of the European Parliament, nuclear industry, industrial energy consumers and civil society) on the opportunities and risks of nuclear energy. The Forum will be organised successively in Bratislava and Prague. The inaugural meeting of the Forum was successfully held on 26-27 November 2007 (see more at http://ec.europa.eu/energy/nuclear/forum/bratislava_prague/index_en.htm). Three working groups on opportunities, risks and transparency were set up.

Nuclear research developments

The 50th anniversary of the Euratom Treaty has also meant the starting point for the Community's Seventh Research Framework Programme – for the period from 2007 to 2011 – which has a budget of around EUR 2 750 million. Just under one-third of this is earmarked for research in the field of nuclear fission, to be carried out either by means of a programme of indirect actions or by the JRC, focusing on the safe exploitation and development of fission reactor systems, the management of radioactive waste, radiation protection and safety and security related to non-proliferation.

Nearly two-thirds will go towards research in the field of fusion energy. The importance attached to fusion can be explained by the fact that the European Union, through the Community, is taking part in the *International Thermonuclear Experimental Reactor* (ITER) project developed with China, South Korea, the United States, Japan, India and Russia. This follows on from the research which has been carried out by the Community in this field since the first Community research programme and which enabled the *Joint European Torus* (JET, Culham) to be set up in 1978, the results of which have been an essential step forward in the advances in fusion energy.

Bilateral nuclear cooperation agreements

Bilateral agreements with Australia, Canada and the USA

The implementation of nuclear cooperation agreements between Euratom and Australia, Canada and the United States of America, respectively, continued during 2007 to the satisfaction of all parties. Regular bilateral consultation meetings were held between the Commission/ESA and Australia as well as Canada and the United States. Discussions continued for consolidating the existing text of the bilateral agreement with Canada, signed in the 1960s.

Japan, Uzbekistan and Ukraine

An agreement for cooperation in the peaceful uses of nuclear energy between Euratom and Japan has been in force since December 2006, a similar agreement with Ukraine since September 2006 and one with Uzbekistan since 2004.

Kazakhstan

An agreement for cooperation in the peaceful uses of nuclear energy between Euratom and Kazakhstan was signed in December 2006, but the entry into force of this agreement still requires finalisation of the related administrative arrangements. Euratom expects Kazakhstan to reply to the draft Administrative Arrangements.

These agreements mainly provide a framework for cooperation in the peaceful uses of nuclear energy, and they cover nuclear safety, controlled nuclear fusion, nuclear research and development, international transfers, including trade in nuclear materials and provision of nuclear fuel cycle services, as well as measures aiming at the prevention of illicit trafficking of nuclear materials.

Russia

Negotiations for an agreement on trade in nuclear materials with the Russian Federation did not progress during 2007. But in 2008 first technical meetings between EC and Russian officials took place in Moscow.

Legal developments

The Council adopted the decision establishing the new Statutes of the ESA on 12 February 2008. The new Statutes define the aim of the Agency to perform the tasks entrusted to it by the Title II Chapter VI of the EURATOM Treaty, in accordance with the objectives of the EURATOM Treaty. Thereby the ESA was given new additional tasks: it will provide the Community with expertise, information and advice on any subjects connected with the operation of the market in nuclear materials and services. ESA will also play a market monitoring role by monitoring and identifying market trends that could affect security of the European Union's supply of nuclear materials and services. The Agency may also build up a stock of nuclear materials, in accordance with articles 62 and 72 of the EURATOM Treaty.

During 2007 the ESA drafted new rules on balancing supply and demand of nuclear materials on the European Atomic Energy Community market (Art 60 (6) EURATOM Treaty). This proposal was submitted to the Advisory Committee of the ESA in October 2007. The Advisory Committee installed a working group on the proposal and started an intensive internal discussion. These rules shall establish procedures for all types of contracts relating to nuclear materials and services. The Financial Regulation applicable to the ESA has not yet been adopted and there is no budget line foreseen for the ESA in the general EU budget in 2008, and no proposal foreseen for 2009 either.

Special situation of the New Member States

Whereas western European utilities buy separately natural uranium, conversion, enrichment and fabrication, the new Member States' utilities (except Slovenia) usually buy fabricated fuel assemblies with everything included. There are also state level agreements between the new MS and Russia which set the framework for nuclear fuel deliveries, often foreseen for the lifetime of the reactors built by Russia. Contracts concluded before accession have been grandfathered (previously also for Finland) but some new ones will need to be concluded. There the COM/ESA diversification policy based on article 105 of the Treaty is being challenged. In addition to the problem of balancing the interests of utilities and producers (enrichers), there is now a risk of unequal treatment of utilities: those who have to limit their purchases of Russian material and those who do not.

As long as these grandfathered contracts remain in force, the first paragraph of Article 105 of the EURATOM Treaty, by protecting acquired rights, conserves the current procurement structures implemented by NPPs in the New Member States. Furthermore, the Commission decided not to contest any of these grandfathered contracts by initiating their review before the European Court of Justice on the basis of the second paragraph of the said Article of the EURATOM Treaty. In case of new fuel procurements, however, users in the New Member States shall fully comply with the rules of Chapter VI of the EURATOM Treaty and with the applicable policies of the Agency.

Prior to the launching of such new fuel procurement procedures, the co-operation between users in the New Member States and the Agency is expected to extend to the detailed disclosure of requirements and consumption data by the former and to the discussion of general policy and regulatory issues within the framework of the Advisory Committee, its working groups and bilateral meetings.

The market of the new MS for nuclear fuel represents slightly more than 10% of the EU-15 market. Recently Bulgaria has added some more demand but Romania has no need for enrichment (CANDU reactor which uses natural uranium) and mines its own uranium.

Most EU utilities are largely covered by supplies until 2010 and many until 2013-2014. The contracted share of Russian SWU's is relatively stable until 2010 in the EU-15 (around 20%). In the new MS, most of the future demand is more or less committed under grandfathered contracts, but some new contracts will have to be concluded, firstly by Czech and Slovak utilities. The Annex 1 gives more details about the already committed plans by EU utilities to buy enrichment services from Russia.

Chapter 2

Global supply and demand, security of supply

This chapter presents a short overview of the main recent developments affecting the global supply and demand balance and security of supply at different stages of the fuel cycle.

Demand for nuclear fuels

At the end of 2006, a total of 436 commercial nuclear reactors were connected to the grid worldwide, operating with a net capacity generating of about 370 GWe requiring some 66 500 tU. By the year 2030, world nuclear capacity is projected to grow to between about 510 GWe net in a low demand case and 660 GWe net in a high demand case (OECD/NEA). Accordingly, world nuclear-related uranium requirements are projected to rise to between 93 495 tU and 121 675 tU by 2030.

The EU outlook for demand shows more potential for increase in demand from 2007, although part of the increase is due to EU enlargement. Construction of new reactors has been decided in Bulgaria and Romania, in addition to Finland, France and Slovakia. Plans for a new reactor in Lithuania have also been confirmed. However, for many EU Member States, the situation is not clear regarding the future share of nuclear in their energy mix.

Worldwide, during 2007 many countries have announced that they are considering nuclear energy as a potential source of energy (Turkey, Egypt, Jordan, Arabic peninsula countries, Indonesia) or to increase its existing share (China, India, Japan, South Korea, Russia). All these latter have extremely ambitious plans to continue increasing the share of nuclear in their energy mix. This is the case of the United States where the number of potential new reactors has increased to 25, and some firm decisions have also been announced recently by US utilities.

Supply of nuclear fuels

Natural uranium production

Despite the high levels of both the spot and term prices in 2007, there was only a limited response to production: throughout 2007 world uranium production increased by approximately 3 % to 41 264 tU (107.1 million pounds). The most significant production increase came from Kazakhstan (up 26 % to 7 847 tU_3O_8), so if it meets its own targeted production goals, Kazakhstan will become increasingly important to avoid a shortfall situation in the future.

Despite overall country production falling some 4 % to 11 158 tU_3O_8 (24.6 million pounds), Canada is again the world's largest uranium producing country, accounting for 23 % of world production in 2007. Production was led by Cameco's majority-owned McArthur River/Key Lake JV which yielded a total of 8 482 tU_3O_8 (18.7 million pounds) in 2007, which was the same level as in 2006. Cameco's 100 %-owned Rabbit Lake mine produced 1 814 tU_3O_8 (4.0 million pounds), which was a 21.7 % decline from production of 5.1 million pounds in 2006.

Production in Australia rose significantly to 10 115 tU_3O_8 (22.3 million pounds) in 2007 from 19.7 million pounds in 2006, securing its position as the second largest uranium producing country, most of the production gain coming from increased operational performance and an increase in the grade of the ore mined.

Kazakhstan produced some 7 847 tU_3O_8 (17.3 million pounds in 2007), much more than in 2006. Kazatomprom's four 100 %-owned ISR mining groups (LLP Kazatomprom) combined produced half of the total output.

