

The background of the cover is a close-up photograph of numerous small, cylindrical metal pellets, which are nuclear fuel elements, scattered across the surface. The pellets are metallic and have a slightly textured appearance. The image is framed by a white border.

Quarterly Uranium Market Report

3rd Quarter 2020

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International and EU developments

Joint Research Centre (JRC) of the European Commission **plans to assess inclusion of nuclear energy into sustainable finance taxonomy**. Nuclear energy being qualified as a “green” energy technology under the taxonomy is an ongoing debate hopefully ending in 2021 with a report of JRC.

NEA of the OECD published a report “**Unlocking Reductions in the Construction Costs of Nuclear: A Practical Guide for Stakeholders**”. According to NEA, the report “identifies longer-term cost reduction opportunities associated with the harmonisation of codes and standards and licensing regimes and explores the risk allocation schemes and mitigation priorities at the outset of well-performing financing frameworks for new nuclear that require a concerted effort among government, industry and the society as a whole.”

Euratom Supply Agency published in September its **2019 Annual Report** informing, amongst others, that the European utilities received 12,835 tU in 2019. 19.8% came from Russia, 19.5% from Kazakhstan, 15.3% from Niger, 14.4% from Australia and 11.6% from Canada. The report as well provides information about increase of long-term uranium prices (8%), drop of volumes of fuel loaded in reactors (4%), decrease of inventory held by utilities (6%) and a descending tendency of future requirements to 2039 (in regard to natural uranium and SWU).

IAEA published an insight entitled “**COVID-19 and Low Carbon Electricity: Lessons for the Future**” informing that the coronavirus pandemic has completely transformed the operation of power systems in the world and performance of nuclear power during these times demonstrated how it can support a resilient, clean energy system.

The **European Union and India signed a Civil Nuclear Cooperation Agreement** on research and development cooperation in the use of atomic energy focusing on, amongst others, the application of nuclear energy in agriculture, healthcare and industry, radioactive waste management, fusion, safety and security.

The **European Union** decided in July to **allocate 1.045 billion EUR for nuclear safety and decommissioning of nuclear installations**. Along with the EU’s own installations, the funding is foreseen for decommissioning of NPP’s in Bulgaria, Lithuania and Slovakia.

World Nuclear Performance Report 2020 by WNA stated that nuclear reactors generated a total 2657 TWh of electricity in 2019, increase from 2563 TWh in 2018 marking the seventh successive year rise. The report informs about power generation and construction achievements in 2019 and brings case studies related to different nuclear topics.

WNA Board appointed Dr Sama Bilbao y León as Director General replacing departing Agneta Rising.

IAEA published the **40th edition of Energy, Electricity and Nuclear Power Estimates for the Period up to 2050**. The publication, according to the IAEA “contains estimates of energy, electricity and nuclear power trends up to the year 2050. Compared with the previous year’s global projections, the 2020 projections are largely unchanged, although revisions were made at the regional level. Relative to a global nuclear electrical generating capacity of 392 GWe in 2019, the low case projections indicate a decrease of about 7%, to 363 GWe, by 2050. In the high case, an increase of about 82%, to 715 GWe, is expected by 2050.”

TerraPower and Centrus Energy have submitted a proposal to the US Department of Energy’s Advanced Reactor Demonstration Program to “**establish commercial-scale, domestic production capabilities for high-assay, low-enriched uranium**”. This would be needed to fuel many next-generation reactor designs, including the recently announced Sodium Power Storage System designed by TerraPower and GE Hitachi Nuclear Energy.

Developments in the Member States

BELGIUM:

Heatwaves and coronavirus pandemic caused **reduction in nuclear power production down to one third of country’s electricity in Belgium** in the period June to August, compared to the same period in 2019.

New **Belgian government** has committed to the previously **agreed nuclear phase-out by 2025**. However the possibility of a life extension for two nuclear power plants has been kept open, with a final decision by November 2021 based on an assessment of the actual country’s security of supply.

