

NUCLEAR INTELLIGENCE WEEKLY[®]

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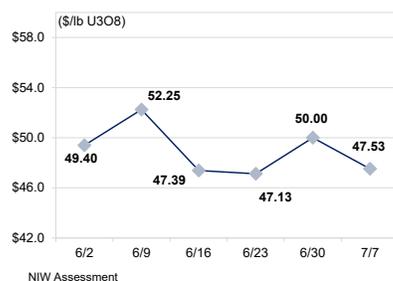
Market Points

Atlantic Project II, docked in St. Petersburg with a cargo of yellowcake and EUP, is awaiting word from Canadian authorities as to what their new Russian sanctions cover.

The uranium spot price is sagging, with the average price delivered by Energy Intelligence's Uranium Price Panel falling to \$47.53 per pound U3O8 on Thursday, down from \$50/lb. a week earlier.

Meanwhile, market assumptions that U3O8 will make it out of Russia but not EUP has sent conversion and enrichment prices soaring.

UPP: \$47.53/LB U3O8



WEEKLY ROUNDUP

Seoul Outlines Push for 30% Nuclear by 2030, and 10 Reactor Exports

- South Korea's new government continued President Yoon Suk-yeol's aggressive pro-nuclear push this week, promising to achieve a 30% share of total output for nuclear by 2030, and the sale of 10 reactor exports by then. It also earmarked 400 billion won (\$308 million) for small modular reactors, and recommitted to restarting work on the APR1400s at Hanul-3 and -4. "This 30% hinges on the premise that nuclear plants still under construction will achieve normal operation, and that those currently in operation will achieve continued operation," said the Jul. 5 announcement from the Ministry of Trade, Industry and Energy. "Moreover, a special act for high-level radioactive waste treatment is in order, possibly installed under the prime minister." These policies will help reduce fossil fuel imports from 81.8% in 2021 to 60% in 2030, the ministry added. South Korea's 24 operating reactors generate 25%-27% of electrical output but seven were slated for permanent closure before 2030 under the previous administration's phase-out policies.
- As UK Prime Minister Boris Johnson announced his resignation amid the virtual collapse of his government, a final planning decision on whether to approve EDF's proposed twin-EPR newbuild at Sizewell C was pushed back from Jul. 8 to Jul. 20. Johnson's coming departure may be a blow to the nuclear industry, given his boosterism: the prime minister pledged in April to support construction of up to eight new nuclear reactors. But Johnson's successor may struggle to justify government support for such costly ambitions. This week saw the UK's largest renewable capacity auction with contracts for 11 GW of new renewables capacity, and offshore wind projects due on line in 2026-27 received a strike price of £37.35/MWh (\$44.70/MWh), in index-linked 2012 prices, compared to the £92.50/MWh price for EDF's EPRs under construction at Hinkley Point C. Undaunted, Rolls-Royce SMR this week shortlisted six possible sites across northern England and Wales for a manufacturing plant to produce heavy vessels for its small modular reactor, for which there are yet no orders, while an EDF-led consortium won a £3 million government award to construct a demonstrator Direct Air Capture that attached to Sizewell C is designed to capture 100 tons of CO2 from the atmosphere annually.
- Washington, DC-based Curio and Energy Northwest on Jul. 7 announced a memorandum of understanding under which the Washington-state utility would partner as a potential off-taker of fuel products produced by Curio's planned nuclear reprocessing facility. Curio is headed by former high-level Department of Energy official Ed McGinnis, who in January promoted the idea of locating the company's "NuCycle" reprocessing facility in West Virginia, shortly before the state overturned its moratorium on nuclear power. Curio says its planned facility will provide "a variety of in-demand commodities and products including domestically produced low-enriched uranium" as well as high-assay low-enriched uranium "and transuranic based TRUfuel for advanced reactors under development." Energy Northwest is in the forefront of the US advanced reactor movement, working with X-Northwest to develop its Xe-100 design that would likely use Haleu-based Triso fuel.

NUCLEAR FUEL MARKET

Waiting on the Atlantic Project II

Atlantic Project II, a 193-meter cargo ship, has been loaded with yellowcake and enriched uranium product (EUP) since it docked in the port of St. Petersburg early on Jul. 7, but much of the uranium market is watching whether or not that cargo must be unloaded before the ship's scheduled departure on Jul. 10. At issue are Canada's anti-Russian sanctions that went into force on Jun. 7, and that would impact the Canadian-domiciled CISN Shipping Group, the parent company of Atlantic Project II owner Atlantic Ro-Ro Carriers. Do the new Canadian regulations extend to uranium at all, and if so does that include U3O8 or just — as many in the market are hoping — EUP?