The Russian nuclear industry has been undergoing an overall restructuring process during 2007. The production was high as almost 4 000 tU_3O_8 (8.8 million pounds) from three operating mines in 2007. Atomredmetzoloto reported that the Priargunsky mine yielded 7.8 million pounds in 2007, a slight decline from the 8.2 million pounds reported by TVEL in 2006. At the Dalur (Dolmatovskoye) and Khiagda ISR mines, production of 910 000 pounds and 68 000 pounds, respectively, was reached in 2007. Both ISR projects are expected to increase production steadily through 2015.

In Uzbekistan, the Navoi Metals and Mining Combine (NMMC) reportedly produced 2 721 tonnes U_3O_8 or tU_3O_8 (6 million pounds) from its Nurabad, Uchkuduk and Zafarabad in-situ recovery facilities.

Meanwhile, Ukraine's VostGOK produced almost 1 000 tU_3O_8 (2.2 million pounds) from the Zheltiye Vody mill in 2007, which was similar to the 2.1 million pounds produced in 2006.

Production in Niger had a total output of 3 720 tonnes U_3O_8 (8.2 million pounds) in 2007, coming mainly from the Akouta (Cominak) and the Arlit (Somair) mines. Production within southern Africa – Namibia and South Africa where two new mines (Paladin's Langer Heinrich and Uranium One's Dominion) started up in 2007, was about 4 000 tU_3O_8.

The production in the United States was 1 748 tU (2 061 tonnes U_3O_8) which shows a 10 % increase compared to the 2006 level. This confirms that the country is back again to the main producer countries and output could increase in the following years.

Table 1: Natural uranium production in 2007, compared to 2006 [(1)]

	Production in 2007 (tonnes uranium)	Share in 2007 (%)	Production in 2006 (tonnes uranium)	Change over 2006 (%)
Canada	9 462	22.93	9 862	-4.06
Australia	8 577	20.79	7 602	12.83
Kazakhstan	6 654	16.13	5 283	25.96
Russia	3 385	8.20	3 300	2.57
Namibia + South Africa	3 423	8.30	3 601	-4.94
Niger	3 154	7.64	3 431	-8.07
Uzbekistan	2 308	5.59	2 260	2.12
USA	1 748	4.24	1 618	8.02
Ukraine	846	2.05	800	5.78
China	636	1.54	769	-17.30
Czech Republic	262	0.64	360	-27.21
India	229	0.55	n.a.	n.a.
Others (estimated)	565	1.37	681	-16.97
Total	41 264	100.00	39 567	2.90

New production plans and exploration activity

According to specialists, the most recent developments in the field of uranium geology, uranium exploration and exploitation technology show that sufficient resources exist to support significant growth in nuclear capacity. Already commonly known identified resources are sufficient for at least 85 years, if considering 2006 uranium requirements (of about 66 500 tU). If estimates of current usage rates are used, the identified resources would be sufficient for about 100 years of reactor supply, however the exploitation of the entire conventional resource base (some 16 872 700 tU) would increase this to 300 years, though significant exploration and development would be required to move these resources to more definitive categories.

In addition to increased demand, it is expected that the availability of supplies from secondary sources will become more limited than it has been in recent years and a higher proportion of demand is likely to be

(1) Figures published by producers or industry estimates.

met from primary production. There are numerous plans for new uranium production capacity around the world, and also for increases in output from existing facilities. A survey of publicly announced expansion plans from existing uranium companies and potential new market entrants shows that primary production could grow to about 70 000 tU by 2010, and to perhaps 88 000 tU by 2015. Some of these potential projects may not proceed, and others may be delayed but the potential is there for uranium mining to expand sufficiently to meet demand from new reactors in this timeframe. All the present major producers are expected to increase their production by 2010.

Regarding mining and production, the big expansion potential continues to be in Kazakhstan, Canada and Australia. As for outlook in the front-end industry, it is very likely that this positive trend will continue in the coming years. Many believe that in 2008 the world uranium production should increase by some 14 % to 55 247 tU_3O_8 (121.8 million pounds), and the major part of the increase in output will be coming from Kazakhstan. This growth will be highly dependent on the availability of sulfuric acid, but nevertheless it is quite significant. Production gains in Africa should also be quite significant in 2008, as Rio Tinto's Rössing looks to improve on a subpar 2007 and Paladin Energy operates Langer Heinrich near full capacity.

Russia, Canada, Australia and Niger continue to be the largest suppliers of nuclear materials to the EU, supplying more than 75 % of our total needs. There were no major changes in the pattern of nuclear fuel supplies for EU users during 2007. In order to cover the needs of the EU-27 for natural uranium, freshly mined natural uranium represents some 86 %, the remaining sources being diluted HEU feed, re-enriched tails, stockdrawdown and reprocessed uranium.

Global trends in the uranium market

The spot U_3O_8 price has gone on a wild ride since the beginning of 2007, peaking at 135 USD/ lb U_3O_8 by the end of June and dropping back thereafter. The price was changing more during this rather small period than the previous 25 years combined, so observers could witness the most volatile period for price in the history of the uranium market. The most recent change in price was a turn back upwards, and with the price now between 71-85 USD, it has maintained its level since its September low at 75 USD. The question is whether this is a return to the upward trend or it is just a temporary increase before price heads even further downward.

The main events simultaneous to the price decline from end June were: the US subprimes crisis, statements about an ending bull market cycle on metals, the US Department of Energy sales and other stock sales. Adjacent to this, some currency effects also impacted on the uranium market. As the Canadian dollar, the Australian dollar and the South-African rand were following the trend of EUR and the USD remaining at historical lows for a rather long period, together had a negative effect on the uranium industry gains. Looking forward, perception will continue to play an important role in price formation, as speculations are continuing about the extent of the nuclear renaissance, the rate at which production will expand, the future course of the dollar, and the impact of government policies.

Production is not sufficient to meet rising demand and for many, the uranium market still has the main characteristics of being inefficient, illiquid and non-transparent, and with the arrival of new participants (hedge funds, speculative stockpiles, juniors, other investors) and of the new price indicators (Blended Financial Value, U Futures, Tullett-Prebon) this market really tends to become a very sophisticated market, bringing uranium closer to other energy commodities and metals in that respect. The historical uranium price evolution correlates well with that of other metals like Cu, Ni, Mb or even with crude oil.

Conversion

Market competition in the uranium conversion segment continues to be limited, with only five major operators worldwide: during 2007, uranium conversion facilities have operated in Canada, France, the United Kingdom, the United States and Russia. AREVA has invested in a new, large-capacity conversion facility (Comurhex II) in France that is expected to begin production by 2012 with a capacity of 15 000 tU/year which could be further extended to 21 000 tU/year if market conditions allow it.

The geographical unbalance of conversion capacities between Europe and North America still remains. One possible new entrant could be Kazatomprom, which appears keen to expand its nuclear fuel activities alongside its rapid expansion of uranium production. The company has signed an agreement with Cameco which could lead to the construction of a new plant in Kazakhstan using Cameco technology.

The conversion capacities available in Europe represent 25 % of the total world capacity. The largest conversion company is Cameco which has its own plant in Canada and presently has marketing control of the output from an additional plant in the UK (which is owned by the UK government through its Nuclear Decommissioning Authority). Areva subsidiary Comurhex operates a large facility in France, while a US plant is operated by ConverDyn. Russia also has a large conversion capacity, and a small plant is in operation in China to feed the enrichment plant there.

Table 2: Major UF_6 conversion suppliers (1)
(approximative 2007 capacity, including HEU material)

Company	Capacity (tonnes U)	Share of global capacity (%)
Cameco (CAN)	19 260	28.1
Atomenergoprom (RUS)	17 760	26.2
Areva (FR)	16 500	24.1
ConverDyn (USA)	13 000	18.9
CNNC (China)	1 000	1.4
Nukem (DE)	920	1.3
World Total	68 440	100.0

For the time being, the EU utilities needs for conversion can be met by the domestic supplies, nevertheless additional conversion capacity in Europe will be needed in light of the new enrichment capacity being installed, from 2009 onwards.

The conversion market has witnessed again a major disruption in production during 2007 and again this proves that this segment, while small, is still an important link in the fuel cycle chain. Nevertheless, prices were stable since instead of seeing upward pressures in the spot price during this most recent production outage, the market ultimately witnessed a downturn in the spot price while the term price remained flat. Although there have not been force majeure notices reported due to this outage, several market participants have been seeking conversion services more quietly, indicating they may potentially be positioning themselves in the event of a stronger price recovery.

