

# Quarterly Uranium Market Report

1<sup>st</sup> Quarter 2021

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## EU and International developments

The first quarter of 2021 saw a number of developments in the field of energy affecting nuclear supply:

### European Parliament Report

The report “Road to EU Climate Neutrality by 2050”, commissioned by Members of the European Parliament from Renew Europe and European Conservatives and Reformists calls for nuclear revival in order to achieve the ambitious climate targets “which cannot be reached with renewables only”.

### European Council Decision

The European Council adopted a decision ensuring the continuation of the European financing of the International Thermonuclear Experimental Reactor project (ITER) during the Multiannual Financial Framework 2021-2027. The indicative European contribution to the project for the period is set at €5.61 billion in current prices.

### European Commission Directorate General for Energy

The Deputy Director-General of DG Energy, Massimo Garribba, stated the EU must consider the role of a variety of energy sources, including nuclear, in its electricity mix if it is to achieve its decarbonisation goals. The statement was made at the occasion of the workshop jointly organised by the International Energy Agency and the International Atomic Energy Agency.

### Canadian Nuclear Association

A Memorandum of Understanding was signed by the Canadian Nuclear Association and Foratom to strengthen the associations' efforts in the nuclear energy development and deployment, amongst others also cooperation on small modular reactors and advanced reactors.

### World Nuclear Association

To meet Paris Agreement targets, nuclear capacity in the world needs to be increased by 600% by 2050, according to the Director General of the World Nuclear Association Dr Sama Bilbao y Leon, who spoke at the London industry webinar.

### Taxonomy

Thirteen trade unions representing energy and nuclear workers sent a joint letter to the President of the European Commission, Ursula von der Leyen, calling for the European taxonomy to include nuclear. In addition, the leaders of seven European Union Member States wrote to the European Commission underlining the important role of nuclear power in EU climate and energy policy, including taxonomy.

## Developments in the EU Member States

### BELGIUM:

The Federal Agency for Nuclear Control of Belgium approved the restart of Tihange unit 2 after the maintenance outage. It was concluded that no new hydrogen flakes appeared and the existing flakes discovered in 2012 did not increase in size.

ENGIE announced that it “decided to stop all the preparation works that would allow a 20-year extension of two nuclear units beyond 2025, as it seems unlikely that such an extension can take place given the technical and regulatory constraints.”

### BULGARIA:

The OECD’s Nuclear Energy Agency announced that Bulgaria became the Agency’s latest 34<sup>th</sup> member.

Bulgaria approved plans for new reactor at Kozloduy NPP. The talks are ongoing with Westinghouse about a possibility to use equipment Bulgaria purchased from Russia for the Belene project.

### CZECHIA:

Czech ministry of industry and trade published “Assessment of the fulfilment of the State Energy Policy of the Czech Republic” along with its background material. The background material states that there exists a techno-economic study considering the long-term operation of Temelin NPP for 60 and subsequently 80 years.

The Czech State Office for Nuclear Safety issued a nuclear site license for two new units, with a capacity of up to 1,200 MW each, to be built at the existing site of Dukovany NPP.

### FINLAND:

Partially used irradiated fuel from the shutdown Finnish Reactor 1 in Espoo was transported to the USA for use in a similar TRIGA Mark II research reactor operated by the US Geological Survey in Denver, Colorado. Dismantling of the Finnish reactor is to begin at the end of 2022.

Radioactive waste management company Posiva Oy informed that it started the excavation of the actual final disposal tunnels at the Onkalo underground characterisation facility near Olkiluoto.

### FRANCE:

EDF announced that the 2020 nuclear output decreased by 11% to 335 TWh, from 379.5 TWh in 2019 due to Covid pandemic.

Framatome informed about plans to hire roughly 1000 employees in 2021 in the areas of engineering, research and development, project management, production and maintenance.

French Nuclear Safety Authority (ASN) approved operation of EDF’s 900 MWe reactors beyond 40 years - for further ten years.