"I don't think any clarification has come down," one nuclear fuel transport source told Energy Intelligence, noting that while three shipping firms have licenses to load Class 7 material in St. Petersburg, only Atlantic Ro-Ro has till now had the necessary logistics in place to ship such material to the US. "But if Ro-Ro can't do this, how will it get out of Russia?" And if the long-established route for transporting Uzbek and Kazakh uranium to St. Petersburg for shipment to the West is closed, pointed out one uranium trader, "it makes a huge difference," and "the price will shoot up."

At the moment the uranium spot price is sagging — the average price delivered by Energy Intelligence's Uranium Price Panel fell to \$47.53 per pound U3O8 this Thursday, down from \$50/lb. a week earlier — but that's largely on the back of a slumping commodities equities market, which in turn limits the ability of uranium holding funds to raise money for further purchases. ("The market is driven by investors," another trader told Energy Intelligence, "and investors don't have as much appetite as before.") If Ottawa sticks to a rigid application of its rules, however, and both the EUP and U3O8 on board the Atlantic Project II is unloaded, this may change everything.

For the moment Kazatomprom, the state-controlled Kazakh miner that appears to own the aforementioned yellowcake — although the company declined to confirm this — appears unworried. "At the moment, we can still ship out of St. Petersburg when needed, which has been confirmed with shippers — the specific issue regarding the Canadian rules was with Russian EUP and as you know, our U3O8 is of Kazakh origin/title, which doesn't change at

any point in the journey from the Kazakh mine to the western converter, regardless of the route," a Kazatomprom spokesperson told Energy Intelligence. "A number of parties are still working on interpreting the changes in Canadian shipping rules, but the most recent information provided to our logistics team indicated that Kazakh material can still be transported."

The spokesperson added that Kazatomprom is continuing to check the viability of an alternative route from Kazakhstan to Europe via the Caspian Sea, avoiding Russia. "Our current plan — regardless of any change to our ability to ship via our traditional St. Pete's route — is to ship west via the alternative Trans Caspian route for one upcoming shipment in September," said the spokesperson.

Meanwhile a spokesperson for Cameco, the Canadian uranium major that relies on St. Petersburg to ship material from its Kazakh Inkai joint venture, said the update in early May quarterly filings "still holds." That filing reported that while "it is still possible to ship through Russia, due to insurance and other concerns," Cameco and Inkai partner Kazatomprom are working "to secure an alternate shipping route that doesn't rely on Russian rail lines or ports. In the meantime, we have decided to delay a near-term delivery for our share of Inkai production destined for our Blind River refinery."

Likely more worried are US nuclear fuel broker Centrus and Rosatom subsidiary Tenex, although neither company confirmed ownership of the EUP on the Atlantic Project II. On delivery to the US, Tenex plans to deliver EUP to two major US nuclear operators, and it's unclear how many counterparties Centrus will deliver to. But the fact that much of the fuel market already assumes the material will not be shipped is why prices for both conversion and enrichment — the two non-uranium components in the EUP — are "going crazy" right now, a nuclear fuel trader said.

Energy Intelligence understands that the owner of CISN Shipping Group sent a letter to the Canadian government about this issue earlier this week, but until a clarification is given, the market will continue to hold its breath.

Phil Chaffee, London

URANIUM PRICE PANEL

For the week ended July 7, 2022

	Weekly Spot Market Prices													
	Chg.	Jul 7	30	23	June 16	9	3	26	May 19	12	5	28	Apr 21	14
Price (\$/lb U3O8)	-2.48	47.53	50.00	47.13	47.39	52.25	49.40	46.67	47.14	50.41	54.00	52.13	61.28	63.88
Total Assessments	0.00	10.00	10.00	10.00	11.00	10.00	10.00	12.00	10.00	9.00	11.00	9.00	10.00	10.00
% within 1 StDev	10.00	70.00	60.00	90.00	72.73	70.00	40.00	75.00	80.00	77.78	72.73	55.56	60.00	90.00
Low (\$/lb U3O8)	-2.25	47.00	49.25	47.00	46.60	51.70	49.00	46.00	47.00	49.00	53.50	51.25	59.00	63.75
High (\$/lb U3O8)	-2.25	48.50	50.75	47.50	48.50	52.50	50.15	47.50	47.50	52.00	55.00	53.00	63.25	64.00
Variability*	0.34	0.50	0.16	0.06	0.09	0.40	0.32	0.05	0.00	0.28	0.50	0.50	0.75	0.08

*This represents the value of the potential range of conceivable final averages that might result when random elimination is used to balance market positions within the panel.

