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## Nuclear News: What Happened in 2022?

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While the discussion of nuclear power and deployment of nuclear technologies has typically remained in the sphere of commercial negotiations, in 2022, the perception of nuclear as a commercial commodity has been significantly shifted to the perception of nuclear as a country's energy and national security. Now, the priority of a country's energy mix is focused on the energy security aspects rather than the emissions reductions aspects. Nuclear is an energy generation source that sits at the intersection of both emissions reductions and national and energy security goals. This shift in perspective can be particularly noted in Europe, where the energy crisis, as a result of the Russian-Ukraine War, is causing politicians to adjust energy plans drastically.

Previously, nuclear projects were typically on the basis of bids, but the atmosphere around developing nuclear projects has changed. Now, emerging markets, especially in Europe, are selectively choosing the US as a nuclear power partner not only because of the commercial competitiveness of the US designs or capabilities, but also because of the geopolitical implications of cooperating with a democratic nation like the US when entering into long-term energy cooperation agreements.

### Industry News

- Exelon Corp. announced its separation of Constellation Energy Corp., Exelon's former power generation and competitive energy business. License transfers for a number of nuclear power plants were completed between Exelon Corp. and Constellation Energy Corp. <https://www.reuters.com/article/constellation-exelon-nuclear/u-s-nrc-okays-5-reactor-license-transfers-from-constellation-to-exelon-idUKL1N0MT1EX20140401>
- The Tennessee Valley Authority (TVA) Board of Directors ratified approval of a New Nuclear Program as a component of its decarbonization goals. The New Nuclear Program will provide a disciplined, systematic "roadmap" for TVA's exploration of advanced nuclear technology, both in terms of reactor designs and potential locations. The process will include specific decision points that would allow TVA to withdraw from plans or projects if they are no longer feasible or not in the best interest of the region. <https://www.tva.com/newsroom/press-releases/tva-board-authorizes-new-nuclear-program-to-explore-innovative-technology>
- BWX Technologies was selected by the US Department of Defense (DOD) to build the Project Pele microreactor. The Strategic Capabilities Office under the DOD has partnered with the DOE to develop, prototype and demonstrate a transportable reactor. The high-temperature gas-cooled reactor (HTGR) will operate at between 1 and 5 MWe and will be transportable in commercially

available shipping containers, BWXT said. It will be powered by TRISO (TRIStructural-ISOtropic) HALEU fuel that can withstand extreme heat and has very low environmental risks. <https://www.world-nuclear-news.org/Articles/BWX-Technologies-selected-to-build-Project-Pele-mi>