The main factors that make totally different market conditions during this 2007 outage and the last major production disruption in 2003 are: higher inventory levels, greater forward contract coverage, and the absence of other factors such as the then recent announcement of one big supplier not meeting the schedule of deliveries. One of the major differences in the market over the past year versus that in late 2003 and 2004 is that of the availability of inventories. Last year, ample supplies of inventories put downward price pressure on the market, and muted the potential supply disruption effect from Port Hope. This inventory supply situation is highlighted by the initial decline at the end of January 2007 in both the NA and EU spot prices to 9-10 USD/kgU, respectively.

(1) Figures published by producers or industry estimates.

Enrichment

The enrichment industry continues to be characterised by the expectations related to the new plants being built and on the progress made in keeping up with the initial plans. Construction of the Georges Besse II plant in France has started in 2006 and reportedly keeps its schedule so that production at the GB II could start in fall 2009, and the full capacity of 7.5 million SWU for the first two modules could be reached in 2016. This capacity could be extended to 11 million SWU to suit EU market evolution.

Recently, Urenco has estimated having a global market share of 23 %, after the SWU capacity at the three centrifuge plants in Europe increased 7 % in 2007. Also the National Enrichment Facility in the US remains on track to begin initial production in 2009 and thus will provide a domestic source of competition for USEC. By 2012, Urenco intends to increase its total production capacity to about 15 million SWU, an increase of about 50 % over the current SWU capacity and that could need some 3 billion EUR cumulative investment.

The Russian giant Atomenergoprom is also steadily increasing its enrichment capacity, over its four sites, with the introduction of new, more efficient centrifuges. In China, CNNC is developing its enrichment plant in co-operation with Atomenergoprom and may well increase capacity to supply most or all of its growing domestic requirements. JNFL is working to increase the capacity of its plant to 1.5 million SWU/year, and may increase this further to maintain its share of Japanese domestic demand, provided it is successful in developing higher efficiency centrifuges.

A further important development could be the entry into the market of General Electric, a large diversified US corporation with wide-ranging nuclear activities, including NPP construction and nuclear fuel fabrication. GE has acquired the rights to the new SILEX enrichment technology (originally developed in Australia) which uses laser excitation to separate uranium isotopes. GE aims to have a commercial facility in operation by 2012 at earliest, although it is likely to take some additional time to build up a significant capacity.

Table 3: Major enrichment companies with approximate 2007 capacity (1)
(including USEC control of HEU material)

Company	Capacity (thousand SW)	Share of global capacity (%)
Atomenergoprom	22 500	37.3
USEC	15 500	25.7
AREVA	10 800	17.9
Urenco	9 600	15.9
JNFL	1 000	1.7
CNNC	1 000	1.7
World Total	60 400	100.0

There are other significant developments taking place in the enrichment market which may alter the picture over the coming ten years and beyond. The two diffusion plants are scheduled to be replaced by centrifuge plants but AREVA and USEC have not decided yet the date of the diffusion plants shutdown, so it can be expected that both companies plan a transition period during which the diffusion plants will be operated at reduced capacity as a buffer while centrifuge capacity is built up. However, the end of deliveries of HEU material from Russia in 2013 may oblige USEC to increase the output of its diffusion plant at that time if insufficient alternative capacity is available. Furthermore, while AREVA's new plant will use proven Urenco-designed centrifuges, USEC is developing a new centrifuge design which inevitably involves a greater risk of delays.

(1) Figures published by producers or industry estimates.

The trend towards lower tails assays continued during 2007, with some utilities going down to 0.20% tails. This can considerably diminish the demand for natural uranium and increases the separative work requirements.

During summer 2007, the Agency proceeded with a survey of the enrichment requirements and contractual coverage of EU utilities for the period 2007-15, and of the capacities of EU enrichers to fulfil these requirements. The survey pointed out that the EU enrichers can meet the demand for SWUs and they will need to increase their capacities only by 2013 in order to satisfy the needs of EU utilities. Otherwise there may be a some risk of undersupply of 2 000 tSWU by EU enrichers in the period between 2013-16.

Fabrication

European fabrication facilities continued to provide adequate coverage of the utilities' needs. The bulk of the fabricated fuel needs is covered by community producers. In the market for VVER fuel, the Russian supplier TVEL has now re-established a dominant position, which means in fact nearly 100% market share.

Reprocessing

Reprocessing of irradiated fuel continued only at the La Hague plant in France. Even though the THORP site in the UK is still not working, the Community utility(ies) are able to reprocess all the material offered for reprocessing, having even some excess capacity.

Due to the recent increase in natural uranium prices, reprocessing is becoming economically attractive. For the first time, the United States are also looking at the possibility of reprocessing civilian spent fuel, which would not only save natural uranium requirements but would also considerably decrease the quantities of radioactive waste to be safely stored.

Secondary sources of supply

During 2007, Russia and the USA were discussing a general nuclear cooperation agreement which could set a new framework for nuclear trade between the two parties. The Russian-US Suspension Agreement Amendment has been negotiated (and signed in the beginning of 2008), intending to give Russia a limited access up to 20% of the US commercial market from 2013 to 2020. Immediately after the signing of this amendment, the Russians can enter into contracts for the sale of the EUP stockpile that was brought into the US to underpin grandfathered deliveries under the original 1992 Suspension Agreement. No further approval is necessary for these sales to be made, as long as they are done prior to 1 January 2014.

A key open question is still how low enriched uranium that is produced in fulfilment of a SWU contract will be treated. The position of US Department of Commerce is that the provision of SWU is a good and these imports will count against any relevant export limitations, while Russia's position is that the provision of SWU is a service that is outside the scope of the amended agreement. This amended agreement allows the Russians to begin entering into contracts for delivery under annual export limits that begin in 2011, ramp up in 2014, and run through 2020. Significantly, these quotas allow for the importation of Russian uranium for US utility end use at the conclusion of the US-Russian HEU Agreement, when supplies are projected to be needed. Specifically, the amended Suspension Agreement contains export limits post-2013, expressed in kgU as LEU (at product assay of 4.4% and tails assay of 0.30%), that hover around 20% of the estimated US demand for SWU.

In the USA, the Department of Energy has been selling some US high-enriched uranium from the government's excess stockpile for down blending and use as commercial nuclear fuel.

Security of supply

Security of supply is a cornerstone of energy policy and has become more prominent on the agenda of policy makers following increasing tensions in oil and gas markets and rising prices of hydrocarbons. The role of nuclear energy in enhancing security of supply has been recognised by several EU countries as major disruptions in energy supply due to technical, economic or political reasons could have significant impacts on the well-being of the entire Community. There are several sources of concern with respect to preserving the stability and security of energy supply, of which three are particularly noteworthy. First, the infrastructure for power generation, transmission, and distribution is ageing in some regions; the ability to manage transfers on the grid must be maintained. Second, increasing demand and trade means that transit countries for energy supply, particularly in the case of natural gas, can become a source of supply constraints or disruptions. Third, the increasing dependence of the EU on imported raw materials exposes the Community to potential shortfalls in the event of rapid external market changes. These concerns necessitate a more coordinated response.

One major difference between today's energy security policies and those that prevailed in the past is the recognition of an important demand-side component rather than an exclusive focus on securing supply. The strengthening of energy efficiency is now firmly recognised in EU energy policy as one of the few ways to address both sustainability and security concerns; by reducing energy demand, both energy imports and energy-related emissions will decrease. Furthermore, energy efficiency improves the competitiveness of European industry and reduces the vulnerability of European infrastructure to sudden changes in weather or in energy prices.

Enlargement of the EU has further underlined the opportunities for efficiency, as the new Member States adopt improved technologies and open their markets up for new innovations. In the enlarged EU, policy-makers attempt to find the right balance between supply and demand – and between security and sustainability – to address the growing and diverse needs of 450 million citizens. The new Member States face a number of challenges in addressing changes in physical infrastructure as well as in energy management practices and the institutions that guide them. At the same time, there are also new business opportunities as Member States pool their knowledge on how to formulate effective energy efficiency programmes and policies.

The implementation of a true diversification policy remains vital for the long-term security of supply of the EU nuclear industry. Global uranium resources are sufficient for a major expansion of the industry, but the investments now being undertaken will not show immediate results. Due to a low number of major players at the various steps of the fuel cycle, supply constraints can happen at any stage, but reasonable inventory levels can mitigate eventual problems. Regarding fabrication, there is concern about the possible lack of alternative suppliers for VVER reactors in the future. Secondary uranium supplies continue to have a very large impact on the market, and therefore it is in the interests of all parties to strive for as much transparency as possible about future plans for the use and release into the market of such supplies.

ESA recommendations and diversification policy

The Supply Agency continues to recommend to EU utilities that they maintain an adequate level of strategic inventories and use market opportunities to increase their inventories, according to their individual circumstances. Furthermore, it is recommended that utilities cover most of their needs under long-term contracts with diversified supply sources.

The Agency is pleased to note that for the second time since 2006, uranium deliveries to EU utilities were higher than the amount of uranium loaded into reactors. Thus inventories are being rebuilt in response to security of supply concerns and rising prices.