EDF plans to build Local Crisis Centres (CCLs) at all nuclear power plant sites in France. These centres would help EDF continue operation of the plants in case of natural disasters. The centres would be located outside the nuclear plant site equipped with the necessary infrastructure to help manage a crisis scenario autonomously for up to three consecutive days. Demanded by ASN after the Fukushima disaster in 2011, EDF built the first one near the Flamanville NPP.

The European Commission agreed that France is to compensate EDF for early closure of the Fessenheim NPP. The compensation complies with the state aid rules.

### GERMANY:

Germany agreed compensation of EUR 2.4billion for its four nuclear utilities for losses they experienced because of the country’s 2022 nuclear phase-out.

The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety unveiled a plan to complement Germany's nuclear phase-out with the closure of the German nuclear fuel cycle facilities. The sites concerned are Urenco's uranium enrichment plant in Gronau and Framatome's fuel fabrication plant in Lingen.

**HUNGARY:**

According to Rosatom, its subsidiary TVEL began delivering a new modified VVER-440 fuel for unit 3 of Paks NPP. The new fuel "will increase the efficiency of fuel use and improve the economic characteristics of the operation of reactors."

**ITALY:**

Ansaldo Nucleare and its partner Monsud signed a five-year, EUR 105 million contract with the European body, Fusion for Energy, to design, implement, test and commission the emergency electrical power distribution system for ITER.

**LITHUANIA:**

Ignalina NPP (INPP) reported progress in line with the plan to fully decommission the plant as foreseen by 2038. "In 2020, large-scale dismantling of the turbine hall of unit 2 was carried out and 97% of the turbine hall equipment was dismantled," according to INPP.

Lithuania also informed that it started the process for siting of a geologic spent fuel repository, planning to have the facility operational in 2068.

**NETHERLANDS:**

The Reactor Institute Delft and IAEA expand their collaboration in neutron activation analysis to neutron beam-based methodologies - a key technique in materials research, biology and medicine.

**POLAND:**

Poland adopted its energy policy until 2040 (PEP2040), thus allowing the energy transformation in the country. The policy foresees a significant reduction of the power generated by coal by 2030 and introduction of renewables and nuclear energy in its mix.

**ROMANIA:**

Societatea Nationala Nuclearelectrica (SNN) received USD 1.28 million grant from the US Trade and Development Agency to identify potential sites in Romania for small modular reactors.

SNN also informed it would buy from Compania Națională a Uraniului assets within the uranium concentrate processing line at Feldioara, thus completing its manufacturing capability for CANDU fuel.

**SLOVENIA:**

Unit 1 of the Krško NPP was temporarily shut down on 30 December 2020 following the earthquake in Croatia. The plant, which was unscathed, came back in operation after thorough inspection on 31 December 2020.

**SPAIN:**

Cofrentes NPP received a renewed license, allowing for operation until 2030.

The new Spanish Climate Change and Energy Transition Law approved by Congressional committee could put an end to the possibility of new applications for the exploration or exploitation of hydrocarbons as well as the mining of radioactive materials. The law awaits approbation in both Parliament and Senate.

**SWEDEN:**

After 44 years of operation, Unit 1 of Ringhals NPP was permanently shut down on 31 December 2020.

Uniper Sweden created a joint venture with LeadCold and the Royal Institute of Technology to potentially construct a demonstration LeadCold SEALER lead-cooled small modular reactor at Oskarshamn by 2030. The reactor is planned to generate 3-10 MWe over a 10-30 year period without the need for refuelling.

## ... and worldwide

### **BELARUS:**

The European Nuclear Safety Regulators Group (ENSREG) approved the preliminary report on the peer review of the Ostrovets NPP. The report reviewed measures implemented by Belarus concerning seven issues and subsequent recommendations from the 2018 ENSREG stress test report. The preliminary report states “progress has been made in implementing all recommendations related to the seven priority issues.”

### **CANADA:**

Canada released its “Canada’s critical minerals list 2021” containing 31 minerals considered critical for the sustainable economic success of Canada and its allies. Uranium is included on the list.