EUROPE

Pushing Brussels for More After Taxonomy Victory

Pro-nuclear governments and industry figures across Europe are pushing Brussels for further support after a key victory in the European Parliament, which locked in the addition of certain nuclear and natural gas investments into the “EU taxonomy” of sustainable activities. But the victory may be largely symbolic unless senior politicians in key nuclear countries can convince the EU to more fully include nuclear in its region-wide energy planning, and attract substantial financing for expensive new nuclear projects.

The Jul. 6 vote in Strasbourg certainly gave industry leaders cause to celebrate: lawmakers voted 328 to 278, with 33 abstaining, against an objection to the commission’s taxonomy initiative, which is now on course to enter into force on Jan. 1, 2023.

Nuclear’s inclusion within the EU taxonomy “is a turning point, in line with international scientific consensus,” tweeted EDF CEO Jean-Bernard Levy hours after the vote. “It will facilitate investment in existing and future assets to achieve the EU’s #climate objectives and strengthen energy sovereignty.”

That 50-vote margin of victory indicated how successful the Commission’s compromise strategy of linking nuclear — the backbone of energy policy in France and several eastern EU states — with natural gas, the default dispatchable energy source of choice in a number of anti-nuclear states.

Heated Debate

The victory was boosted by a last-minute letter from Ukrainian Energy Minister German Galushchenko, who countered the argument made by opponents of the nuclear and gas inclusion that it would only encourage more imports into the EU of Russian gas and nuclear fuel. “I strongly believe that the inclusion of gas and nuclear in the taxonomy is an important element of the energy security in Europe,” Galushchenko argued in a Jul. 5 letter that was delivered to Parliamentarians just hours before they debated the issue, “especially with a view to replacing Russian gas.”

This prompted fury from the taxonomy initiative opponents. “When we see the lobbying that has gone on around this vote, we really get to understand the vested interests that are at stake here,” Irish MEP Clare Daly told her colleagues during the debate. “Invoking Ukraine, I have to say, is the last straw for me. We talk an awful lot in here about foreign interference, but the letter from the Ukrainian government, which we received at lunchtime, telling us to support this greenwashing in order to show support for Ukraine, I think is a new low.”

Others pointed their fingers at Paris. “This is a pure political game by France,” Dutch MEP Bas Eickhout, who as vice-chair of the

Parliament’s environment committee helped engineer opposition to the Commission’s taxonomy initiative, told the Parliament. “The criteria are written by France, for France. Even the Netherlands have said that the criteria they cannot comply with.”

That’s a reference to the rule that a newbuild or reactor life-extension project would need to be in a country with an operating disposal facility for very-low, low- and intermediate-level radioactive waste, and with plans in place for a high-level radioactive waste repository.

It’s not yet clear how many nuclear projects in how many countries might fit the taxonomy rules, and much will likely be decided as the initiative becomes law next year, with detailed implementation overseen by the European supervisory authorities tasked with European financial supervision. But the call-outs of Ukraine and France set the debate’s tone, with emotive attacks on, and defenses of, nuclear power and gas, all singling out particular countries’ energy policies.

“Near the Austrian border, in Krsko, an atomic power station is operating that still is there from Soviet times,” said Austrian MEP Georg Mayer. “If there was an incident, we wouldn’t need to worry about CO2 anymore.” This prompted immediate retort from Slovenian MEP Franc Bogovic: “I was actually mayor of Krsko for quite a long time,” and the Krsko plant “uses American technology, very high quality... You’re misleading the public when you say this is technology inherited by the Soviets.” Though Mayer claimed “my information is different,” quick Googling would have revealed that Krsko is in fact a Westinghouse-supplied reactor.

The most powerful defense of the taxonomy initiative came from Spanish MEP Luis Garicano. “The reality is that as long as we don’t have a viable large scale storage technology, renewables will not be enough, and in the transition we will need to use nuclear and gas for a very limited period of time,” said Garicano. “Nuclear is a useful transition technology, because it doesn’t emit any CO2, and the taxonomy will allow investment in it until 2045. Also gas is necessary in the transition, as this war has made sadly, painfully, clear.”

Further Support Possible?

That’s roughly in line with the compromise position of the European Commission, which in a statement following the Parliament vote underlined that the “inclusion of certain gas and nuclear activities is time-limited and dependent on specific conditions and transparency requirements.”

It’s not clear that this reluctant compromise will be enough to direct money towards nuclear projects, however, as Eickhout pointed out. “Will any investor really step in because of the green label?” asked the Dutch politician while discussing nuclear’s inclusion in the taxonomy. “Absolutely not, because the investor will need security from the government. This green label will not work and will not help.”