The Supply Agency continues to monitor the market, especially the supply of natural and enriched uranium to the EU, to ensure that EU utilities have diversified sources of supply and do not become over-dependent on any single source. Maintaining the viability of the EU industry at all stages of the fuel cycle remains an important goal for long-term security of supply. In recent years, restrictions on imports of natural uranium have not been deemed necessary.

Regarding enrichment, the supply policy remained unchanged. Recently, the Agency proceeded with a survey of the enrichment requirements and contractual coverage of EU utilities for the period 2007-15, and of the capacities of EU enrichers to fulfil these requirements. The survey pointed out that the EU enrichers can meet the demand for SWUs and they will need to increase their capacities only by 2013 in order to satisfy the needs of EU utilities. Nevertheless, those Member States which are 100 % dependent on one single enricher company, located inside or outside the EU, may face serious problems. Such a situation is not sustainable for the long term as the EU utilities need a balanced and diversified supply policy.

Chapter 3

EU supply and demand for nuclear fuels

The overview of supply and demand for nuclear fuels in the European Union is based on information provided by the EU utilities or their procurement organisations concerning the amounts of fuel loaded into reactors, estimates of future fuel requirements, and on the quantities, origins and prices of acquisitions of natural uranium and separative work.

The data presented for 2007 include for the first time all the 27 EU Member States.

Fuel loaded into reactors

During 2007, about 2 800 tU of fresh fuel were loaded into EU-27 reactors containing the equivalent of 19 774 tU as natural uranium and 13 050 tSWU. Compared to 2006, the amount of contained SWUs increased by some 350 tSWU and that of natural uranium decreased by some 1 220 tU. This is not only a result of lower tails assays but also because the two new member states (BG, RO) are taken into account for the first time. Many utilities had specified their tails assays to be in the range of 0.20-0.25 %, although values in the range 0.30-0.35 % were also still common during 2007.

Reactor needs/net requirements

Estimates of future EU reactor needs and net requirements for uranium and separative work, based on data supplied by all EU utilities, are shown in Figure 1 (see Annex 2 for the corresponding table). Net requirements are calculated on the basis of reactor needs less the contributions from currently planned uranium/plutonium recycling, and taking account of inventory management as communicated to the Agency by utilities.

The new Member States represent an addition of about 10 % to the requirements of the EU-15. The foreseen decline over the years reflects the planned closure of reactors in some Member States, especially Germany, and the small number of firm plans for new reactors, although several others are planned.

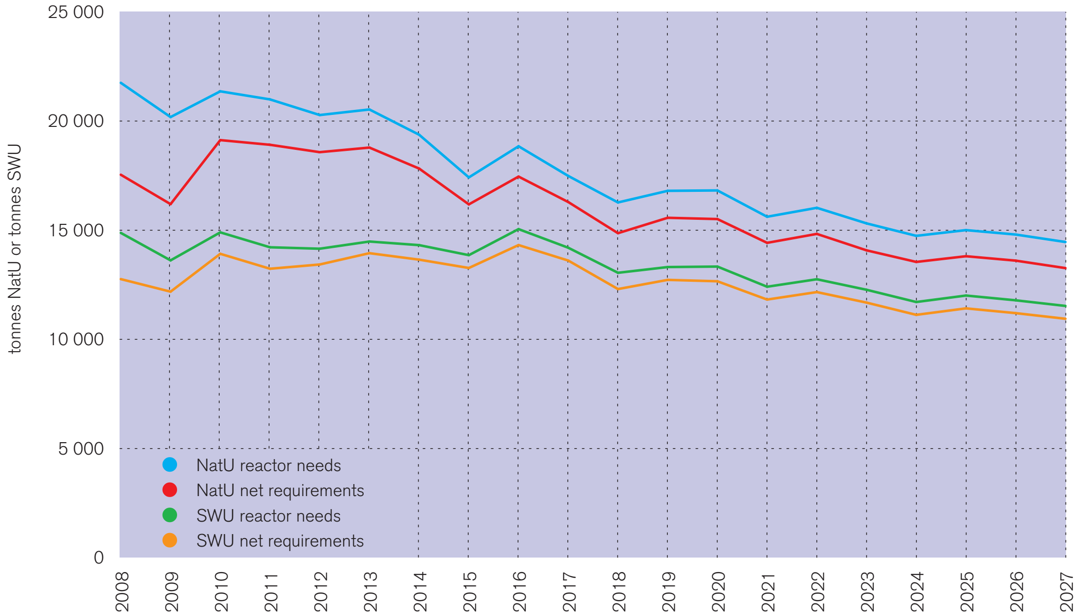
For the EU-27, average reactor needs for natural uranium over the next 10 years are forecast to be 19 874 tU/year, while average net requirements are about 17 733 tU/year, respectively 15 622 tU/year and 14 381 tU/year for the period between 2018-27.

Average reactor needs for enrichment services over the next 10 years are expected to be 14 398 tSWU/year, while average net requirements will be in the order of 13 461 tSWU/year, respectively 12 441 tSWU/year and 11 827 tSWU/year for the period between 2018-27 (see Annex 2 for details).

From these averages one can see that forecast net requirements for natural uranium had been stable (compared with forecast in 2006) and estimates for enrichment requirements had slightly increased. This tendency has continued with the latest forecasts provided by EU utilities but this is partly due to the EU enlargement (two new member states operating nuclear plants). Average estimated net requirements for natural uranium for the next 10 years are down 0.6 % but forecast net enrichment requirements are up 2.0 % from the previous estimates (for total reactor needs the figures are +0.2 % for natural uranium and +2.0 % for enrichment).

This reflects further decreasing tails assays due to the current relationship between natural uranium and enrichment prices. However, it is not certain whether the enrichment companies will be able to accommodate the wishes of utilities for lower tails assays without causing a substantial increase in enrichment prices, which in turn could again affect the relationship between uranium and enrichment requirements.

Figure 1: Reactor needs and net requirements for uranium and separative work (EU-27)



Supply of natural uranium

Conclusion of contracts

The number of contracts and amendments relating to ores and source materials (essentially natural uranium) which were dealt with in accordance with the Supply Agency's procedures during 2007 is shown in Table 4. Transactions totalled approximately 60 671 tU including contract amendments, which was slightly lower than the 62 800 tU in 2006. Some 14 348 tU were the subject of new purchase contracts by EU utilities (spot and multiannual), versus 49 100 tU in 2006. This may mean that utilities, instead of buying much fuel during 2007 via new contracts, they amended the previous ones and/or used the freshly arrived deliveries to create stocks. Amendments to existing contracts were concluded for a net increase of 40 369 tU during 2007.

Table 4: Natural uranium contracts concluded by or notified to the Supply Agency

(including feed contained in EUP purchases)

Contract type	Number	Quantity (tU) [1]
Purchase/sale by an EU utility/user		
• multiannual [2]	15	13 869
• spot [2]	5	479
Other purchase/sale		
• between EU utilities (multiannual)	1	
• between EU utilities (spot)	2	
• between intermediaries [3] (multiannual)	2	
• between intermediaries [3] (spot)	4	810
Exchanges and loans [4]	9	4 630
Amendments to purchasing contracts [5]	15	40 369
TOTAL	53	60 671

(1) *In order to maintain confidentiality the quantity has been indicated only when there were at least three contracts of each type, but all quantities have been included in the total.*

(2) *Multiannual contracts are defined as those providing for deliveries extending over more than 12 months, whereas spot contracts are those providing for either only one delivery or deliveries extending over a period of a maximum of 12 months, whatever the time between the conclusion of the contract and the first delivery.*

(3) *Purchase/sale contracts between intermediaries – both buyer and seller are not EU utilities/end users.*

(4) *This category includes exchanges of ownership and U_3O_8 against UF_6. Exchanges of safeguards' obligation codes and international exchanges of safeguards' obligations are not included.*