- NuScale Power and KGHM Polska Miedz SA signed an agreement to initiate work towards deploying a first NuScale VOYGR small modular reactor (SMR) in Poland as early as 2029. The first task under the agreement will identify and assess potential project sites and develop project planning milestones and cost estimates. The new agreement follows the signing of a Memorandum of Understanding (MoU) in September 2021 by NuScale Power, KGHM and business engineering advisory consultancy PBE to jointly explore the deployment of NuScale's SMR technology as a repowering or repurposing solution for existing coal-fired power plants and electricity and heat for KGHM's industrial processes in Poland. <https://www.world-nuclear-news.org/Articles/NuScale,-KGHM-agree-to-deploy-SMRs-in-Poland>
- TRISO-X, a subsidiary of X-energy, announced its plans to build a commercial advanced nuclear fuel fabrication facility at the Horizon Center Industrial Park in Oak Ridge, Tennessee. This fuel fabrication facility is the nation's first High-Assay Low-Enriched Uranium (HALEU) based facility, The TRISO-X Fuel Fabrication Facility is being partially funded through the DOE's Advanced Reactor Demonstration Program (ARDP). The commercial plant will use HALEU to produce TRISO particles, which are fabricated into fuel forms, including the spherical graphite "pebbles" needed to fuel the company's Xe-100 high-temperature gas reactor. Site preparation and construction were expected to get underway in 2022, with commissioning and start-up scheduled for as early as 2025, according to X-energy. <https://x-energy.com/media/news-releases/x-energy-triso-x-selects-oak-ridge-horizon-center-for-first-commercial-advanced-reactor-fuel-fabrication-facility-in-north-america>
- Ontario Power Generation (OPG) and TVA announced plans to work together to develop advanced nuclear technology including SMRs in both Canada and the US, creating a North American energy hub. The companies said their "pioneering partnership" will develop advanced nuclear technology as an integral part of a clean energy future, driving decarbonization and advancing energy security in North America. The agreement allows the companies to coordinate their explorations into the design, licensing, construction, and operation of SMRs. <https://www.world-nuclear-news.org/Articles/OPG,-TVA-partner-to-advance-SMRs>
- NuScale Power signed a MOU with GS Energy, Doosan Enerbility, and Samsung to explore the deployment of NuScale's VOYGR SMR plants in Asia. Along with financial support, Doosan, Samsung and GS Energy will lend their respective expertise to NuScale Power in areas such as component manufacturing, prior nuclear construction experience, and power plant operation. Doosan is a world-renowned nuclear pressure vessel manufacturer, Samsung is a trusted nuclear power plant contractor, and GS Energy brings more than 20 years of expertise as a power plant operator. <https://www.businesswire.com/news/home/20220426005317/en/NuScale-Power-Signs-Memorandum-of-Understanding-with-GS-Energy-Doosan-and-Samsung-to-Explore-Small-Modular-Reactor-Deployment>
- NRC authorized Southern Nuclear Operating Co. to begin fuel loading and operation at Vogtle Unit 3 in Georgia. The unit is the first reactor to reach this stage under the NRC's combined license process. The decision moves the 1,117 MW AP1000 generating unit out of NRC construction monitoring and into the regulatory body's operating reactor oversight process. Plant Vogtle units 3 and 4 are on track to be the first new nuclear units built in the United States in the last three decades. <https://www.power-eng.com/nuclear/nrc-approves-nuclear-fuel-load-at-vogtle-unit-3/>
- Dow and X-energy announced that they have signed a letter of intent which

will help Dow advance its carbon emissions reduction goals through the development and deployment of X-energy's advanced small modular nuclear technology in the United States. Dow and X-energy will collaborate with the intent to deploy X-energy's Xe-100 high-temperature gas reactor technology at one of Dow's U.S. Gulf Coast sites – which is expected to be operational by approximately 2030. Dow also intends to take a minority equity stake in X-energy, working with the company to deploy small modular nuclear technology. <https://x-energy.com/media/news-releases/dow-and%E2%80%BBenergy-to-drive-carbon-emissions-reductions-through-deployment-of-advanced-small-modular-nuclear-power>