CZECHIA:

Czech government and CEZ signed agreements for construction of a new 1200MW unit at Dukovany NPP. The Czech government offered to extend a loan covering 70% of the construction costs for the unit and proposed to sign

a power offtake agreement with CEZ for at least 30 years for all the electricity produced after the start of the operation.

Unit 1 of Temelin NPP received a permit for another 10-year operation. According to the State Office for Nuclear Safety "Neither the evaluation or inspections revealed any facts that would prevent issuance of the permit". CEZ already begun preparations for the application for a further 10-year permit for Temelin-2.

FRANCE:

EDF informed that the **emergency diesel generators became operational** at all France's 900-MW reactors, thus fulfilling the requirement of French nuclear regulator ASN after the Fukushima accident.

HUNGARY:

Paks II submitted the application for final construction license for its two new VVER1200 units with a view to pour first concrete in 2021.

LITHUANIA:

Lithuanian Prime Minister sent a letter to the European Commission asking it to stop the Ostravets nuclear power plant in Belarus from starting operations. He asked the Commission to send a clear political signal that electricity from Ostravets would not be allowed on the European market and he underlined that the current situation is at "a critical stage" when it was still not too late to prevent a negative impact from the plant's operation. Lithuania has long opposed Ostravets, clearly saying that the two Russian VVER-1200 reactors are not being built in line with safety standards. The first 1,200-MW unit was undergoing hot testing in the third quarter of 2020.

NETHERLANDS:

The Dutch Government published a report by a consultancy company ENCO on **the potential role of nuclear in its future energy mix**, to be followed by a market consultation, assessing commercial interest in nuclear developments in the country.

POLAND:

In September **Poland's** Climate Ministry presented an **update to its standing Energy Strategy by 2040**. Poland plans to invest 33.7 billion EUR to build its first nuclear power plants, with 6-9 GWe of capacity. The first 1-1.6 GWe facility would be up and running by 2033.

ROMANIA:

Romania launched a tender to update the feasibility study of completion of Cernavoda 3&4 units. The feasibility study should also include an analysis considering completion of the unit 3 only.

SLOVAKIA:

Slovenske Elektrarne plans **to uprate Mochovce 1 & 2 to a total of 1000MWe** via efficiency upgrades, foreseeing the completion of works in 2021.

Slovak ministry of Economy informed of its **expectations** for **Mochovce-3 reactor to start in 2021**, followed by Mochovce 4 two years later.

SPAIN:

In July **Spanish government approved the life extension of Almaraz and Vandellos NPPs**. The operation was extended as follows: Almaraz 1 until 2027, Almaraz 2 until 2028 and Vandellos 2 until 2030.

In August **Berkeley Energia was granted land use permit for construction of Salamanca uranium project**, from the Municipality of Retortillo.

SWEDEN:

Sweden decided in June that the **state will become responsible for the safety of final spent fuel repository** in Forsmark once SKB will have fulfilled its mission. Its spent fuel and high-level waste storage facility and repository for low and medium level waste received an authorization to operate until 2028.

UNITED KINGDOM:

UK government awarded £40 million to support advanced nuclear technology development with a major part of the funding allotted to the Advanced Modular Reactor (AMR) projects.

Hitachi decided to abandon Wylfa Newydd NPP project after the UK government failed to develop a funding model for the plant that the company would find satisfactory.

EU Court of Justice dismissed a case brought by Austria to block construction of Hinkley Point C NPP. It found the UK government's plans to subsidize development of a new nuclear power plant in line with EU state aid and environmental law.

... and worldwide**CHINA:**

China forbids export of Generation III & IV nuclear reactors - it listed the technology in its "Catalogue of China's Export Prohibited and Restricted Technologies". China considers these to be "dual-use technologies" under export control management.

State Power Investment Corporation of China officially launched the CAP1400 reactor design. The 1400 MWe design is an enlarged version of the AP1000 pressurised water reactor developed from the Westinghouse original.