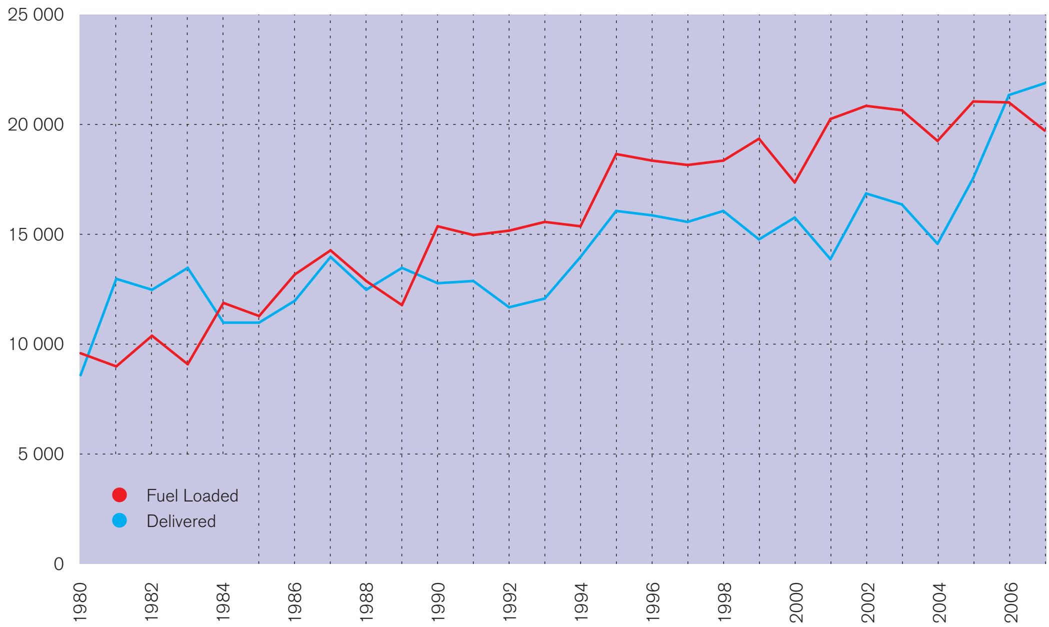
(5) *The quantity represents the net increase (or decrease) in material contracted for.*

Volume of deliveries

From the quantitative analysis of deliveries of natural uranium to EU-27 utilities we can point out the same as we already noted in 2006: during 2007 there were 21 932 tonnes natU delivered (without repU) which was again well above the 19 774 tonnes of uranium loaded into reactors. As it has been already said, this is the second consecutive year that the quantities loaded into reactors are lower than deliveries, which can indicate that reduction of inventories has now definitively ended and even turned into accumulation in some cases. The last time quantities delivered and loaded were in balance was in the late 1980s. The amount of uranium delivered under spot contracts has decreased dramatically, well under historic averages, representing just some 2.4 % of total natural uranium deliveries. The difference between deliveries and the amount of fuel loaded in previous years can be explained by the use of reprocessed uranium or MOX fuel and drawing down of inventories.

The deliveries taken into account are those made to the EU-27 utilities or their procurement organisations (excluding research reactors); they also include the natural uranium equivalent contained in enriched uranium purchases. Deliveries and fuel loaded into reactors by EU utilities since 1980 are shown in Figure 2. The corresponding table is in Annex 3.

Figure 2: Natural uranium feed contained in fuel loaded into EU reactors and natural uranium delivered to utilities under purchasing contracts (tU)



Average prices of deliveries

In order to provide comparable price information with previous years, the deliveries taken into account in the average price calculations are those made to the EU utilities or their procurement organisations under purchasing contracts. This year the average price calculations include some of the purchase contracts where the price of the natural uranium equivalent could be identified. Excluded from the calculations are a number of contracts where it was not possible to establish reliably the price of the natural uranium component, e.g. in some cases of enriched uranium deliveries priced per kg EUP and ready fuel, which is often the case for utilities in the new Member States. The ESA prices therefore refer to contracts where natural uranium is purchased separately or when there is a reliable estimate of the component price.

To calculate the average price, the original contract prices are converted, using the average annual exchange rates as published by the European Central Bank, into Euro per kilogram uranium in chemical form of U_3O_8 and then weighted by the quantities involved per contract. To establish a price excluding the conversion cost, when it was not specified, in 2007 the Supply Agency applied an estimated average conversion price of EUR 7.10/kgU (USD 9.74/kgU).

The average prices of deliveries under multiannual contracts in 2007 were:

EUR 40.98/kgU contained in U_3O_8	(6.7 % up from EUR 38.41/kgU in 2006)
USD 21.60/lb U_3O_8	(USD 18.55/lb U_3O_8 in 2006)

The average price of material delivered in 2007 under spot contracts was as follows:

EUR 121.80/kgU contained in U_3O_8	(127 % up from EUR 53.73/kgU in 2006)
USD 64.21/lb U_3O_8	(USD 25.95/lb U_3O_8 in 2006)

Spot contracts are those providing for either only one delivery or deliveries extending over a period of a maximum of 12 months, whatever the time between the conclusion of the contract and the first delivery. We should note here again that the amount of uranium delivered under spot contracts was considerably decreasing, representing just 2.4 % of total natural uranium deliveries in 2007.

The ESA spot price may differ significantly from the spot prices published by market reporting companies (e.g. Nukem, TradeTech, Energy Intelligence, UxC, Platts etc.) and this can be explained mainly by the difference in the used calculation methodologies and partly by the timing of spot market deals during the year and the time lag between contract conclusion and delivery. Since the ESA spot price definition does not include a time limit between contract conclusion and delivery of the material, some spot deliveries which occurred during 2007, may have been agreed by the contracting parties in previous years.

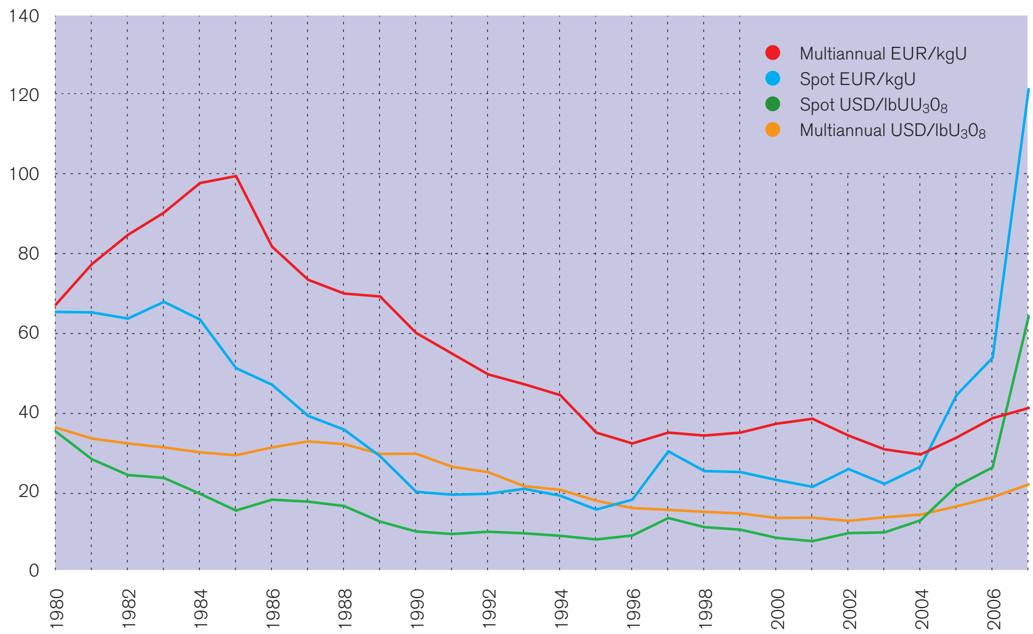
The exchange rate situation was characterised throughout 2007 by a Euro that appreciated in nominal effective terms vis-à-vis the US dollar, with the greatest part of the appreciation occurring in the course of November. On an average, compared to 2006, the US dollar weakened by some 9 %, the annual average EUR/USD rate being 1.37 (vs. 1.26 in 2006).

See Annex 4 for detailed price information and Annex 5 for the price calculation methodology.

Price history

Figure 3 shows the ESA average prices for natural uranium since 1980; the corresponding data are presented in Annex 4 (note: the Euro replaced the ecu on 1 January 1999 with a conversion rate of 1:1).

Figure 3: Average prices for natural uranium delivered under spot and multiannual contracts, 1980-2007 (EUR/kgU and USD/lbU_3O_8)



Origins

For the first time in many years, Canada's leading position in 2007 as a supplier of natural uranium to EU utilities was overtaken by Russia, according to the declarations received from utilities. Though Canadian uranium amounted to 3 786 tU (5 100 tU in 2006) (some 25 % decrease). Even though Australia maintained its previous level of deliveries with 3 209 tU (3 050 tU in 2006) it has now become 4th supplier, because deliveries from Niger increased to 3 531 tU (from 3 350 tU in 2006) and, natural uranium of Russian origin amounted to almost 5 144 tU. Like explained in the previous reports, this last figure can be unreliable and would need more detailed analysis, as it would represent much more than Russia's total production of natural uranium (3 381 tU according to the Red Book). Since many EU utilities are receiving enriched uranium or even complete fuel assemblies from Russia, it is simply impossible to determine the exact mining origin of the uranium contained in the EUP. Uranium declared as 'Russian' may include uranium mined in other countries (i.e. Kazakhstan, Ukraine and Uzbekistan) and part of the high quantity may be explained by the low tails assays used by the Russian enrichment industry, thereby 'creating' more uranium. Direct purchases from Kazakhstan have remained relatively low considering the production level and future potential of this country. It is however expected that the amount of uranium from Kazakhstan will increase in coming years with the operation of various joint ventures.