- Westinghouse fuel plant license was renewed for four more decades of operation. The NRC announced that it has issued a renewed license for Westinghouse Electric Company's Columbia Fuel Fabrication Facility (CFFF), authorizing operations at the plant for another 40 years—through September 12, 2062. <https://www.ans.org/news/article-4309/westinghouse-fuel-plant-okayed-for-four-more-decades-of-operation/>
- Cameco Corp and Brookfield Renewable Partners said they would acquire Westinghouse in a \$7.9-billion deal including debt, amid renewed interest in nuclear energy. Brookfield said in a separate statement it expects to generate about \$1.8 billion in proceeds from the sale of its 44% stake in Westinghouse, with the balance distributed among institutional partners. The deal is expected to close in the second half of 2023. <https://www.reuters.com/markets/deals/cameco-corp-brookfield-renewable-partners-buy-westinghouse-79-blb-deal-2022-10-11/>
- NuScale Power announced a MOU with Romania's state nuclear power corporation S.N. Nuclearelectrica S.A. to conduct engineering studies, technical reviews, and licensing and permitting activities at a site in Doicesti, Romania. The announcement is a key advancement of NuScale and Nuclearelectrica's teaming agreement signed in 2021, under which NuScale and Nuclearelectrica are taking steps toward deploying a first NuScale VOYGR™-6 (6-module), 462 MWe, power plant in Romania. Romania has the potential to accommodate the first deployment of SMRs in Europe and become a catalyst for SMRs in the region, as well as a base for supporting operatorship of this new technology in other countries. <https://www.nuscalepower.com/en/news/press-releases/2022/nuscale-signs-agreement-with-nuclearelectrica-and-owner-of-preferred-site-for-first-smr-in-romania>
- Westinghouse signed an agreement with Energoatom, Ukraine's state-owned nuclear utility, to supply nuclear fuel for Ukraine's nuclear fleet as well as increasing the number of planned AP-1000 reactor exports to a total of nine units. Energoatom announced earlier that it would stop using Russian nuclear fuel. It was already in the process of diversifying its fuel supplies but will now be making a full shift to using Westinghouse fuel. <https://www.world-nuclear-news.org/Articles/Westinghouse-and-Energoatom-expand-plans-to-nine-A>
- Westinghouse and Finland's state-owned energy company Fortum signed an agreement for the design, licensing, and supply of a new fuel type. Fortum, is tied to the fuel agreement with Russian nuclear power company TVEL for the duration of their operating licenses, which will expire in 2027 and 2030. Until then, and after regulatory approvals, the new fuel from the US will be used with Russian-supplied fuel. <https://www.euractiv.com/section/politics/news/two-finnish-nuclear-reactors-to-receive-fuel-from-us/>
- GE Hitachi Nuclear Energy (GEH) has been selected by OPG as the technology partner for the Darlington New Nuclear Project. GEH will work with OPG to deploy a BWRX-300 SMR at the Darlington site that could be complete as early as 2028. <https://www.ge.com/news/press-releases/ge-hitachi-nuclear-energy-selected-by-ontario-power-generation-as-technology>

## US Government News

- The US Department of Energy (DOE) announced the establishment of a \$6 billion program to preserve the US's clean nuclear energy infrastructure. A Notice of Intent and Request for Information (RFI) was released as part of the implementation of the Bipartisan Infrastructure Law's \$6 billion Civil Nuclear Credit Program (CNC). The newly enacted Bipartisan Infrastructure Law created CNC, allowing owners or operators of commercial reactors to apply for certification and bid on credits to help support their continued operations. The DOE's RFI sought input on the structure and execution of the CNC Program, including the certification process and eligibility criteria, invitations to submit bids for credits, and the allocation of credits. <https://www.energy.gov/articles/doe-establishes-6-billion-program-preserve-americas-clean-nuclear-energy-infrastructure>
- **The US passed the Inflation Reduction Act (IRA)**, which provides unprecedented federal support for climate change and clean energy activities. The IRA invests \$369 billion to take the most aggressive action in US history to confronting the climate crisis and strengthening both economic and energy security. Two main pillars of this legislation, among others, include emissions control and lowering energy costs for consumers. The IRA includes investment and tax incentives for large, existing nuclear plants; newer, advanced reactors; HALEU; and hydrogen production. The tax credit for existing large reactors begins in 2024 and ends in 2032. The base credit amount is \$15 per megawatt-hour for electricity production. The advanced nuclear production tax credit is a technology-neutral production tax credit of \$25 per megawatt-hour or a 30% investment tax credit on new zero-carbon power plants placed into operation after 2025. The IRA 2022 also expands on the amount of loan guarantees available to the Department of Energy by \$40 billion, which is available for nuclear facilities, and there is another \$250 billion in loan guarantee cap that is available to some nuclear facilities. In addition to the tax credits and loan guaranty, the IRA also invests \$700 million to support the development of a domestic supply chain for HALEU. The IRA 2022 also included significant tax credits for hydrogen produced cleanly. Because nuclear can produce hydrogen without emissions, nuclear hydrogen production would receive the maximum PTC of \$3.00 per kg. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/15/by-the-numbers-the-inflation-reduction-act/>
- The CHIPS and Science Act broadly authorizes \$11.2 billion for research, development, and demonstration (RD&D) aligned with the 10 technology areas in the applied energy offices, including \$400 million over FY 2023 through FY 2026, for the Office of Nuclear Energy to carry out advanced materials RD&D activities. The Act also includes \$1.2 billion for the Advanced Research Projects Agency–Energy (ARPA-E) program. Investment in existing and new university nuclear infrastructure will support next-generation nuclear technologies and professionals. <https://www.pillsburylaw.com/en/news-and-insights/chips-science-act-supports-nuclear-fusion-industries.html>
- DOE announced \$16 million in funding to provide resources to communities interested in learning more about consent-based siting, management of spent nuclear fuel, and interim storage facility siting considerations. DOE continues to advance research and development related to the long-term disposition of spent nuclear fuel and high-level radioactive waste. To maximize transparency and support for facilities needed to manage spent nuclear fuel, DOE is committed to a consent-based approach that is driven by communities and reflective of needs specific to each surrounding area. <https://www.energy.gov/articles/doe-announces-16-million-support-consent-based-siting-spent-nuclear-fuel>
- DOE opened applications for the \$7 billion program to create regional clean hydrogen hubs (H2Hubs) across the country, which will form a critical arm of