This analysis is at least implicitly shared by a group of senior national politicians who pushed this week for the EU to extend

support beyond the taxonomy to other areas, including its Green Deal, launched in 2019, and the REPowerEU initiative unveiled in May, to end the EU's dependence on fossil fuel imports from Russia by 2027. Both initiatives, as with all EU energy planning documents, avoid all but the most cursory mention of nuclear.

"If the EU wants to stick to its goal of achieving carbon neutrality and at the same time secure its security of supply, our attitude towards nuclear energy must change," a group of finance, climate change, industry and energy ministers from 10 EU countries — Bulgaria, Croatia, Czech Republic, Finland, France, Hungary, Poland, Romania, Slovenia and Slovakia — wrote in a joint article published Jul. 4 on social media and in respective national newspapers. "To meet this challenge, nuclear must be included in Green Deal and REPowerEU policies," as "foreseen" in the "Clean Planet for all" strategic vision document unveiled in November 2018. That broad policy statement notably grouped nuclear with renewables as "the backbone of a carbon-free European power system."

However, given the furious pushback immediately following the highly controversial vote — protestors inside the parliament chamber stood up in red T-shirts spelling out "Betrayal" — it's unlikely the commission is in a rush to include nuclear in any of these broader energy policy initiatives.

Phil Chaffee, London

JAPAN

JAEA Inks Reprocessing Deal with Orano

The 35 billion yen (\$258 million) reprocessing contract recently signed by the Japan Atomic Energy Agency (JAEA) and Orano's Areva Recycling Co. appears to be the first such Japanese deal aimed at lowering Japan's notoriously high stockpile of separated plutonium. It does so by transferring ownership of the plutonium separated under the deal to Orano, thereby increasing France's mounting Pu stockpiles.

The deal, which covers both transportation and reprocessing of the fuel, provides JAEA with a way out of a years-long conundrum created by the combination of the Fukui prefectural government's opposition to retaining spent nuclear fuel waste in its territory, the JAEA's inability to find other storage sites and the lack of capacity in Japan to reprocess mixed-oxide (Mox) fuel. The prefecture's stance on nuclear waste also complicated attempts by Kansai Electric Power Co. to restart its reactor fleet. The new arrangement may, however, serve as a model to cope with the no less vexing issue of what to do with spent fuel from the JAEA's ill-fated Monju fast breeder reactor. And by transferring ownership of the separated plutonium, the JAEA would at least be helping Japan to meet its commitment to not produce more plutonium than it maintains it needs.

Touted as an advanced thermal reactor, the heavy water-moderated 165 MWe Fugen light water reactor was the world's first to attempt to use a full Mox fuel core though its core ultimately consisted of a mix of Mox and uranium assemblies. The experimental reactor began commercial operation in March 1979, but was shut down in 2003 due to its lack of efficiency. Its decommissioning program was approved in February 2008 and is scheduled for completion by the end of fiscal 2033, or Mar. 31, 2034.

According to an exchange of letters between the Japanese and French governments, the contract will cover transport of 731 spent fuel Mox assemblies to Orano's La Hague plant in Normandy between Apr. 1, 2023 and Mar. 31, 2027, with reprocessing scheduled between Apr. 1, 2024 and Mar. 31, 2029, as well as the conditioning of the remaining radioactive waste that will be sent back to Japan no later than Mar. 31, 2042. The contract evidently does not include 13.3 billion yen paid to Areva Recycling under a October 2018 contract for the design and manufacture of shipping containers in preparation for the transport of Fugen spent fuel to France.

The JAEA spokesperson also said that the agency's schedule to complete decommissioning at Fugen by the end of fiscal 2033 "will not change." And he confirmed an NHK report that Monju's spent fuel, currently stored in the reactor's spent fuel pool, is targeted for shipment by the end of fiscal 2037.

Reducing Japan's Pu Stockpile

An Orano spokesperson told Energy Intelligence that "the amount of recovered plutonium produced by reprocessing 111 tons of used fuels coming from Fugen is estimated to be about 1.3 tons." Both French and Japanese authorities concurred that "recyclable materials" will be used for civil purposes in power reactors, with the JAEA's Jun. 24 statement saying recovered plutonium would be used "by a third party other than Japan." The JAEA spokesperson added that the plutonium ownership transfer was made "in consideration of the government's policy of not having plutonium for no purpose" and affirmed that it "will hand over the entire amount to the reprocessing company." He added that "Orano will make the supply decisions" on the future use of any plutonium generated from the reprocessed Fugen fuel.

"The type and quantity of wastes to be returned from France to Japan will be appropriately coordinated between the French and Japanese operators," an Orano spokesperson said. It will be "ultimately disposed by the Nuclear Waste Management Organization of Japan," said the JAEA spokesperson.

