The Final Stretch: Tackling Remaining HEU Minimization Challenges

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Civil HEU Elimination: Important Progress

- Thirty-three countries and Taiwan have been cleared entirely of HEU, including 15 since the Obama administration launched the Nuclear Security Summit process in 2010. Entire regions –Latin America, Southeast Asia—have been cleared

- More than 100 reactors have either been shut down or converted since the U.S Reduced Enrichment for Research and Test Reactors (RERTR) program began.

- Nearly 7 tons of HEU have been removed from civilian use—enough for hundreds of nuclear weapons

- Conversion of Mo-99 production to LEU largely complete

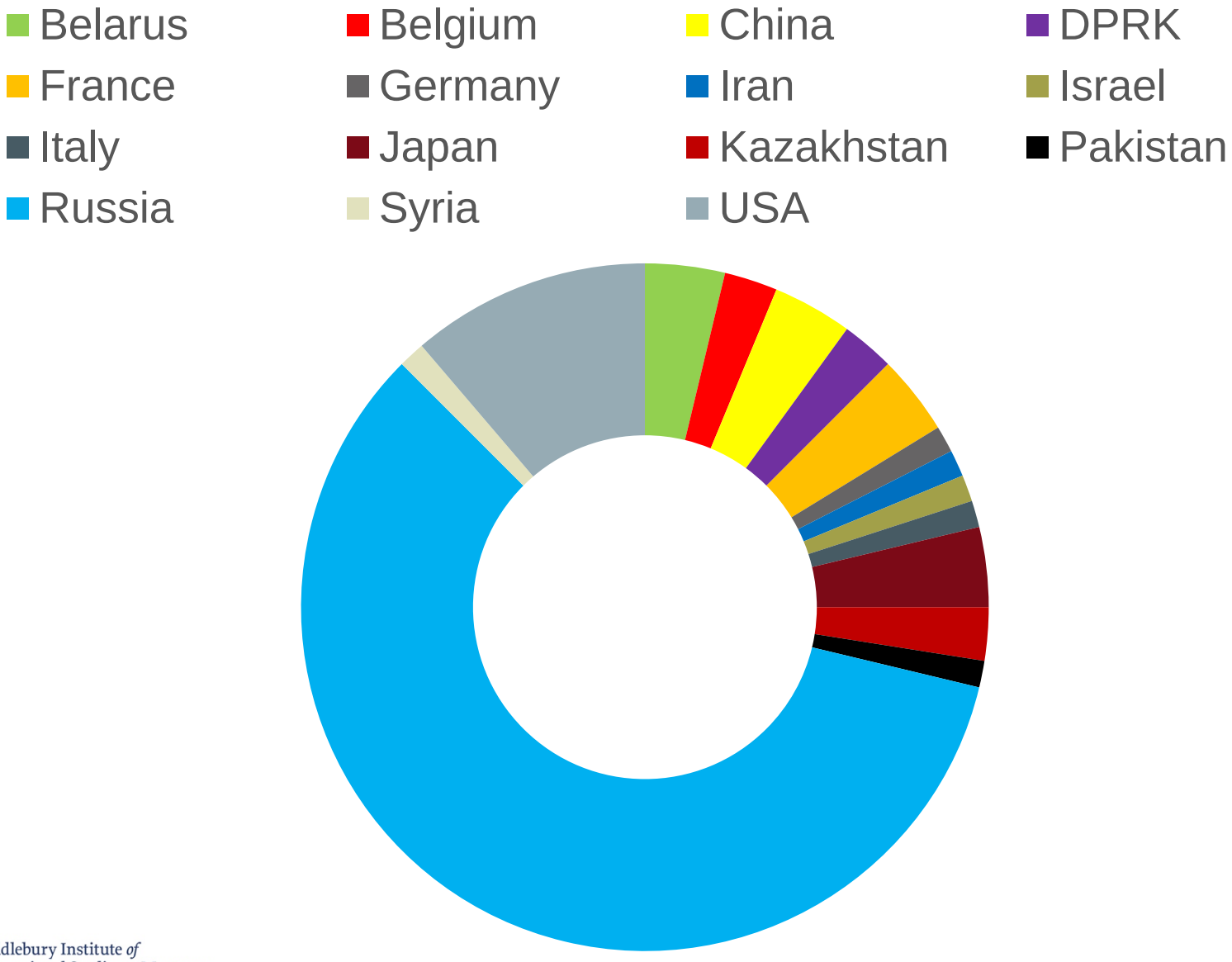
- These efforts have strengthened the nonproliferation and nuclear security regimes and decreased the threat from HEU misuse worldwide.