JAPAN:

JNFL again delays completion of Rokkasho reprocessing plant - to 2022.

KAZAKHSTAN:

USA and Kazkhstan completed a join effort to downblend Kazakh HEU fuel from IGR research reactor by removal and downblending of the last 2.9 kilograms of unirradiated HEU fuel.

RUSSIA:

Rosenergoatom informed of its plans for **new reactors in Leningrad and Smolensk regions.** The new VVER-1200 and/or VVER-TOI units will **replace** the units with RBMK-1000 reactors reaching the end of their lifetime.

UNITED ARAB EMIRATES:

1400MW Barakah-1, the first of four units was connected **to the electricity grid.** Before going into full operation testing regime will last several months.

USA:

The **U.S. House of Representatives Appropriations Committee** unveiled the draft Fiscal Year 2021 Energy and Water Development and Related Agencies funding bill, which funds the Department of Energy and other related agency programs. **It refused to provide the requested \$150 million for creation of a uranium reserve** due to "concerns about the lack of justification for a reserve and potential market implications of establishing a reserve for commercial purposes".

The **US Nuclear Regulatory Commission issued a standard design approval to NuScale Power, for its small modular reactor.** This allows the design to be referenced in construction applications, operating and manufacturing licences and permits in the USA.

Uranium production

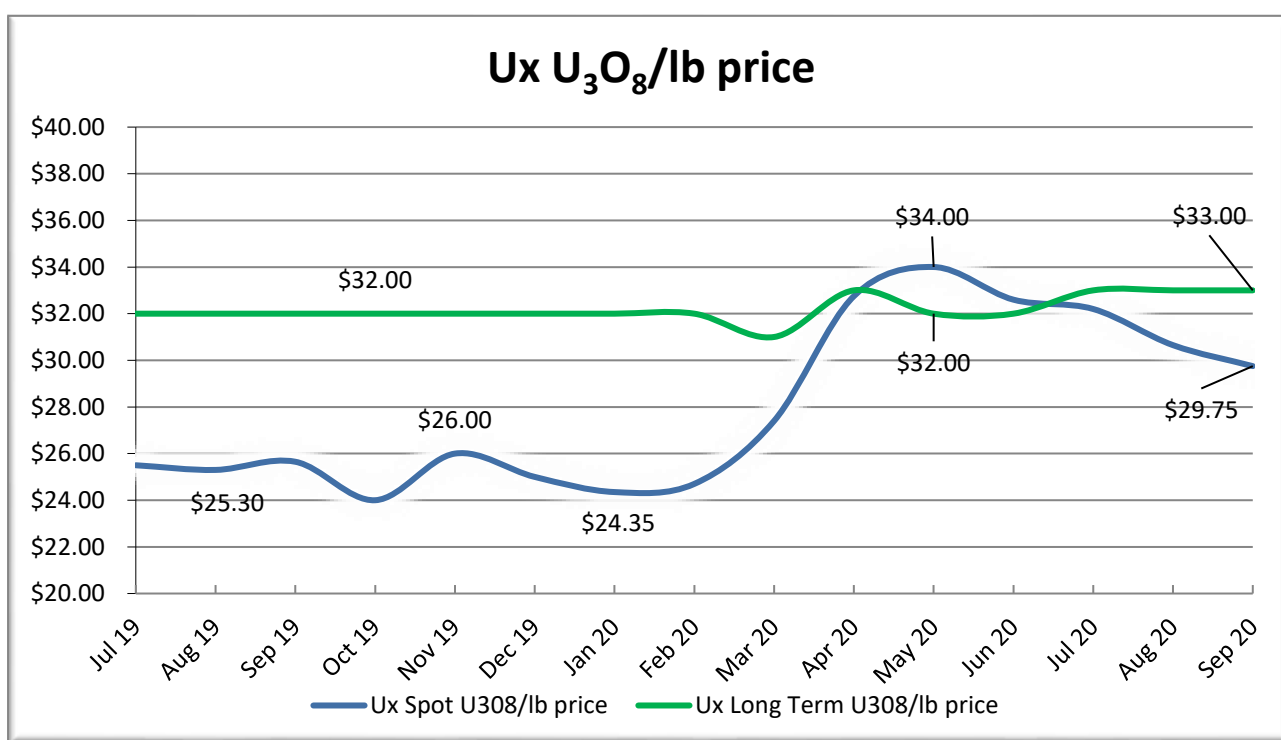
Kazatomprom informed of its intention to produce 20% less uranium in 2021 and 2022 than the limits set in Kazakhstan's subsoil contracts. Amounts foreseen are between 22,000 mtU and 22,500 mtU. The decision comes as a consequence of oversupplied market.