The commercial arrangements concerning the ultimate disposition of the separated plutonium are at this stage pretty murky. One Japan-based analyst told Energy Intelligence that the JAEA "may have spent considerable time negotiating the terms of what to do with plutonium after reprocessing, which would have been a difficult negotiation since Japan is likely to have paid an extra fee rather than selling plutonium to the French company since plutonium does not have a positive price and EDF also has a plutonium stockpile problem."

Another Japanese expert told Energy Intelligence: “Media reports do not talk about the logical problem of who will pay to whom for Pu transfer based on the cost of MOX production with Pu given for free vs. LEU [low enriched uranium] fuel with purchased U, or the Pu glut in France. They just quote unidentified officials referring to payment to be made by Orano to JAEA to be decided later.”

Long in the Making

The possibility of transferring Fugen’s spent fuel to France for reprocessing has been under consideration for some time as the JAEA could neither store it onsite, or reprocess it at either its own Tokai reprocessing facility, which was shut down in 2007, or the repeatedly delayed Rokkasho Reprocessing Plant, owned by Japan Nuclear Fuel Limited, which is only licensed to reprocess uranium-oxide fuel.

According to the JAEA, the number of fuel assemblies used in Fugen totaled 1,459 including 687 uranium-based fuel assemblies and 772 Mox assemblies. Of these, 723 assemblies were previously reprocessed, but 736 assemblies remain unprocessed. Of the remaining unprocessed assemblies 466 remain in Fugen’s spent fuel pool, and 265 were removed and stored at the JAEA’s Nuclear Fuel Cycle Laboratories (the former Tokai reprocessing facility) in Ibaraki prefecture. In addition to these 731 assemblies covered under the Jun. 24 contract, five more remain stored at the JAEA’s Nuclear Science Research Institute, also in Tokai Village.

The JAEA and the government were unable to persuade the Fukui prefecture government to accept “interim storage” for spent fuel from either Fugen or Monju and thus reprocessing became the only means for getting the spent fuel out of the site, observed Tatsujiro Suzuki, vice director of the Nagasaki-based Research Center for Nuclear Weapons Abolition.

“This new contract is a compromise between the principle of not increasing the plutonium stockpile and the policy of reprocessing all spent fuel,” said Suzuki, who added that “in my opinion, they should have tried harder to find an interim storage site and avoided reprocessing.”

Dennis Engbarth, Taipei City

CORPORATE

France Reconfirms EDF Nationalization, Replacing Levy

The new French government reconfirmed plans first unveiled during President Emmanuel Macron’s first term to completely nationalize EDF, the world’s largest nuclear operator. Separately, the government revealed it will not extend EDF CEO Jean-Bernard Levy’s mandate, ending a tenure that began in October 2014. Levy’s term will expire no later than Mar. 18 of next year.

“I confirm to you today the intention of the State to hold 100% of the capital of EDF,” newly appointed Prime Minister Elisabeth Borne told the National Assembly in a Jul. 6 address. “This development will enable EDF to strengthen its ability to carry out ambitious and essential projects as soon as possible for our energy future.”

Nationalizing EDF had in the previous Macron government been seen as the first step in a broader restructuring plan called “Project Hercule” that Paris was negotiating with Brussels, and which would split the utility into two separate entities: a state-owned “EDF Blue,” which would retain the company’s thermal and nuclear generation assets, and a partially privatized “EDF Green,” which would spin off EDF’s profitable renewables and low-voltage distribution grid operator. But in the shorter term, the nationalization would effectively allow a recapitalization, an injection of government money into a company hemorrhaging money.

“The priority of the current government will likely be to build new nuclear and renewable capacities in France, while preserving affordability through measures to protect end customers against the skyrocketing power prices, which have been exacerbated in France by the uncertainties surrounding nuclear output in the forthcoming months,” Moody’s Investor Service said in a Jul. 7 issuer comment.

EDF’s problems with its nuclear fleet — roughly half of which remains off line thanks to outages planned and unplanned — combined with a government mandate in January 2022 to sell more of its nuclear output to competitors at the fixed “Arenh” tariff well below current market prices, pushing EDF billions of euros into the red. “One-year forward wholesale power prices in France currently exceed” €400 per megawatt hour, noted Moody’s, “compared with the €46.2/MWh offtake price for the 20 TWh [Terrorawatt hour] Arenh supplement decided by the French government in January 2022.” As EDF had forward sold its 2022 output, this mandate combined with less-than-anticipated output means that the company has been forced to buy kilowatts on the market and then sell them at an incredible loss.