### **CHINA:**

According to IEA, in next 10 years China is to have the world’s largest nuclear power fleet. The rest of the world is going to reach the end of foreseen 40 year lifetime of its units and in the absence of the policy support for the long-term operation of the existing fleet, the situation is unlikely to change.

China’s 14th Five Year Plan, approved in March includes plans for increase of nuclear power capacity to 70 GWe operational in 2025, up from 50GWe operating today.

### **JAPAN:**

Tokyo Electric Power Company informed of the completion in February 2021 of the removal of all 566 fuel assemblies from the storage pool of unit 3 at the damaged Fukushima Daiichi NPP.

### **NORWAY:**

In the second half of 2020, Norway exported 14 TWh of electricity, thus surpassing France. France is positioned in second place having exported 11.6 TWh. France’s nuclear generation was impacted in the winter by delayed maintenance due to COVID-19.

### **PAKISTAN:**

Pakistan Atomic Energy Commission informed that Unit 2 of the Karachi NPP was connected to the grid.

### **RUSSIA:**

Russian regulator, Rostechnadzor, issued a license to Siberian Chemical Combine to build a demonstration reactor, Brest-OD-300. The reactor is a lead-cooled fast neutron reactor operating with mixed nitride uranium-plutonium fuel.

Rosatom announced it plans for its land-based small modular reactor in the Republic of Yakutia in Russia. The site license is expected in 2023 followed by a construction permit in 2024 and start of operations in 2028. The RITM-200 reactor based on existing PWR technology should have an approximate capacity of 55MW.

VVER-1200 Unit 2 of the Leningrad-II NPP in Sosnovy Bor entered commercial operation in March.

### **SWITZERLAND:**

The Swiss Federal Nuclear Safety Inspectorate requires all nuclear facilities on the Aare River to update flood safety certificates to ensure their protection against extreme events, following an analysis of extreme floods in the region.

### **UKRAINE:**

Ukrainian Cabinet of Ministers decided to transfer direct management of the nuclear utility, Energoatom, from the Energy Ministry to the government, in line with the conditions of the Third Energy Package of the EU in terms of delimiting transmission system operators, producers and suppliers of electricity.

**UNITED KINGDOM<sup>1</sup>:**

In December 2020, the UK and the European Atomic Energy Community (Euratom) signed a Nuclear Cooperation Agreement. The agreement sets a legal framework for continuous civil nuclear cooperation and trade between the UK and Euratom.

The UK Nuclear Industry Council unveiled a Hydrogen Roadmap, stating that nuclear power could, by 2050 contribute one-third to UK's clean hydrogen needs.

The UK Office for Nuclear Regulation allowed the restart of EDF Energy's Units 1 and 2 of the Hinkley Point B NPP, after they were investigated for safety issues related to cracking in graphite bricks in the reactor core.

**USA:**

The Office of Nuclear Energy of US DOE published a "Strategic vision" supporting development of advanced reactors but also keeping existing reactors in operation. The vision paper sees, among others, a demonstration of a commercial microreactor by 2025 and a hybrid nuclear-renewable system by 2027.

The US President Trump issued an Executive Order on Promoting Small Modular Reactors for National Defense and Space Exploration with the aim to "revitalize the U.S. nuclear energy sector, reinvigorate America's space exploration program, and develop diverse energy options for national defense needs."

The US President Biden issued an Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis and re-joining the Paris Climate Agreement. He also signed an Executive Order on America's supply chains asking for a review of supply chains supporting key US industries, with the aim to improve their security.

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<sup>1</sup> UK's withdrawal from the European Union came effective on the 1 January 2021. During the reporting period of this Quarterly Report, UK was still in the transition period prior to the final withdrawal.



## Uranium production

Kazakhstan's 2020 production of uranium decreased by 15% to 19 500 tU, compared to 2019.

Kazatomprom announced its intention to sell 49% share of Ortalyk LLP to a subsidiary of China General Nuclear Power Corporation (CGNPC). Upon completion of the sale, Kazatomprom would retain a 51% interest and CGNPC or its affiliates will hold a 49% interest, with each partner purchasing a proportionate share of uranium production from the operation.

