

# Russia's use and stockpiles of highly enriched uranium pose significant nuclear risks

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Russia currently holds the world's largest stockpile of highly enriched uranium, a nuclear weapon-usable material, posing significant nuclear security risks, according to a recent report issued by the International Panel on Fissile Materials (IPFM), a group based at Princeton University and made up of nuclear experts from 16 countries.

The report, "The Use of Highly Enriched Uranium as Fuel in Russia," provides unprecedented details of the military and civilian use of highly enriched uranium in Russia—the only country to produce highly enriched uranium as an export.

Russia's stockpile of highly enriched uranium is estimated to be about 680 tons, and as of 2017, Russia is estimated to use about 8.5 tons of highly enriched uranium annually, a large fraction of which is weapon-grade material. Likewise, Russia currently operates more highly enriched uranium facilities than the rest of the world combined, creating substantial nuclear security risks.

"There has been a great deal of progress in reducing the number of locations where highly enriched uranium can be found outside of Russia. As a result, Russia has become an increasingly important part of the remaining problem," said Frank N. von Hippel, founding co-chair of IPFM and senior research physicist and professor of public and international affairs, emeritus, at Princeton University's Woodrow Wilson of Public and International Affairs.

The report was edited by Pavel Podvig, a researcher at Princeton's Program on Science and Global Security, with contributions by six other leading Russian experts.

In addition to its stockpiles, Russia also has a large number of highly enriched uranium facilities—58 nuclear reactors and assemblies—meaning that substantial amounts of highly enriched uranium are moving through the fuel cycle. Highly enriched uranium poses special concerns, the researchers wrote, as it can be used relatively easily in simple nuclear explosive devices by states with limited nuclear weapon expertise or even by non-state actors. Over the past several decades—and especially since 9/11—there have been high-level international initiatives to address these risks, especially for highly enriched uranium for civilian uses, like reactors used for nuclear research.

"Reducing the use of highly enriched uranium in research reactors is a complex but solvable technical task, and promising new fuels are under development in the United States, Europe, and Russia," said Alexander Glaser, co-director of the Program on Science and Global Security, co-chair of the IPFM and associate professor of mechanical and aerospace engineering and international affairs at Princeton.

While Russia has been active in returning its highly enriched uranium from research facilities abroad and has closed down some domestic highly enriched uranium facilities, it has not made highly enriched uranium minimization a priority, according to the report. On the contrary, Russia is working on a number of new projects that involve the use of highly enriched uranium and, in 2012, resumed production of highly enriched uranium for export.

"Russia's participation is essential for the success of the global effort to reduce the risks associated with highly enriched uranium use," said

Podvig. "Russia has the ability to make a strong contribution to the international highly enriched uranium minimization effort. This would require launching a new round of international cooperation that would involve Russia's technical community in developing a new strategy for reducing the use of highly enriched uranium."

Securing Russia's commitment to this goal requires development of a comprehensive global highly enriched uranium minimization strategy, according to the report. Given the variety of applications for highly enriched uranium worldwide, such a strategy should include a consistent approach to the use of highly enriched [uranium](#) to fuel high-performance civilian reactors, defense-related research facilities, and naval reactors. The report concludes that, eventually, this effort also must address the material security risks associated with [highly enriched uranium](#) stocks for weapons.

Additional information can be found in two already published reports. Von Hippel authored an earlier IPFM report, "Banning the Production of Highly Enriched Uranium," and Glaser was a contributor to the 2016 U.S. National Academies [report](#), "Reducing the Use of Highly Enriched Uranium in Civilian Research Reactors."

Provided by Princeton University

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