Despite growing tension between US/China: the US, China and Ghana worked together to convert an MNSR and repatriate bomb-grade HEU to China. Parts of the agreement were decided at meetings at the 2009 RERTR Conference.

Civil HEU Elimination: Still Much to Be Done

- More than 80 research reactors still use HEU of varying enrichments. Most are in Russia.

HEU Reactors Around the World



Remaining Challenges

Insufficient International Commitments and Declining Attention

- Fewer than two dozen countries have made firm commitments to minimize and eliminate civil HEU
  - INFCIRC 912
- Many possessors have still failed to do so
- Political attention to HEU conversion has slipped sharply since the end of the Nuclear Security Summit process
- IAEA has many other priorities, which can appear more pressing

Technical Challenges

- Converting most sophisticated high-performance reactors is very difficult and has required developing new high-density LEU fuels
- Efforts have lagged more than a decade behind initial projections with many setbacks
- US and European reactor operators have made significant progress recently
- Further work is required and will demand consistent financial support and political backing for nearly two decades more

Political Challenges

- Political challenges in Pakistan, Iran, and Syria have hampered efforts to convert the last HEU-fueled Miniature Neutron Source Reactors (MNSR) exported by China

- Political crisis in Belarus has placed another obstacle in efforts to convert facilities to full LEU use

- South Africa continues to hold onto sizeable stocks of HEU as a tool of its disarmament diplomacy

Russia

- Slow progress in shutting down or converting Russia's HEU reactors
- Russia has shut down a half-dozen HEU-fueled reactors since 2016
  - It has also just begun operating the world's lone new HEU-fueled reactor
- Not a Russian government priority
- Little external cooperation after some efforts with US during Obama administration

Space Reactors

- There is a resurgence of interest in using fission reactors for deep space missions for propulsion and for providing power on the moon or mars.
- This is a concern because for some of the applications the reactors may require weapon grade material far in excess to what is needed for a nuclear weapon (30-50 kg weapons grade uranium).
- The Trump Administration in December 2020 put in place a directive to allow use of HEU in space reactors if no non-fission alternative exists.

Recommendations (1 of 3)

- Neutron Needs Study
  - GP Countries support, supply data
- CPPNM/A RevCon “Gift Basket” on High-Performance Reactor Conversion—pledging to maintain support
  - Perhaps organize a standing group similar to NEA/OECD HLGMR under the aegis of the Global Partnership?
- Declare HEU-Free-Zones in regions such as Latin America, Southeast Asia
- Encourage Additional Countries to Join INFCIRC 912 (HEU “Gift basket”) by CPPNM/A Review Conference
  - And for countries to report HEU holdings per form
- MNSR Conversion
  - Leverage international organizations to raise funds and apply political pressure
  - Hold a technical workshop in Vienna in partnership with the IAEA to share lessons learned as a potential model for Iran, Pakistan, and Syria.

Recommendations (2 of 3)

- Reinvigorate US-Russia cooperation
  - Begin with removal of HEU in Belarus.
  - Other issues related to joint development of high-density LEU fuels and potential LEU Russian exports could then be discussed.
- Take South African Spent HEU
- US Certification to Block HEU exports for Mo-99
  - Due in 2022
  - Pledges from other countries not to license non-LEU Mo-99
- International Attention
  - Press issue at international gatherings, such as the NPT Review Conference
  - Norway should be encouraged to host 2024 symposium to chart progress
  - Continued attention from GP

Recommendations (3 of 3)

- Further Restrict HEU Use for Space Missions
  - US should insist that if an HEU reactor is proposed an independent technical team should review the request at the financial expense of the mission agency to verify that no non-HEU alternatives exist
  - The Biden Administration should reaffirm the Trump Administration's directive
  - Other spacefaring nations should pledge similar steps