Greenland issued two uranium exploration licenses to Orano. If however Orano discovers uranium, the exploitation permit will depend on the decision of the Self-Government and politicians.

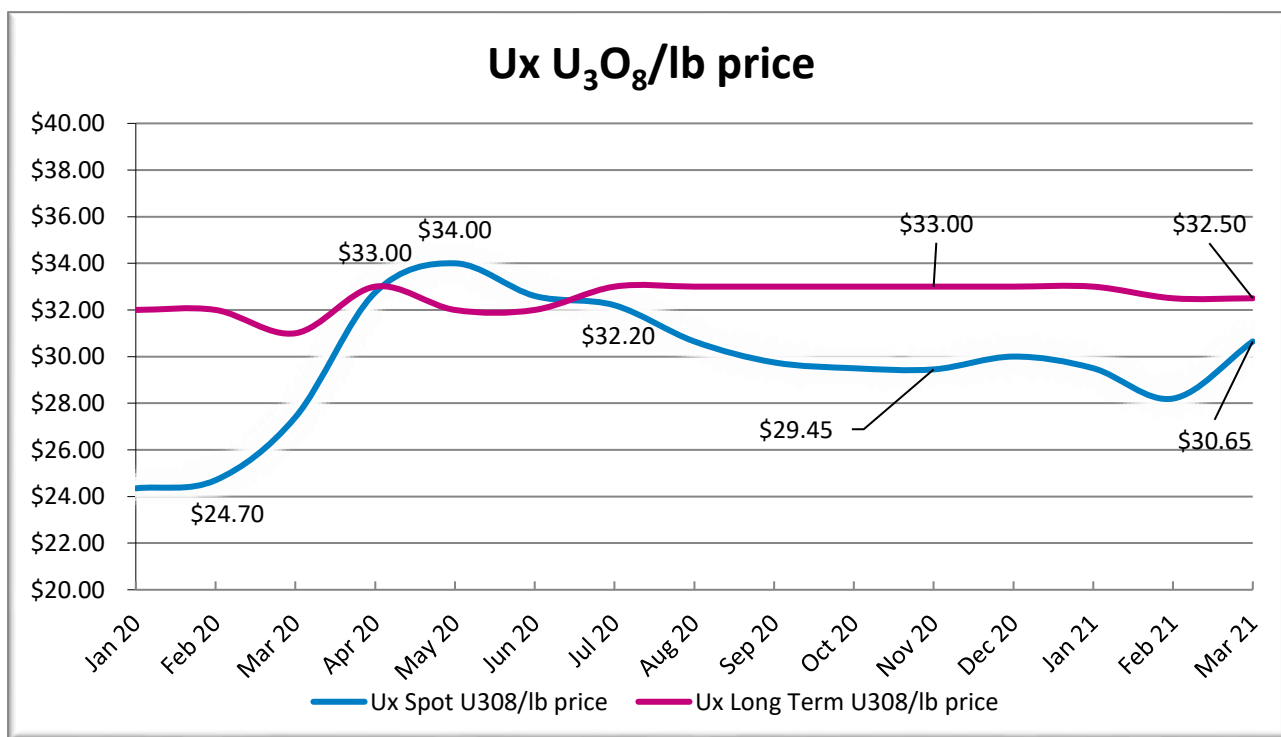
As a result of COVID-19 pandemic leading to shut downs of its Cigar lake mine, Cameco posted net losses for 2020 at CAD 53 million.

Romanian Compania Națională a Uraniului S.A.'s is closing permanently its Crucea-Botușana mine in Romania. The closure comes after an inefficient economic recovery of the remaining reserves due to low ore grade.

## Uranium prices<sup>2</sup>

The UX monthly spot uranium price increased by more than 2% comparing quarter to quarter and, at the end of March, it accounted for USD 30.65/lb U<sub>3</sub>O<sub>8</sub>. It was up by almost 12% in an annual comparison.

