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The U.S. Is Paying Billions to Russia's Nuclear Agency. Here's Why.

Nuclear power companies rely on cheap enriched uranium made in Russia. That geopolitical dilemma is intensifying as climate change underscores the need for emissions-free energy.

(full text and photos below)

Uranium enrichment centrifuges at the ready in Ohio.Credit...Brian Kaiser for The New York Times

By Max Bearak

Reporting from Piketon, Ohio; Kemmerer, Wyo.; and Washington.

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In a cavernous, Pentagon-sized facility nestled in an Appalachian valley, thousands upon thousands of empty holes line the bare concrete floor.

A mere 16 of them house the spindly, 30-foot-tall centrifuges that enrich uranium, converting it into the key ingredient that fuels nuclear power plants. And for now, they are dormant.

But if each hole housed a working centrifuge, the facility could get the United States out of a predicament that has implications for both the war in Ukraine and for America's transition away from burning fossil fuels. Today, American companies are paying around $1 billion a year to Russia's state-owned nuclear agency to buy the fuel that generates more than half of the United States' emissions-free energy.

It is one of the most significant remaining flows of money from the United States to Russia, and it continues despite strenuous efforts among U.S. allies to sever economic ties with Moscow. The enriched uranium payments are made to subsidiaries of Rosatom, which in turn is closely intertwined with Russia's military apparatus.

The United States' reliance on nuclear power is primed to grow as the country aims to decrease reliance on fossil fuels. But no American-owned company enriches uranium. The United States once dominated the market, until a swirl of historical factors, including an enriched-uranium-buying deal between Russia and the United States designed to promote Russia's peaceful nuclear program after the Soviet Union's collapse, enabled Russia to corner half the global market. The United States ceased enriching uranium entirely.

The United States and Europe have largely stopped buying Russian fossil fuels as punishment for the Ukraine invasion. But building a new enriched uranium supply chain will take years — and significantly more government funding than currently allocated.

That the vast facility in Piketon, Ohio, stands nearly empty more than a year into Russia's war in Ukraine is a testament to the difficulty.

"We cannot be held hostage by nations that don't have our values, but that's what has happened," said Senator Joe Manchin III, the West Virginia Democrat who leads the Senate's energy committee. Mr. Manchin is the sponsor of a bill to rebuild American enrichment capacity that would promote federal subsidies for an industry the United States privatized in the late 1990s.

Nuclear-power vulnerability

The reliance also leaves current and future nuclear plants in the United States vulnerable to a Russian shutdown of enriched uranium sales, which analysts say is a conceivable strategy for President Vladimir V. Putin, who often wields energy as a geopolitical tool.