Brazil intends to resume uranium mining at Engenho, according to the state company INB. The company expects to produce 38.6 mtU in 2020, 109 mtU in 2021 and 260 mtU in 2022. **Brazil also plans a new uranium-phosphate extraction plant in Santa Quitéria**. The deposit in the interior of the state of Ceará is the largest discovered uranium reserve in Brazil. An estimated 142,200 tonnes of uranium is intermixed with phosphates.

Uranium prices¹

The UX monthly spot uranium price decreased by almost 9% comparing quarter to quarter and, at the end of September, it accounted for USD 29.75/lb U₃O₈. It was up by almost 16% in an annual comparison.

The UX long term uranium price accounted for USD 33.00/lb U₃O₈ at the end of September which is more than 3% up when compared quarter to quarter and more than 3% up in an annual comparison.

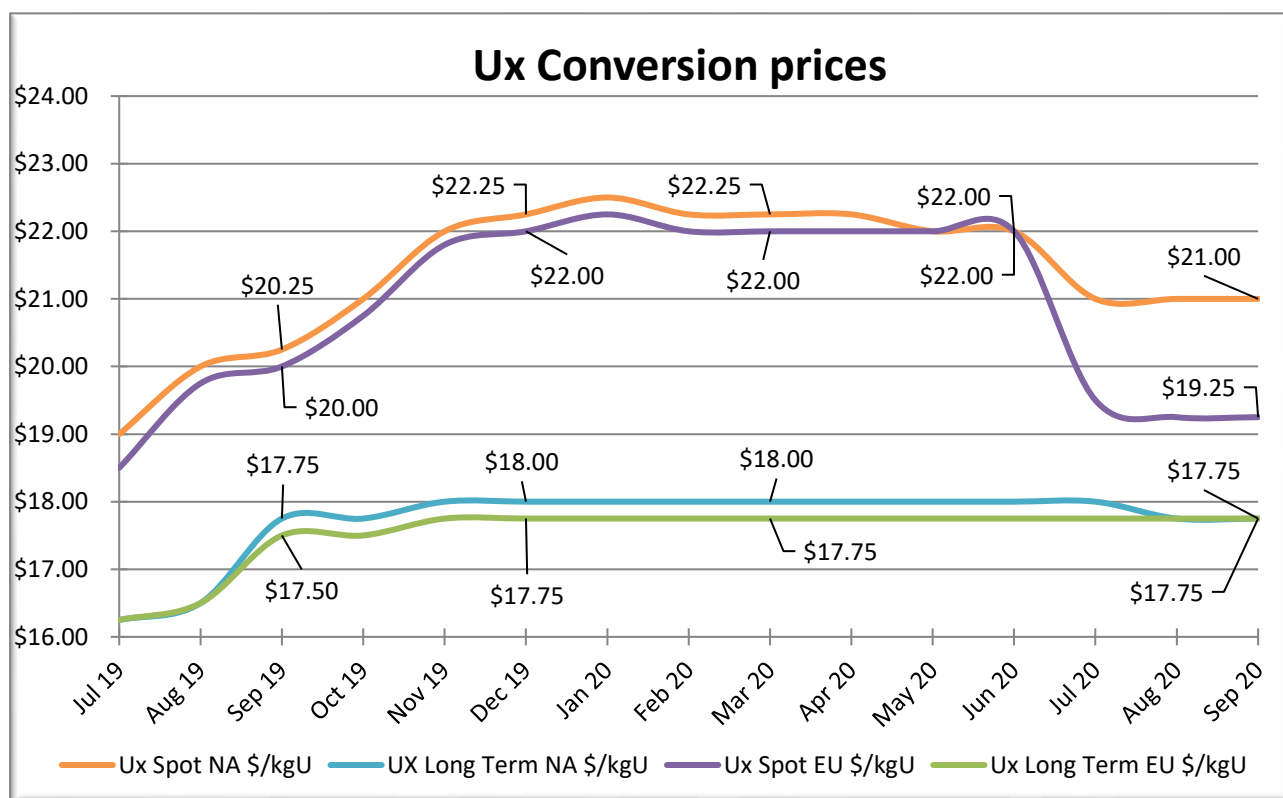


¹ The market price information in the chapters: Uranium prices, Conversion and Enrichment is provided with permission of the Ux Consulting Company, LLC (UxC) www.uxc.com. UxC does not bear any legal liability for the use of these data.

Conversion

Spot conversion price in the European Union dropped by 13% and in North America by 5% compared to the previous quarter and amounted to USD 19.25/kg in the EU and 21.00 /kg in North America at the end of September. In an annual comparison, they decreased by 4% in the European Union and increased by 4% in North America.

UX long term conversion prices amounted to USD 17.75/kg in the EU and in North America, which means no change in the European Union and 1% decrease in North America, when compared to the previous quarter. They increased by 1% in the European Union and stayed at the same level in North America in an annual comparison.