The UX long-term uranium price accounted for USD 32.50/lb U<sub>3</sub>O<sub>8</sub> at the end of March, which is more than 1% down when compared quarter to quarter and almost 5% up in an annual comparison.

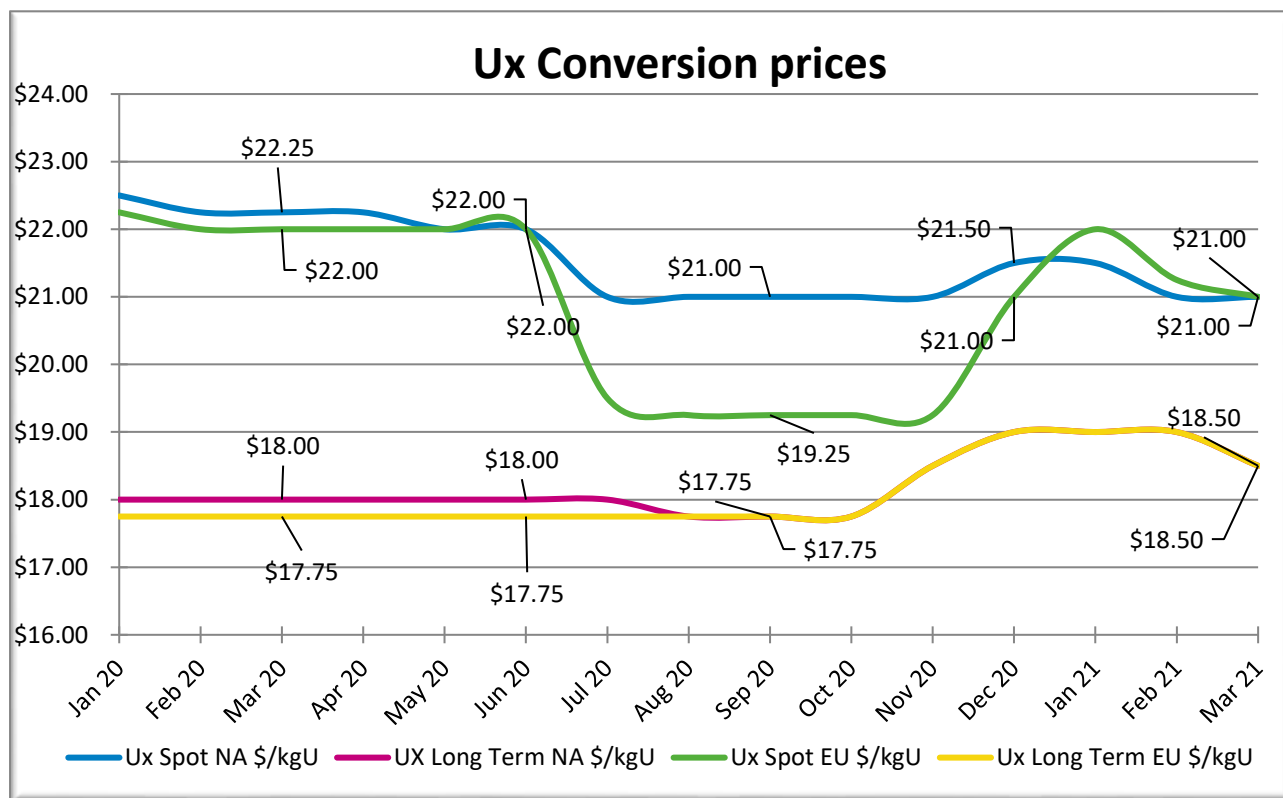


<sup>2</sup> The market price information in the following chapters: Uranium prices, Conversion and Enrichment is provided with permission of the Ux Consulting Company, LLC (UxC) [www.uxc.com](http://www.uxc.com). UxC does not bear any legal liability for the use of these data.