All of which explains why in her first speech to the National Assembly, Borne focused on EDF’s nationalization, which Moody’s viewed as credit positive. “The energy transition goes through nuclear power,” said Borne, who continued that “this is a conviction widely shared on these benches. It is a low-carbon, sovereign and competitive energy. Successful energy transition means being able to manage it.”

It remains unclear if that management will include the EDF restructuring envisioned by Project Hercule, which wasn’t mentioned by Borne, and which had been stridently opposed by France’s powerful industrial unions. “In no case” should the government reform EDF “according to a capital revamping that would lead to its de facto dismantling,” argued a federation of French unions in a Jul. 7 statement, which also insisted on “putting an end to the mortifying Arenh” or “at a minimum,”

repealing the additional 20 TWh EDF is forced to supply under that scheme from the January mandate.

Easing the Arenh pressure on EDF is no sure thing, particularly with Macron’s apparent irritation over EDF’s unplanned outages during the ongoing European power crisis, but it’s clear that the government wants the utility helmed by a new CEO. The state and Levy “have agreed to immediately launch the process of succession of the latter at the head of EDF,” the French finance ministry said in a Jul. 7 statement.

EDF pointed out that Levy’s term was already set to expire within nine months “given the age limit set by the company’s bylaws.” But the finance ministry explained that the new EDF head “may be appointed” before Levy’s term officially expires on Mar. 18 “so that the new manager is quickly able to implement the strategic and industrial projects announced by the President of the Republic in Belfort.”

That’s a reference to Macron’s speech earlier this year in the eastern French city, promising construction of six EPR2 reactors, with the option for building eight more. Yesterday’s finance ministry announcement also noted that the new CEO “will also have as a priority in the shorter term to ensure the return to service of the nuclear reactors shut down for maintenance.”

Phil Chaffee, London

UNITED STATES

Technical Challenges Await a Diablo Canyon Life Extension

California Gov. Gavin Newsom has moved Pacific Gas & Electric (PG&E) closer to a decision to extend the life of the twin-unit Diablo Canyon nuclear power plant beyond 2025, likely with substantial support from state and federal subsidies. But members of a state watchdog group are warning that the amount of technical work required for such an extension, coupled with substantial challenges to revitalizing the plant’s workforce, is a heavy lift — and one that requires political expediency by state leaders.

Whatever the eventual decision, Newsom’s about-face on the plant’s future reflects the degree to which energy politics in the US has changed. Newsom faced pressure over Diablo Canyon early in his gubernatorial re-election bid, and while his re-election this fall now seems all but certain, his ambitions for national office may be prompting him to fall in line with the pro-nuclear stance of the current Democratic administration of President Joe Biden. However, the realities on the ground at Diablo Canyon mean that absent a concerted effort starting almost immediately the chances of keeping the plant open past 2025 will diminish. And that work could be held up by uncertainty over the timing of decisions and

disbursement of state and federal subsidies that could amount to more than \$1.2 billion.

“If this decision goes that way, the scope of the plant’s work will change dramatically in the next year or two, in dozens of different areas, in fact, almost every area of the plant’s work on safety,” Diablo Canyon Independent Safety Committee (DCISC) Chairman Robert Budnitz said during Jun. 22 and 23 hearings. “It’s a concern to make sure nothing falls through the cracks.” The DCISC is an independent watchdog board, comprised of three politically-appointed members, focused on operations at Diablo Canyon. Budnitz, a former senior staff member of the US Nuclear Regulatory Commission (NRC) and guest scientist at the US Department of Energy’s (DOE) Lawrence Berkeley National Laboratory, pointed out that the plant’s fate rests most immediately with state authorities and is “outside our control,” which means the DCISC has to be “reactive.” Details of the technical requirements to keep Diablo Canyon open will remain “elusive” until a final decision is handed down, he added.

Diablo Canyon has long been the subject of controversy, and became a focal point of the US anti-nuclear movement more than 40 years ago when some 1,900 activists were arrested and sent to jail during a two-week period in 1981 for protesting the plant’s construction, according to a case study of the protests. Fast forward to the present and those distant events seem all but forgotten. With California’s energy transition hampered by the Covid-19 pandemic and supply chain difficulties, and political pressures, Newsom reversed his position about the future of the 2,256 MW nuclear plant that sits near two fault lines roughly midway along California’s Pacific coast.

In 2016, when he was lieutenant governor, Newsom helmed the State Land Commission that only extended the plant’s lease after owner-operator PG&E agreed to the 2025 closure. That deal was solidified in a 2016 joint proposal with area environmental groups and neighboring communities, and then approved by the California Public Utilities Commission, the state legislature and former Gov. Jerry Brown.