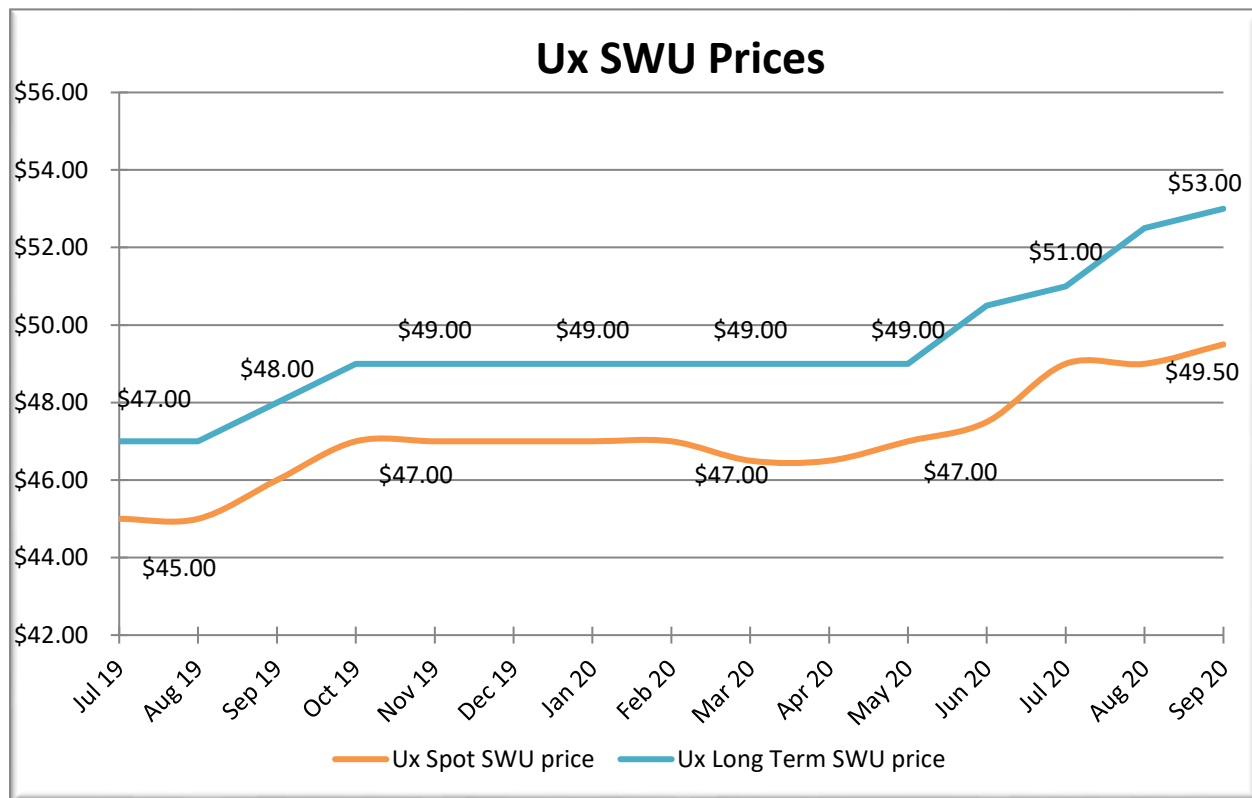


TVEL plans to extend its DUF₆ capacity, intending to build a new facility at the Urals Electro-chemical Plant. The facility would utilize DUF₆ technology provided by France's Orano to convert the DUF₆ into more stable uranium oxide through a defluorination process.

Enrichment

At the end of September 2020, the UX spot SWU price amounted to USD 49.50 per SWU and it increased by more than 4% compared to the previous quarter. It was up by almost 8% in an annual comparison.

The UX long term SWU price amounted to USD 53.00 and it increased by 5% compared to the previous quarter and by more than 10% compared to the same quarter of 2019.



TVEL informed it installed and started operating new centrifuges (the latest generation 9+) at JSC Electrochemical Plant (ECP) in Zelenogorsk, Russia. Another batch of generation 9+ cascades is planned to be installed and begin operation by the end of 2020.

Fuel fabrication

Westinghouse and Energoatom signed a contract for the supply of fuel assemblies for the two 440MWe units of Rovno NPP. The parties also signed a letter of intent regarding exploring localising fuel assembly component production.

Rosatom informed that **Siberian Chemical Combine belonging to TVEL will develop a new uranium-plutonium REMIX (regenerated mixture) fuel fabrication facility** for VVER-1000 reactors. REMIX fuel fabrication will be done in cooperation with the Mining and Chemical Combine in Zheleznogorsk. The project is planned for completion by 2023.