America's future clean energy economy. As part of a larger \$8 billion hydrogen hub program funded through President Biden's Bipartisan Infrastructure Law, the H2Hubs will be a central driver in helping communities across the country benefit from clean energy investments, good-paying jobs, and improved energy security – all while supporting President Biden's goal of a net-zero carbon economy by 2050. <https://www.energy.gov/articles/biden-harris-administration-announces-historic-7-billion-funding-opportunity-jump-start>

- DOE announced \$38 million for a dozen projects that will work to reduce the impacts of light-water reactor used nuclear fuel (UNF) disposal. The projects, led by universities, private companies, and national laboratories, were selected to develop technologies to advance UNF recycling, reduce the volume of high-level waste requiring permanent disposal, and provide safe domestic advanced reactor fuel stocks. <https://www.energy.gov/articles/doe-awards-38-million-projects-leading-used-nuclear-fuel-recycling-initiative>
- The Senate Foreign Relations Committee passed the International Nuclear Energy Act. This legislation would promote engagement with ally and partner nations to develop a civil nuclear export strategy that would offset Russia and China's growing influence on international nuclear energy development. [https://www.foreign.senate.gov/imo/media/doc/12-07-22\\_international\\_nuclear\\_energy\\_act.pdf](https://www.foreign.senate.gov/imo/media/doc/12-07-22_international_nuclear_energy_act.pdf)
- Centrus Energy and DOE finalized HALEU contract. The first phase of the USD150 million contract will see demonstration production of HALEU at Piketon by the end of 2023. Centrus says it could scale up the facility to commercial production capacity, given sufficient funding. <https://www.world-nuclear-news.org/Articles/Centrus-Energy,-DOE-finalise-HALEU-contract>

### International News

- The government of Sweden announced that it had issued a permit to build a deep geological repository for spent nuclear fuel. The permit was issued to the Swedish Nuclear Fuel and Waste Management Company (SKB), and SKB is planning to use the KBS-3 method for final fuel disposal. This method is based on three protective barriers: copper canisters, Bentonite clay, and the Swedish bedrock. <https://www.ans.org/news/article-3628/sweden-issues-permits-for-spent-fuel-repository-encapsulation-plant/>
- On March 4, Russian forces seized and took control of Ukraine's six-unit Zaporizhzhia nuclear power plant. This power plant supplied approximately 25% of Ukraine's power generation. Russia's unprovoked attack on Ukraine resulted in significant geopolitical shifts in the Central and Eastern European region, but it also represented a significant shift in the energy security mentality of the entire European region. Prior to the Russian invasion of Ukraine, Western, Central, and Eastern Europe were all heavily dependent on Russian hydrocarbon fuels. The situation in Russia and Ukraine has accelerated the shift towards clean energy deployment, not only as a climate change strategy, but more significantly as a strategy to improve energy security in the region. <https://www.aljazeera.com/news/2022/3/4/russia-ukraine-war-fire-at-zaporizhzhia-nuclear-plant-put-out>
- The Emirates Nuclear Energy Corporation (ENEC) announced the start of commercial operation for the UAE's second nuclear unit at Barakah, a nuclear power plant exported and built by the South Korean nuclear industry including KHNP and KEPCO. Together with Barakah unit 1, which began commercial operation in April 2021, the output from Barakah 2 means that nuclear energy is now supplying 2800 MW to the UAE's grid and represents the half-way mark towards ENEC's commitment to supply up to a quarter of the country's electricity needs. Additionally, unit 3 at the Barakah nuclear power station has been brought to 100% of its reactor power capacity for the first time as part of its testing activities. The milestone brings the third unit of the four-unit Barakah station one step closer to beginning commercial operation, scheduled for early 2023. <https://www.world-nuclear->