European uranium mining supplied just below 3 % of the total EU needs, coming from the Czech Republic and Romania (a total of 526 tU). Production in the Rožňa mine was to be terminated in 2008, but the Czech Government decided in May 2007 to continue mining and extended the lifetime without time limit as long as it remains profitable.

In 2007 the amount of re-enriched tails material was 388 tU and that of HEU feed 825 tU.

Figure 4: Sources of uranium delivered to EU utilities in 2007 (% share)

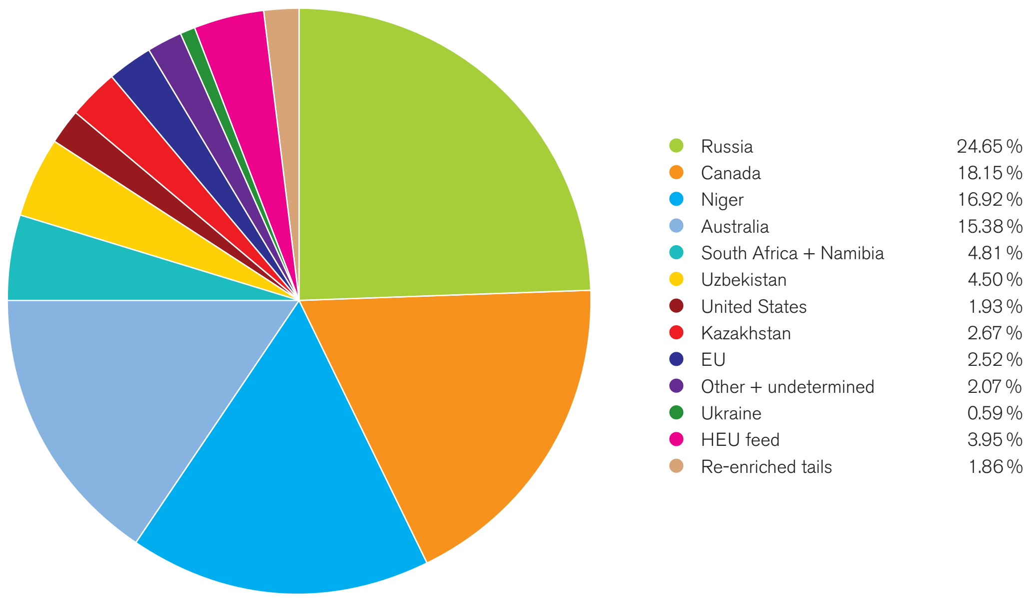
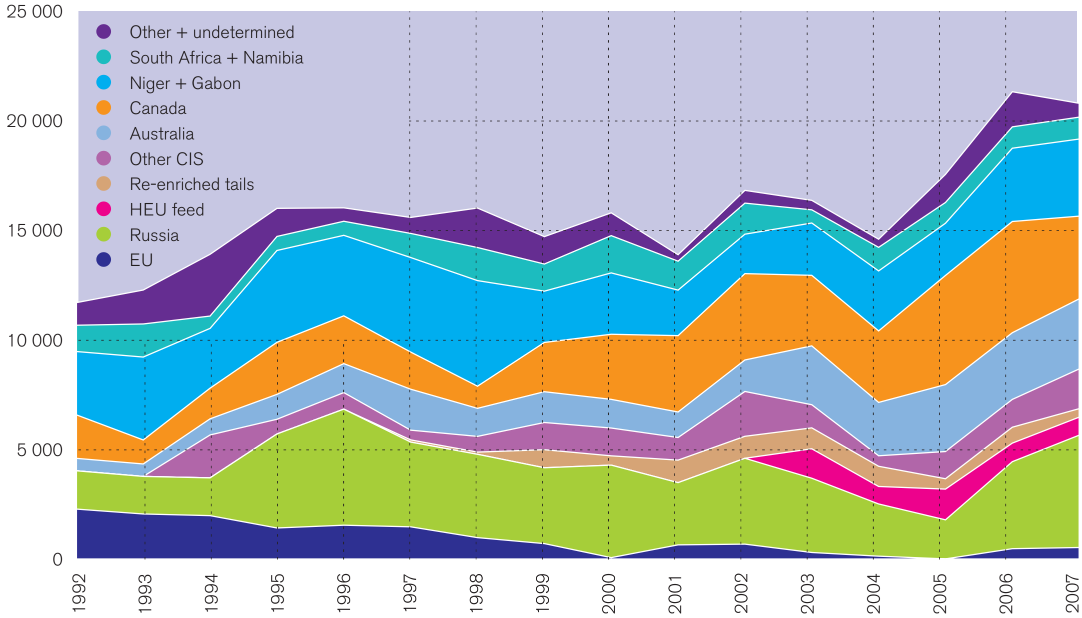


Figure 5: Purchases of natural uranium by EU utilities by origin, 1992-2007 (tU)



Special fissile materials

Conclusion of contracts

Table 5 shows the number of contracts and amendments relating to special fissile materials (enrichment, enriched uranium and plutonium for power and research reactors) which were dealt with during 2007 in accordance with the Supply Agency's procedures.

Table 5: Special fissile material contracts concluded by or notified to the Supply Agency

Contract type		Number
A. Special fissile materials		
Purchase (by an EU utility/user)	• multiannual	5
	• spot	10
Sale (by an EU utility/user)	• multiannual	0
	• spot	3
Purchase/sale (between two EU utilities/end users)	• multiannual	4
	• spot	6
Purchase/sale (intermediaries)	• multiannual	1
	• spot	16
Exchanges		19
Loans		3
Pool		9
Total (1)		**76**
Contract amendments		**11**
B. Enrichment contracts (2)	• multiannual	40
	• spot	5
Contract amendments		**18**

(1) In addition, there were 86 transactions for small quantities (Article 74 of the Euratom Treaty) which are not included here.

(2) Contracts with primary enrichers only.

Deliveries of low enriched uranium

In 2007, supply of enrichment (separative work) to EU utilities totalled approximately 14 756 tSWU, delivered in 2 629 tLEU which contained the equivalent of some 21 932 tonnes of natural uranium feed, a significant increase compared to 2006 (28 %). Some 62 % of this separative work was provided by EU enricher companies (AREVA-Eurodif and Urenco).

Like in the previous years, the average tails assays specified by utilities have continued to slightly decrease, and the range has been maintained between 0.20 % and 0.35 %. This is an expected and normal result of the rising natural uranium prices and has also led to higher expectations for future enrichment requirements on the part of utilities.

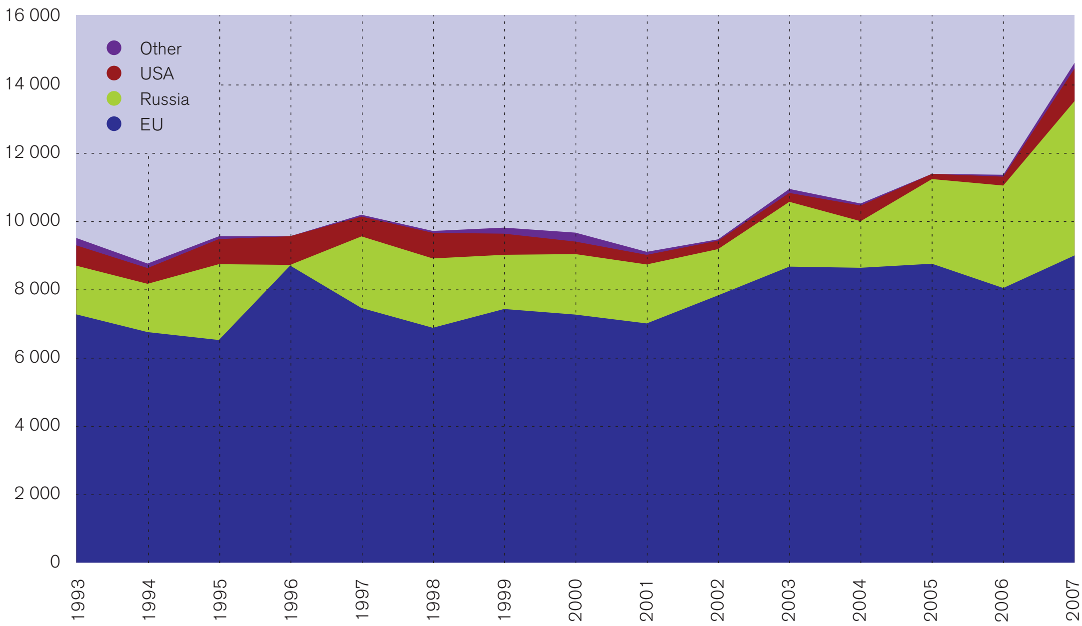
(The tails assay used for the calculation of the natural uranium feed and separative work components has a significant impact on the values of these components. An increase in the tails assay increases the amount of natural uranium and reduces the amount of separative work required to produce the same amount of EUP. The optimal tails assay is dictated by the prices of natural uranium and separative work. For its calculations the Supply Agency used the contractual tails assay declared by the utilities or, when this was not available, a standard 0.30 %. It should also be noted that enrichers do not always use the contractual tails assay at their plants; as a result, they may become major users or 'producers' of natural uranium according to the circumstances. The real figures for supply and demand of natural uranium and separative work may be influenced in one or the other direction by the real tails assay).