## Conversion

Spot conversion price in the European Union did not change and in North America dropped by 2% compared to the previous quarter and amounted to USD 21.00/kg in the EU and in North America at the end of March. In an annual comparison, they decreased by 5% in the European Union and by 6% in North America.

UX long term conversion prices amounted to USD 18.50/kg in the EU and in North America, which means decrease by 3% in the European Union and in North America, when compared to the previous quarter. They increased by 4% in the European Union and by 3% in North America in an annual comparison.



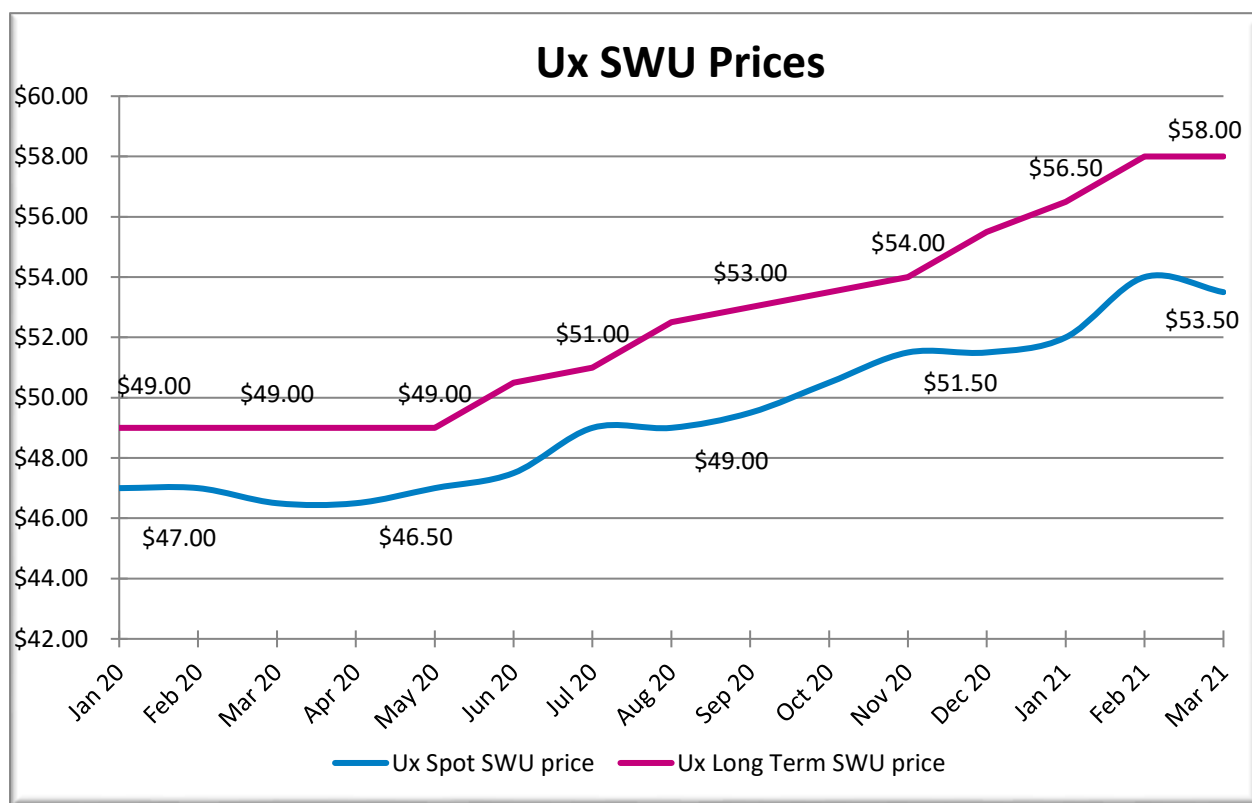
Honeywell International plans to restart its Metropolis Works conversion plant in Illinois in 2023, causing the uranium spot prices likely to stay at the current level.



## Enrichment

At the end of March, the UX spot SWU price amounted to USD 53.50 per SWU and it increased by almost 4% compared to the previous quarter. It was up by 15% in an annual comparison.