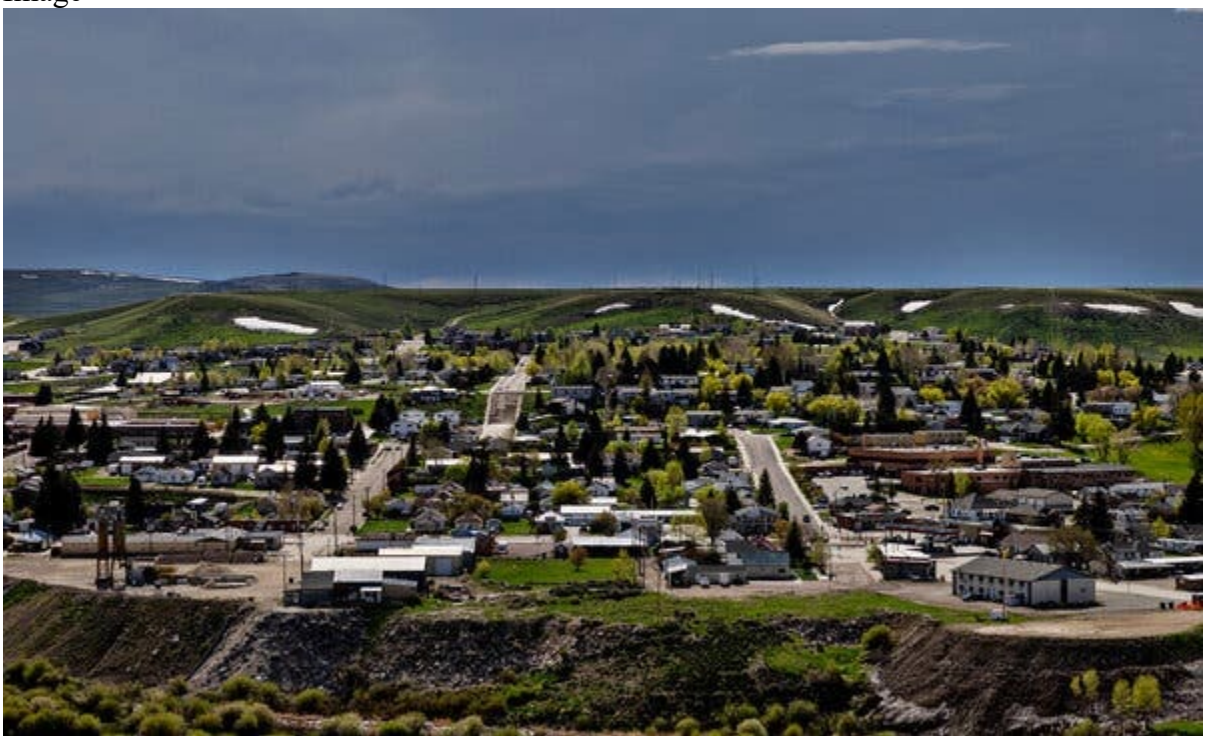
Yet with the war well into its second year and no end in sight, the U.S. government has shown little alacrity in kick-starting domestic enrichment. Billions of dollars in potential federal funding remain stuck in bureaucratic processes.

"It's inexplicable that over a year after Russia invaded Ukraine, the Biden administration does not appear to have a plan to end this dependence," said James

Krellenstein, the director of GHS Climate, a clean energy consulting firm that recently issued a white paper on the subject. “We could eliminate almost all of America’s dependence on Russian enrichment by finishing the centrifuge plant in Ohio.”

The American Centrifuge Plant in Ohio will also be key to producing another, more concentrated form of enriched uranium crucial to the development of smaller, safer and more efficient next-generation reactors. That evolution in nuclear power, decades in the making, has received billions of dollars in federal development funds. Nevertheless, in the United States, next-generation reactors remain in the design stage.

Image



Kemmerer, Wyo., where a plan to replace an aging coal plant with a next-generation nuclear facility is facing delays.Credit...Kim Raff for The New York Times


The Naughton coal plant, outside Kemmerer, is set to be decommissioned in 2025.Credit...Kim Raff for The New York Times

One American company, TerraPower, which was founded by Bill Gates, has had to delay the opening of what could be the United States' first new-age nuclear plant by at least two years in part because it has pledged to not use Russian enriched uranium.

TerraPower's facility will be built on the site of a coal-burning plant in remote Kemmerer, Wyo., to be decommissioned in 2025. TerraPower has promised jobs and retraining for all the coal plant's workers. But the delays have left some in Kemmerer with doubts.

All of this makes for an unlikely linking of Piketon and Kemmerer, towns of 2,400 people apiece nestled in American coal country, both hoping that the crisis facing the U.S. government will translate into a boon for their economies. "Some of the biggest national security questions facing the country run through Piketon and Kemmerer," said Jeff Navin, TerraPower's director of external relations."

A Post-Soviet deal

American reliance on foreign enriched uranium echoes its competitive disadvantages on microchips and the critical minerals used to make electric batteries — two essential components of the global energy transition.

But in the case of uranium enrichment, the United States once had an advantage and chose to give it up.

In the 1950s, as the nuclear era began in earnest, Piketon became the site of one of two enormous enrichment facilities in the Ohio River Valley region, where a process called gaseous diffusion was used.

Meanwhile, the Soviet Union developed centrifuges in a secret program, relying on a team of German physicists and engineers captured toward the end of World War II. Its centrifuges proved to be 20 times as energy efficient as gaseous diffusion. By the end of the Cold War, the United States and Russia had roughly equal enrichment capacities, but huge differences in the cost of production.