- Finnish-led consortium Fennovoima announced that it had scrapped a contract with Russia's state-owned Rosatom to build a nuclear power plant in Finland citing delays and increased risk due to the Russian invasion of Ukraine. After Russia's invasion of Ukraine Finland's Minister of Economic Affairs, Mika Lintila, repeatedly said it would be "absolutely impossible" for the government to grant a construction permit. <https://www.reuters.com/world/europe/finnish-group-ditches-russian-built-nuclear-plant-plan-2022-05-02/>
- The Egyptian Nuclear and Radiological Regulatory Authority (ENRRA) issued a construction license to the Nuclear Power Plants Authority (NPPA) for unit 1 of the planned four-unit El Dabaa nuclear power plant. Russian state nuclear corporation Rosatom - which will construct the El Dabaa plant - said this permit, along with excavation works at site, is a prerequisite for the start of the main stage of construction. The El Dabaa nuclear power plant project is based on contracts that entered into force on December 11, 2017. These stipulate that Rosatom will not only build the plant but will also supply Russian nuclear fuel for its entire life cycle. They will also assist Egyptian partners in training personnel and plant maintenance for the first 10 years of its operation. <https://www.world-nuclear-news.org/Articles/Construction-permit-issued-for-first-Egyptian-unit>
- The European Parliament backed EU rules labeling investments in gas and nuclear power plants as climate friendly. The new rules will add gas and nuclear power plants to the EU "taxonomy" rulebook from 2023, enabling investors to label and market investments in them as green. <https://www.reuters.com/business/sustainable-business/eu-parliament-vote-green-gas-nuclear-rules-2022-07-06/>
- EDF Energy announced the Hinkley Point B 1 reactor has been permanently shut down bringing an end to electricity generation in Somerset, England, after 46 years of operation. The Hinkley Point B plant - comprising two Advanced Gas-cooled Reactors (AGRs) - was first synchronized to the UK electricity grid in February 1976. <https://www.world-nuclear-news.org/Articles/Hinkley-Point-B-enters-retirement>
- Germany extends lifetime of remaining nuclear plants. Germany planned to complete a phaseout of nuclear power by the end of 2022, but a energy supply crunch following Russian gas cuts has caused lengthy debate over keeping nuclear power plants at the ready. <https://www.dw.com/en/germany-extends-lifetime-of-all-3-remaining-nuclear-plants/a-63466196>
- As the Netherlands aims to make its power production carbon neutral by 2040, the country is planning to build two new nuclear power plants by 2035. <https://www.brusselstimes.com/world-all-news/330003/netherlands-to-build-two-new-nuclear-power-plants-just-across-belgian-border>
- Poland has chosen Westinghouse to supply the reactors for its initial nuclear power plant, as the Central European nation seeks to lessen its dependence on domestic coal and Russian imports for its energy supply. <https://www.energy.gov/articles/doe-awards-38-million-projects-leading-used-nuclear-fuel-recycling-initiative>
- Korea Atomic Energy Research Institute (KAERI) plans to supply nuclear fuel for Poland's research reactor MARIA using high-density low-enriched uranium silicide (U<sub>3</sub>Si<sub>2</sub>) plate-shaped nuclear fuel manufacturing technology. <https://www.world-nuclear-news.org/Articles/Korea-signs-nuclear-fuel-MoU-with-Polish-Atomic-En>
- Seoul and Warsaw signed outline agreements to develop nuclear power in Poland as Poland strives to phase out coal and lower its carbon emissions