The UX long term SWU price amounted to USD 58.00 and it increased by more than 4% compared to the previous quarter and by more than 18% compared to the same quarter of 2020.



Iran announced it restarted uranium enrichment to the 20% U-235 level at its Fordow nuclear facility and informed IAEA accordingly.

## Fuel fabrication

China National Nuclear Corp. manufactured and shipped the first batch of spherical fuel elements for the high-temperature gas-cooled reactor (HTR-PM) at the Shidaowan NPP.

Framatome informed its GAIA Enhanced Accident Tolerant Fuel (EATF) completed its first 18 month cycle at a US nuclear plant. This is the first time a full-length EATF comprising both pellets and cladding completed a fuel cycle in a reactor.

The Russian Bochvar Institute developed a fuel rod design based on nitride uranium-plutonium fuel (MNUP-fuel) for the BREST-OD-300 fast neutron reactor. Rosatom's nuclear fuel division is developing second-generation fuel rods for the same reactor, with a higher burnout level, to be used at MNUP fuel re-fabrication stage.

TVEL informed it started a production site in Elektrostal for the fabrication of fuel for China's CFR-600, fast neutron reactor.

The German Federal Cartel Office - Bundeskartellamt authorized the Russian TVEL and the French Framatome to create a joint venture for fuel fabrication.

Rosatom published a tender for development of a facility for the production of mixed uranium-plutonium fuel for commercial use. The winner of a RUB 1.8 billion (USD 24.2 million) tender is to conduct research until 2024, and then to develop a technical design for a facility to produce mixed oxide, fuel using carbothermal synthesis technology.

## Nuclear medicine

BWXT Medical and Global Medical Solutions created a joint venture to manufacture and distribute radioisotopes and radiopharmaceuticals in the Asia-Pacific region.

## Concluded natural uranium contracts in the EU<sup>3</sup>

Quarter	ESA quarterly spot uranium price EUR/kgU	ESA quarterly spot uranium price USD/lb U <sub>3</sub> O <sub>8</sub>	ESA All Users quarterly spot uranium price EUR/kgU*	ESA All Users quarterly spot uranium price USD/lb U <sub>3</sub> O <sub>8</sub> *	Number of spot natural uranium contracts concluded by EU utilities**	Number of spot natural uranium contracts concluded by all parties**	Total number of contracts processed by ESA***
<b>2020 Q1</b>	-	-	-	-	<b>1</b>	<b>6</b>	<b>63</b>
<b>2020 Q2</b>	-	-	-	-	<b>4</b>	<b>9</b>	<b>65</b>
<b>2020 Q3</b>	-	-	<b>64.52</b>	<b>29.26</b>	<b>3</b>	<b>5</b>	<b>79</b>
<b>2020 Q4</b>	-	-	-	-	<b>4</b>	<b>7</b>	<b>69</b>
<b>2021 Q1</b>	-	-	-	-	<b>3</b>	<b>8</b>	<b>67</b>

\* prices converted with use of ECB reference exchange rate ([www.ecb.europa.eu](http://www.ecb.europa.eu))

\*\* including purchases, sales, exchanges and loans

\*\*\* including contracts, amendments and notifications on the front-end activities

### List of common abbreviations:

ESA	Euratom Supply Agency
IAEA	International Atomic Energy Agency
OECD	The Organisation for Economic Co-operation and Development
(US) DoE	United States Department of Energy
(US) EIA	United States Energy Information Administration
WNA	World Nuclear Association
NA	North America
USEC	United States Enrichment Corporation
NPP	Nuclear Power Plant
PWR	Pressurized Water Reactor
ABWR	Advanced Boiling Water Reactor
EPR	European Pressurised Water Reactor
VVER	Water-Water Power Reactor
SWU	Separative Work Unit
tU	tonne U (= 1 000 kg uranium)

<sup>3</sup> The statistics and data analysis provided by ESA are for information purposes only, and ESA does not bear any legal liability for using them. ESA ensures confidentiality and physical protection of the commercial data.