Deliveries of Russian separative work to EU utilities under purchasing contracts amounted to some 4 528 tSWU which means a significant increase of some 1 500 tSWU (50 % over 2006) and represents thus almost 31 % of the total enrichment services supplied to EU utilities.

From a low base of 300 to 653 tSWU, there was a net increase in the enrichment supplies from the USA which now accounted for about 6.5 % of the total in the EU-27.

Supply of enrichment to EU utilities by origin since 1993 is shown below.

Figure 6: Supply of enrichment to EU utilities by origin, 1993-2007 (tSWU)



Plutonium and mixed-oxide fuel

The use of MOX has contributed to a significant reduction in requirements for natural uranium and separative work in recent years. However, reprocessing and the use of MOX fuels continue to face difficulties because of the political decisions in some countries to postpone or to abandon this solution for the management of irradiated fuels. Recently, the United States has started to reconsider its position towards reprocessing and may start to develop its fuel cycle operations in this direction.

The quantities loaded into EU reactors and the estimated savings from the use of MOX fuel are shown in Table 6 (no MOX fuel is used in the new Member States). The quantity of MOX fuel loaded was 8 624 kg Pu in 2007, a slight decrease from the average of recent years (some 10 tPu between 2001 and 2006). It should be noted that published figures on natural uranium and separative work savings may vary according the calculation scheme. In this report it was assumed that 1 tPu saves the equivalent of 120 tU as natural uranium and 80 tSWU.

Table 6: Utilisation of plutonium in MOX in the EU-27

and estimated natural uranium (NatU) and separative work savings

Year	kg Pu	Savings	
		t NatU	tSWU
1996	4 050	490	320
1997	5 770	690	460
1998	9 210	1 110	740
1999	7 230	870	580
2000	9 130	1 100	730
2001	9 070	1 090	725
2002	9 890	1 190	790
2003	12 120	1 450	970
2004	10 730	1 290	860
2005	8 390	1 010	670
2006	10 210	1 225	815
2007	8 624	1 035	690
Cumulative Total	**104 424**	**12 550**	**8 350**

Chapter 4
Administrative report

Personnel

During 2007 one new staff member has been recruited and two have left. The number of staff at the Supply Agency is now 16. A new Director-General should be appointed on 1 July 2008.

Finance

The Supply Agency is financed principally by a subvention from the budget of the Commission, as a result of a Council decision of 1960 to postpone the introduction of a charge on transactions to defray the operating expenses of the Supply Agency as provided by the Euratom Treaty.

Costs relating directly to the Supply Agency's staff and its office are borne by the European Commission.

The Supply Agency's expenditure in 2007 amounted to EUR 191 000, which means a budgetary execution of 76.5 %.

The Financial Regulation applicable to the ESA has not yet been adopted and there is no budget line foreseen for the ESA in the general EU budget in 2008, and no proposal foreseen for 2009 either.

Activities of the Advisory Committee

The Advisory Committee held two formal meetings during 2007. In addition to this, an informal technical meeting was held in February 2007 in order to discuss the implications of the EU Court ruling in the INB case for the handling of contracts by the ESA, especially enrichment contracts.

At its June meeting the committee, in fulfilment of its statutory duties, examined and gave opinions on the Agency's annual report for 2006, its balance sheet and accounts for the same year as well as its budget for 2008.

At its October meeting, the committee held in-depth discussion on the 2007 summer enrichment survey, created a working group for modifying the rules of the Agency, and gave opinion on the new statutes and financial regulation for the ESA which have been submitted to the Council for adoption.

The Commission gave regular updates on negotiations between Euratom and third countries.

Contact information

ESA address for correspondence

Euratom Supply Agency
European Commission
L-2920 Luxembourg

Office address

Complexe Euroforum
10 rue Robert Stumper
L-2557 Luxembourg
Tel. (352) 43 01-36738
Fax (352) 43 01-38139

E-mail

Esa-AAE@ec.europa.eu

Website

This report and previous editions are available from the Supply Agency's website:
http://ec.europa.eu/euratom/index_en.html
A limited number of paper copies of this report may be obtained, subject to availability, from the above address.

Further information

Additional information may be found on Europa, the European Union server at http://europa.eu/index_en.htm. It provides access to the websites of all European institutions and other bodies.

The Internet address of the European Commission's Directorate-General for Energy and Transport is http://ec.europa.eu/energy/index_en.html. It contains information, for example, on the security of energy supply, energy related research, nuclear safety, and electricity and gas market liberalisation.

List of abbreviations

CIS	Commonwealth of Independent States
ESA	Euratom Supply Agency
EURATOM	European Atomic Energy Community
IAEA	International Atomic Energy Agency
(US) DOE	United States Department of Energy
(US) NRC	US Nuclear Regulatory Commission
USEC	United States Enrichment Corporation
EUP	Enriched uranium product
HEU	Highly enriched uranium
LEU	Low-enriched uranium
MOX	Mixed-oxide fuel (fuel of uranium and plutonium oxide)
RET	Re-enriched tails
SWU	Separative work unit
tSWU	1 000 SWU
mSWU	1 000 000 SWU
tU	tonne U (= 1 000 kg uranium)
BWR	Boiling water reactor
EPR	Evolutionary (European) pressurised water reactor
LWR	Light water reactor
NPP	Nuclear power plant
PWR	Pressurised water reactor
RBMK	Light water graphite-moderated reactor (Russian design)
VVER/WWER	Pressurised water reactor (Russian design)
kWh	kilowatt-hour
MWh	megawatt-hour = 10^3 kWh
GWh	gigawatt-hour = 10^6 kWh
TWh	terawatt-hour = 10^9 kWh

Annexes

Annex 1: CIS supplies

(A) Russian supply of natural uranium and feed contained in EUP to EU-27 utilities

Year	Deliveries (1)	Exchanges (2)	Subtotal (1) (2)	Re-enriched tails (3)	Total (1) (2) (3)	Total as % of supply
1992	1 800	900	2 700	0	2 700	23
1993	1 700	600	2 300	0	2 300	19
1994	1 700	500	2 200	0	2 200	16
1995	4 300	200	4 500	0	4 500	28
1996	5 100	700	5 800	0	5 800	36
1997	3 900	500	4 400	–	4 400	28
1998	3 900	600	4 500	–	4 500	28
1999	3 500	400	3 900	1 100	5 000	34
2000	4 200	0	4 200	1 200	5 400	34
2001	2 850	200	3 050	1 050	4 100	29
2002	3 900	600	4 500	1 000	5 500	33
2003	3 400	0	3 400	1 200	4 600	28
2004	2 400	0	2 400	900	3 300	23
2005	3 800	0	3 800	500	4 300	23
2006	4 850	0	4 850	700	5 550	26
2007	5 144	0	5 144	388	5 532	27
Total	**56 444**	**5 200**	**61 644**	**8 038**	**69 682**	**27**

NB: For 1997 and 1998, re-enriched tails are included under 'Deliveries' because quantities were small and could not be shown separately for confidentiality reasons.

(B) Deliveries to EU-27 utilities of natural uranium and feed contained in EUP from the CIS (tU)

Year	Deliveries to EU utilities (2)			
	Quantity tU	as % of supply (3)	incl. RET (4)	incl. RET as % of supply (3)
1992	2 700	23		
1993	2 700	22		
1994	4 500	32		
1995	5 200	32		
1996	6 800	43		
1997	5 000	32	–	–
1998	5 600	35	–	–
1999	5 100	34	6 200	42
2000	5 800	37	7 000	44
2001	4 100	29	5 100	37
2002	6 900	41	7 900	47
2003	4 500	27	5 700	35
2004	2 900	20	3 800	26
2005	5 050	27	5 550	30
2006	5 300	25	6 000	28
2007	6 750	32	7 150	34
Total	**78 900**	**31**		

(1) Operators include producers, users and intermediaries.

(2) Including exchanges but excluding re-enriched tails except for 1997-98 as explained under footnote 4.

(3) Supply to EU utilities covers total deliveries to EU utilities under purchasing contracts during the respective year.

(4) Deliveries of re-enriched tails (RET) to EU utilities started in 1997 but were negligible (< 1 % of total supply) during the first two years. For confidentiality reasons they have been included under 'Quantity tU' for 1997 and 1998. The figures include RET acquired as a result of exchanges.