Walking Back an Agreement

Today, Newsom is walking back the agreement in hopes the resource remains temporarily available to meet a projected supply gap of 1,800 MW, not even accounting for extreme events. But Newsom’s history with Diablo Canyon should provide at least some preparation for the work involved in not just rolling back a legal agreement with the neighboring community and plant workers, but retroactively reviewing years of planning documents to determine how much plant upgrading work was set aside in anticipation that Units-1 and -2 would shut down when their licenses expired, respectively in 2024 and 2025.

The DCISC members agreed that one of the biggest concerns is the impact the attrition of nuclear plant workers and the current labor shortage would have on hiring and recruitment needed to keep the

plant online longer. The committee itself would likely require extra consultation just to revisit operational planning documents and decisions.

DCISC technical consultant Rick McWhorter highlighted complex aging management items that are likely to require attention by both PG&E and the NRC if the plant's life is extended. McWhorter cited, as an example, an inspection program intended to identify erosion in carbon steel piping caused by fluids and steam to prevent rupture. Since 2016, those inspections have been dramatically reduced because the plant was approaching retirement. "From my perspective, if PG&E had known they weren't going to shut down in 2025, there would have been a larger scope in the last maintenance outage," McWhorter said. "Time is of the essence," he added. "Waiting too long could make it hard to ensure this is done safely."

McWhorter said that a decision to extend the plant's life would likely require the committee to "review all of our reports probably since 2016" that might require a reversal, he said. That includes DCISC's "Open Items List" — currently comprised of about 150 items and updated three times a year — that the committee tracks for follow-up, monitoring, or action. One of those closed items involved the replacement of a reactor coolant vibration monitoring system at Unit 1, but not at Unit 2 because of "trouble with the system inside containment" that had potential environmental consequences. McWhorter suggested the item would have to be reopened.

The list also includes capital projects that the committee may have rejected in the past. One such project includes upgrading the main annunciator system in the control room that alerts control room

operators to abnormal plant conditions and emergent problems. Ultimately the committee rejected the capital project in favor of procuring enough spare parts to ensure operation to 2025. With continued operation, that system would likely have to be replaced.

Finding the Funds

California's legislature last week passed a controversial bill that sets up a \$75 million strategic reserve that would give the state Department of Water Resources authority to buy power from aging fossil fuel plants and Diablo Canyon for "on-call emergency supply." At the same time, the DOE amended the rules of and extended the deadline for its \$6 billion Civil Nuclear Credit (CNC) program to allow Diablo Canyon to qualify.

Citing the amendment to the CNC program guidance, "as well as the Governor's request that we take steps to preserve [Diablo Canyon] as an option to support grid reliability, PG&E expects to apply for CNC funding as it would reduce costs for our customers should there be a change in state policy extending operations at the plant," PG&E spokesperson Suzanne Hosn told Energy Intelligence this week. It has until Sep. 6 to apply.

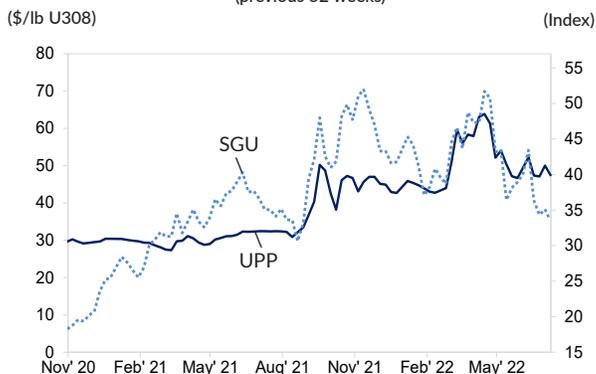
In addition to as much as \$75 million in state-subsidized power purchase agreements, Diablo Canyon stands to receive a total of about \$1.2 billion in federal funding distributed annually over four years from the CNC program. At this stage, though, it's entirely unclear how big PG&E's expenditures would be to extend the plant's operating life, and therefore how much of a contribution the subsidies would make.

Jessica Sondgeroth, Washington.