In 1993, Washington and Moscow signed an agreement, dubbed Megatons to Megawatts, in which the United States purchased and imported much of Russia's enormous glut of weapons-grade uranium, which it then downgraded to use in power plants. This provided the U.S. with cheap fuel and Moscow with cash, and was seen as a de-escalatory gesture.

But it also destroyed the profitability of America's inefficient enrichment facilities, which were eventually shuttered. Then, instead of investing in upgraded centrifuges in the United States, successive administrations kept buying from Russia.

Image

A mural celebrates Piketon's gaseous diffusion plant, long ago shuttered, and its role in the local economy.Credit...Brian Kaiser for The New York Times

In the lobby at Piketon plant, a miniature display of new centrifuges.Credit...Brian Kaiser for The New York Times

The centrifuge plant in Piketon, operated by Centrus Energy, occupies a corner of the site of the old gaseous diffusion facility. Building it to its full potential would create thousands of jobs, according to Centrus. And it could produce the kinds of enriched uranium needed in both current and new-age nuclear plants.

Lacking Piketon's output, plants like TerraPower's would have to look to foreign producers, like France, that might be a more politically acceptable and reliable supplier than Russia, but would also be more expensive.

TerraPower sees itself as integral to phasing out climate-warming fossil fuels in electricity. Its reactor would include a sodium-based battery that would allow the plant to ramp up electricity production on demand, offsetting fluctuations in wind or solar production elsewhere.

It is part of the energy transition that coal-country senators like Mr. Manchin and John Barrasso, a Wyoming Republican, are keen to fix as they eye nuclear replacements for lost coal jobs and revenue. While Mr. Manchin in particular has complicated the Biden administration's efforts to quicken the transition away from fossil fuels, he also pushed back against colleagues, mostly Democrats, who are skeptical of nuclear power's role in that transition, partly because of the radioactive waste it creates.

“We have emissions targets we’re trying to meet,” said Mr. Manchin, “and the people who are talking about taking nuclear out of the mix, well, they’re living in an unrealistic bubble.”

For its part, the Department of Energy estimates that achieving U.S. emissions-reduction pledges will require more than doubling nuclear power capacity.

Without U.S. competition in enrichment and next-generation reactors, officials at TerraPower and Centrus say the gap between Washington and its rivals will only widen as Russia and China in particular race ahead and win long-term nuclear contracts with countries the United States also seeks to court.

“The administration talks a really good game about using U.S. technology to help further its geopolitical goals, and also about the speed at which it’s necessary to move to solve climate change,” said Mr. Navin. “But their inability to move this very basic process forward over this long of a time frame is perplexing.”

This week, the department issued a long-awaited draft of a request for proposals to scale up domestic enrichment, particularly for plants like TerraPower’s. Kathryn Huff, the department’s assistant secretary for nuclear energy, said the draft was an “important step” in stopping American “reliance on Russia.”

A lifeline in coal country

“All we can do is hope,” said Bill Thek, the mayor of Kemmerer, Wyo.Credit...Kim Raff for The New York Times

In Piketon and Kemmerer, the stakes are more personal.

Once the 1,800 workers finish dismantling the old gaseous diffusion facility outside Piketon, there will be even fewer good-paying jobs and reasons to stay, said Billy Spencer, who has been the town’s mayor for 20 years and worked as a security guard at the plant for 38 years before that.

Mr. Spencer recently raised the town’s flat-rate monthly charge for water by $15 to help pay off a 40-year loan on a new water treatment plant. Even that small bump will cause people to leave, he fears. “We don’t get the kind of government help we need,” he said.

In Kemmerer, there’s still hope that the hundreds of coal workers who will lose their jobs when the local plant shuts down will find work, but the delays are causing jitters. Bill Thek, the mayor, said he was still hopeful the town could grow enough such that it could attract not just nuclear jobs, but a plumber, for instance, a service Kemmerer now lacks.

“All we can do is hope that they find a way to come together to solve this,” Mr. Thek said.

Audio produced by Adrienne Hurst.

Max Bearak covers the geopolitics of climate change. He has been based in India, Kenya and Ukraine and reported from more than 30 countries. @maxbearak