Annex 2: EU-27 reactor needs and net requirements (quantities in tU and tSWU)

(A) From 2008 until 2017

Year	Natural uranium		Separative work	
	Reactor needs	Net requirements	Reactor needs	Net requirements
2008	21 810	17 584	14 909	12 785
2009	20 237	16 233	13 647	12 208
2010	21 420	19 177	14 935	13 949
2011	21 049	18 962	14 249	13 262
2012	20 330	18 623	14 183	13 458
2013	20 586	18 834	14 514	13 978
2014	19 425	17 869	14 348	13 680
2015	17 462	16 222	13 887	13 297
2016	18 894	17 500	15 084	14 351
2017	17 529	16 329	14 228	13 638
Total	198 742	177 333	143 984	134 606
Average	19 874	17 733	14 398	13 461

(B) Extended forecast from 2018 until 2027

Year	Natural uranium		Separative work	
	Reactor needs	Net requirements	Reactor needs	Net requirements
2018	16 310	14 897	13 076	12 328
2019	16 845	15 605	13 340	12 750
2020	16 863	15 547	13 362	12 686
2021	15 653	14 453	12 435	11 845
2022	16 064	14 864	12 779	12 189
2023	15 348	14 108	12 295	11 705
2024	14 775	13 575	11 732	11 142
2025	15 038	13 838	12 030	11 440
2026	14 835	13 635	11 811	11 221
2027	14 492	13 292	11 552	10 962
Total	156 223	143 814	124 412	118 268
Average	15 622	14 381	12 441	11 827

Annex 3: Fuel loaded into EU-27 reactors and deliveries of fresh fuel under purchasing contracts

Year	Fuel loaded			Deliveries		
	LEU (tU)	Feed equiv. (tU)	Enrich. eq. (tSWU)	Natural U (tU)	% spot	Enrichm. (tSWU)
1980		9 600		8 600		
1981		9 000		13 000	10	
1982		10 400		12 500	<10	
1983		9 100		13 500	<10	
1984		11 900		11 000	<10	
1985		11 300		11 000	11.5	
1986		13 200		12 000	9.5	
1987		14 300		14 000	17.0	
1988		12 900		12 500	4.5	
1989		11 800		13 500	11.5	
1990		15 400		12 800	16.7	
1991		15 000	9 200	12 900	13.3	10 000
1992		15 200	9 200	11 700	13.7	10 900
1993		15 600	9 300	12 100	11.3	9 100
1994	2 520	15 400	9 100	14 000	21.0	9 800
1995	3 040	18 700	10 400	16 100	18.1	9 600
1996	2 920	18 400	11 100	15 900	4.4	11 700
1997	2 900	18 200	11 000	15 600	12.0	10 100
1998	2 830	18 400	10 400	16 100	6.0	9 200
1999	2 860	19 400	10 800	14 800	8.0	9 700
2000	2 500	17 400	9 800	15 800	12.0	9 700
2001	2 800	20 300	11 100	13 900	4.0	9 100
2002	2 900	20 900	11 600	16 900	8.0	9 500
2003	2 800	20 700	11 500	16 400	18.0	11 000
2004	2 600	19 300	10 900	14 600	4.0	10 500
2005	2 500	21 100	12 000	17 600	5.0	11 400
2006	2 700	21 000	12 700	21 400	7.8	11 400
2007	2 809	19 774	13 051	21 932	2.4	14 756

Annex 4: Supply Agency average prices for natural uranium

Year	Multiannual contracts		Spot contracts		Exch. rate
	EUR/kgU	USD/lb U_3O_8	EUR/kgU	USD/lb U_3O_8	USD/EUR
1980	67.20	36.00	65.34	35.00	1.39
1981	77.45	33.25	65.22	28.00	1.12
1982	84.86	32.00	63.65	24.00	0.98
1983	90.51	31.00	67.89	23.25	0.89
1984	98.00	29.75	63.41	19.25	0.79
1985	99.77	29.00	51.09	15.00	0.76
1986	81.89	31.00	46.89	17.75	0.98
1987	73.50	32.50	39.00	17.25	1.15
1988	70.00	31.82	35.50	16.13	1.18
1989	69.25	29.35	28.75	12.19	1.10
1990	60.00	29.39	19.75	9.68	1.27
1991	54.75	26.09	19.00	9.05	1.24
1992	49.50	24.71	19.25	9.61	1.30
1993	47.00	21.17	20.50	9.23	1.17
1994	44.25	20.25	18.75	8.58	1.19
1995	34.75	17.48	15.25	7.67	1.31
1996	32.00	15.63	17.75	8.67	1.27
1997	34.75	15.16	30.00	13.09	1.13
1998	34.00	14.66	25.00	10.78	1.12
1999	34.75	14.25	24.75	10.15	1.07
2000	37.00	13.12	22.75	8.07	0.92
2001	38.25	13.18	(1) 21.00	(1) 7.23	0.90
2002	34.00	12.37	25.50	9.27	0.95
2003	30.50	13.27	21.75	9.46	1.13
2004	29.20	13.97	26.14	12.51	1.24
2005	33.56	16.06	44.27	21.19	1.24
2006	38.41	18.55	53.73	25.95	1.26
2007	40.98	21.60	121.80	64.21	1.37

(1) *The spot price for 2001 was calculated on the basis of an exceptionally low total volume of only some 330 tU under four transactions, one of which accounted for two thirds of this quantity. Some 300 tU were delivered as UF6 without a price being specified for the conversion component. To establish a price excluding conversion costs for these deliveries, the Supply Agency applied an estimated average conversion price of EUR 5.70/kgU (USD 5.10/kgU).*

Annex 5: Calculation methodology for ESA U_3O_8 average prices

The Euratom Supply Agency collects two categories of prices on an annual basis:

- ESA weighted average U_3O_8 price for multiannual contracts, paid by EU utilities for their deliveries in a given year;
- ESA weighed average U_3O_8 price for spot contracts, paid by EU utilities for their deliveries in a given year.

The differences between multiannual and spot contracts are defined as follows:

- 'multiannual' contracts are defined as those providing for deliveries extending over more than 12 months;
- 'spot' contracts are those providing for either only one delivery or deliveries extending over a period of a maximum of 12 months, whatever the time between the conclusion of the contract and the first delivery.

Methodology

Prices

Prices are collected directly from utilities or via their procurement organisations, through:

- contracts submitted to the ESA;
- end-of-year questionnaires, completed if necessary by visits to the utilities.

Data requested on natural uranium deliveries during the year

These include the following elements: ESA contract reference, quantity (kgU), delivery date, place of delivery, mining origin, natural uranium price with specification of currency, unit of weight (kg, kgU, lb), chemical form (U_3O_8, UF_6, UO_2), indication of whether the price includes conversion and, if so, the price of conversion, if known.

Deliveries taken into account

The deliveries taken into account are those made under purchasing contracts to the EU electricity utilities or their procurement organisations during the respective year. They also include the natural uranium equivalent contained in enriched uranium purchases.

Other categories of contracts such as contracts between intermediaries, sales by utilities, purchases by non-utility industries, barter deals are excluded.

Deliveries for which it is not possible to reliably establish the price of the natural uranium component are excluded from the price calculation (e.g. uranium out of specification or enriched uranium priced per kg of EUP without separation for the feed and enrichment components).

Checking

The ESA compares the deliveries and prices reported with the data collected at the time of the conclusion of contracts as subsequently updated. It compares, in particular, the actual deliveries with the 'scheduled deliveries' and options. Where there are discrepancies between scheduled and actual deliveries, clarifications are sought from the organisations concerned.

Exchange rates

To calculate the average prices, the original contract prices are converted into EUR per kgU contained in U_3O_8 using the average annual exchange rates as published by the European Central Bank.

Prices which include conversion

For the few prices which include conversion and where the conversion price is not specified, the ESA, given the relatively minor cost of the conversion, converts the UF_6 price to a U_3O_8 price using an average conversion value based on its own sources of information, specialised trade press publications and confirmed by discussions with the converters.

Independent verification

Two members of the ESA staff independently verify calculation sheets from the database.

In spite of all the care, errors/omissions are uncovered from time to time, mostly on missing data, e.g. deliveries under options, which were not reported. As a matter of policy, the ESA never publishes a corrective figure.

Data protection

Confidentiality and physical protection of commercial data is provided through use of stand-alone computers, not connected either to the Commission Intranet or to the outside world (including Internet). Contracts and backups are kept in a safe room, with restricted key access.

European Commission

Euratom Supply Agency — Annual Report 2007

Luxembourg: Office for Official Publications of the European Communities

2008 — 36 pp. — 21x29.7 cm

ISBN 978-92-79-09437-8

KO-AA-08-001-EN-C

Publications Office
Publications.europa.eu

ISBN 978-92-79-09437-8

9 789279 094378