URANIUM MARKET UPDATE

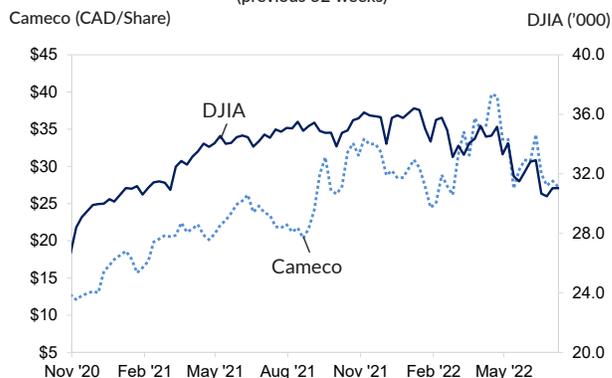
All prices as of Thursday, July 7, 2022

UPP VS. SOLACTIVE GLOBAL URANIUM INDEX
(previous 52 weeks)



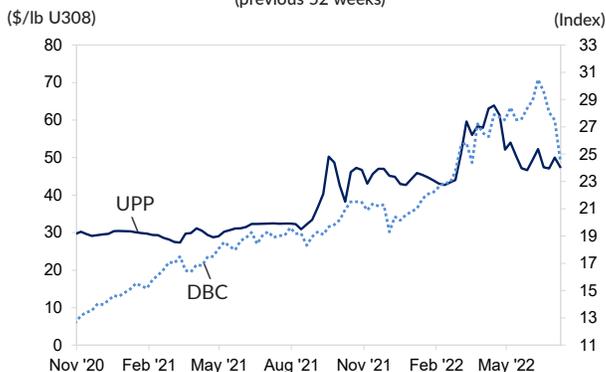
The Solactive Global Uranium Total Return Index, created by Structured Solutions AG, tracks the price movements in shares of companies active in the uranium mining industry. Calculated as a total return index and published in US\$, its composition is ordinarily adjusted twice a year.

CAMECO VS. DOW JONES INDUSTRIAL AVERAGE
(previous 52 weeks)



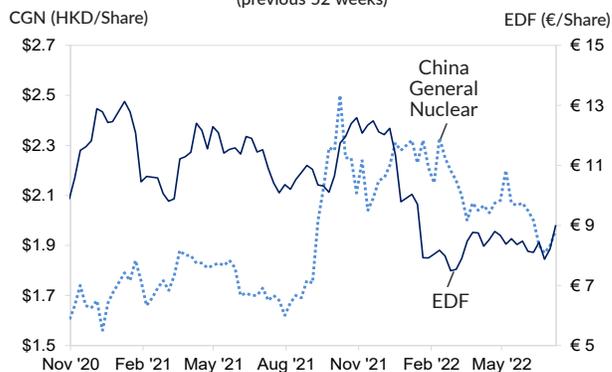
Canadian uranium miner Cameco's stock is valued in Canadian dollars compared with the US dollar on the Dow Jones Industrial Average (DJIA). Roughly two-thirds of DJIA's 30 component companies are manufacturers of industrial and consumer goods. The others represent industries ranging from financial services to entertainment.

UPP VS. POWERSHARES DB COMMODITY INDEX
(previous 52 weeks)



The PowerShares DB Commodity Index Tracking Fund is designed to provide investors with a broadly diversified exposure to the returns on the commodities markets. It is based on the Deutsche Bank Liquid Commodity Index, which is composed of futures contracts on 14 of the most heavily traded and important physical commodities.

EDF VS. CHINA GENERAL NUCLEAR
(previous 52 weeks)



The stock valuation of France's Electricite de France (EDF), largely owned by the French state, is in euros compared to state-owned China General Nuclear (CGN) Power Co., valued in Chinese yuan renminbi. Both companies build nuclear power facilities, design and service reactors, operate nuclear reactors and supply nuclear components and technology.

MONTHLY SPOT MARKET PRICES

	Chg.	2022						2021						
		Jun	May	Apr	Mar	Feb	Jan	Dec	Nov	Oct	Sep	Aug	Jul	
Uranium (\$/lb U308)														
Low	+1.00	45.50	46.00	52.50	51.00	42.50	43.00	42.00	43.00	36.00	36.00	32.20	32.20	
High	-1.50	52.50	54.00	64.00	60.00	44.50	46.50	47.00	47.50	48.00	51.00	36.00	32.50	
Conversion (\$/kgU)														
Low	-	30.00	30.00	28.00	26.00	16.00	16.00	16.00	15.00	16.00	19.00	19.00	19.50	
High	-	33.00	33.00	30.00	28.00	17.00	17.00	17.00	18.00	19.00	21.00	21.00	21.50	
Enrichment (\$/SWU)														
Low	-	84.00	84.00	82.00	100.00	59.00	57.00	56.00	56.00	55.50	55.50	54.00	54.00	
High	-	150.00	150.00	150.00	150.00	61.00	59.00	57.00	57.00	57.50	57.50	56.00	56.00	

NIW monthly UF6, SWU and U308 prices rely on the general consensus of direct market participants and is informed by actual market transactions. This section was previously known as the Nukem Weekly Report and the Nukem Price Bulletin. The methodology for NIW's weekly UPP price is different - more information about the methodology behind that price is available on page two.

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