In September **Westinghouse Electric Co. and ENUSA Industrias Avanzadas announced the installation of EnCore Fuel** at Doel Unit 4 nuclear power plant in Belgium. This installation is the first insertion of accident tolerant EnCore Fuel rod assemblies in Europe, and the second insertion into a commercial nuclear power plant worldwide.

Nuclear medicine

The **Central Design and Technological Institute in Russia started work on plans to build Russia's first radiopharmaceuticals manufacturing facility**. The plant is to be built at the site of Karpov Physical-Chemical Research Institute in Obninsk, which is in the Kaluga region. Its launch is scheduled for 2024.

Concluded natural uranium contracts in the EU²

Quarter	ESA quarterly spot uranium price EUR/kgU	ESA quarterly spot uranium price USD/lb U ₃ O ₈	ESA All Users quarterly spot uranium price EUR/kgU*	ESA All Users quarterly spot uranium price USD/lb U ₃ O ₈ *	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***
2019 Q3	-	-	60.73	25.98	3	8	86
2019 Q4	-	-	-	-	4	7	84
2020 Q1	-	-	-	-	1	6	63
2020 Q2					4	9	65
2020 Q3			64.52	29.26	3	5	79

* prices converted with use of ECB reference exchange rate (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)
DUF6	Depleted uranium hexafluoride

² 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.