and South Korea seeks to revive its nuclear industry. A letter of intent has also been signed between KHNP, Poland's state-owned public power company PGE and Polish private energy company ZE PAK to appraise the feasibility of building APR-1400 in Patnow, central Poland, which currently hosts coal-fired plant owned by ZE PAK. These agreements are private company-led project. <https://www.world-nuclear-news.org/Articles/South-Korea-s-KHNP-signs-letter-of-intent-on-Polis>

- Finnish utility Fortum and Swedish small modular reactor (SMR) project development company Kärnfull Next AB have signed a Memorandum of Understanding (MoU) to jointly explore opportunities in new nuclear for developing SMRs in Sweden. <https://www.world-nuclear-news.org/Articles/Fortum-and-Karnfull-to-explore-SMR-deployment-in-S>
- France's EDF, South Korea's KHNP, and U.S.-Canadian group Westinghouse have made initial bids to build a new unit at the Czech Republic's Dukovany nuclear power plant. Majority state-owned CEZ, which launched the Dukovany expansion tender in March, said final bids would come in by the end of September 2023. <https://www.reuters.com/business/energy/cez-gets-3-initial-bids-build-new-unit-dukovany-nuclear-plant-2022-11-30/>
- The UK government has allocated a total of £102 million to support both nuclear and hydrogen innovation in a bid to reduce the UK's carbon footprint. As part of the funding, the UK government will look to develop the next generation of nuclear modules in the form of high-temperature gas reactors (HTGR). <https://www.current-news.co.uk/news/uk-government-allocates-102-million-to-nuclear-and-hydrogen-innovation>
- Indonesia aims to develop a nuclear power plant in 2039 to achieve net zero emissions and support domestic needs for energy. Indonesia has a greater depth of experience and infrastructure in nuclear technology than any other country in southeast Asia. [https://www.business-standard.com/article/international/indonesia-plans-to-build-nuclear-power-plant-by-2039-seeks-investors-122120500038\\_1.html](https://www.business-standard.com/article/international/indonesia-plans-to-build-nuclear-power-plant-by-2039-seeks-investors-122120500038_1.html)
- The Atomic Energy Organization of Iran (AOEI) said "construction" of a 300 MWe domestically designed pressurized water reactor (PWR) at a site near the Karun river was launched. Iran has one operating nuclear power plant, with a Russia-designed VVER V-446 pressurized water reactor, which entered commercial operation in 2011. <https://www.world-nuclear-news.org/Articles/Iran-marks-start-of-work-for-Darkhovin-plant>
- Westinghouse has signed a technology license agreement with Sweden's Studsvik to develop a contaminated metallic waste recycling and treatment facility at its Springfields site in Lancashire, UK. Westinghouse said innovative and carbon-neutral solutions are required to process the hundreds of thousands of tons of contaminated metals expected from nuclear decommissioning projects globally. "The ability to clean, melt and recycle metals is recognized as a sustainable and cost-effective alternative to disposal," it added. <https://www.world-nuclear-news.org/Articles/Studsvik-to-develop-UK-metal-treatment-facility-fo>
- President Yoon Suk Yeol welcomed President Joseph R. Biden to the Republic of Korea (ROK) as part of the Yoon-Biden Summit. The two leaders recognized the importance of nuclear energy as a critical and reliable source of carbon-free electricity. The two leaders committed to greater nuclear energy collaboration and accelerating the development and global deployment of advanced reactors and small modular reactors by jointly using export promotion and capacity building tools, and building a more resilient nuclear supply chain. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/05/21/united-states-republic-of-korea-leaders-joint-statement/>
- France has announced plans to build up to 14 new nuclear reactors in a

move that could help reduce greenhouse gas emissions and provide a buffer  
against volatile energy prices.  
<https://www.cnn.com/2022/02/11/business/nuclear-power-france/index.html>

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