

Analysis of Recent U.S. Nuclear Policy Changes and Their Implications

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***Keywords:** U.S. Nuclear Policy, Export Control, ADVANCE Act, Russian Uranium Imports Act

1. Introduction

The United States (U.S.) has increasingly focused on nuclear energy as a clean energy source to address surging electricity demand driven by domestic industrial revitalization. In 2024, the U.S. government implemented several legislative and executive measures to strengthen its nuclear industry, including the Prohibiting Russian Uranium Imports Act (H.R.1042) and the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act (S.870). Furthermore, Executive Orders 14154 and 14156 were issued to remove regulatory burdens and enhance energy independence. Unlike other studies, this research focuses on analyzing the latest U.S. nuclear policy changes specifically from an export control perspective, considering both regulatory shifts and their global implications. The objective of this study is to assess how recent legislative and executive measures impact nuclear export regulations, influence international nuclear trade, and create strategic challenges and opportunities for South Korea's nuclear sector.

2. Legislative and Executive Measures

2.1. ADVANCE Act (S.870)

The ADVANCE Act is a landmark legislation that seeks to modernize nuclear licensing, promote international nuclear exports, and enhance regulatory efficiency. Key provisions include:

- Streamlining NRC Licensing Procedures: The act simplifies licensing for microreactors and advanced nuclear technologies, reducing financial burdens for private entities and shortening approval times.
- Promoting Nuclear Exports to Allied Nations: The law establishes clearer guidelines for nuclear cooperation agreements and reduces bureaucratic hurdles for export licenses to allied countries, including G7 nations and South Korea.
- Restricting Russian and Chinese Influence: Strengthened prohibitions on U.S. entities engaging in nuclear fuel transactions with Russian and Chinese state-owned entities ensure that U.S. nuclear technology does not support adversarial nations.
- Expanding NRC Resources: The act allocates additional funding and workforce expansion for the

NRC to facilitate efficient regulatory oversight and licensing activities.

While the act eases licensing for allied nations, South Korea must carefully assess how U.S. technology transfer restrictions may still apply to its projects, particularly in cases involving re-exporting U.S.-origin nuclear items.

2.2. Prohibiting Russian Uranium Imports Act (H.R.1042)

This legislation directly addresses U.S. energy security concerns amid geopolitical tensions with Russia. The law implements a phased prohibition on low-enriched uranium (LEU) imports from Russia, compelling U.S. utilities to diversify their uranium supply chains. It includes:

- Establishment of a Strategic Uranium Reserve: The U.S. Government is mandated to build a stockpile of domestically produced uranium to ensure long-term energy security.
- Investment in Uranium Enrichment and Processing: Federal incentives for private sector engagement in uranium enrichment and conversion activities have been introduced to reduce dependence on foreign suppliers

While this policy aims to reduce dependence on Russian uranium, it directly affects South Korean nuclear fuel exports to third-party countries that may include U.S.-origin enriched uranium, necessitating compliance with U.S. re-export restrictions.

2.3. Executive Order 14154: Unleashing American Energy

This legislation directly addresses U.S. energy security concerns amid geopolitical tensions with Russia. The law implements a phased prohibition on low-enriched uranium (LEU) imports from Russia, compelling U.S. utilities to diversify their uranium supply chains. It includes:

- Establishment of a Strategic Uranium Reserve: The U.S. government is required to accumulate domestically sourced uranium to ensure long-term energy security.
- Incentives for Domestic Uranium Processing: Financial support mechanisms for domestic enrichment and conversion infrastructure are introduced to reduce reliance on foreign suppliers.

2.4. Executive Order 14156: Declaring a National Energy Emergency

This executive order, issued in January 2025, emphasizes national energy independence through:

- Expanding Domestic Uranium and Energy Production: Policies aimed at increasing domestic mining, refining, and enrichment of uranium and other critical minerals.
- Enhancing Infrastructure for Uranium Transportation and Storage: Federal funding allocated for logistics improvements.
- Deregulation of Nuclear Energy Development: Reducing regulatory constraints to facilitate quicker deployment of new nuclear technologies.

While orders 14154 and 14156 do not introduce new export controls, they indirectly support U.S. nuclear technology expansion by bolstering domestic industry resilience.

3. Regulatory Updates in Export Control

3.1. 10 CFR 810 - Increase in Civil Penalties

The Department of Energy (DOE) regulates nuclear technology exports under 10 CFR 810. In 2024, the maximum civil penalty for unintended violations increased from \$120,816 to \$124,732 per day, adjusted for inflation. The updated regulation aims to ensure stricter compliance with nuclear export control guidelines and deter unauthorized technology transfers.

4. Discussion: Strategic Implications for South Korea

The U.S. nuclear policy changes present both opportunities and challenges for South Korea's nuclear industry.

- Enhanced Collaboration under the ADVANCE Act: The streamlining of NRC licensing procedures and export control relaxations provide South Korean entities with improved market access to the U.S. nuclear sector.
- Opportunities from Russian Uranium Ban: With Russian uranium imports ceasing, South Korean nuclear fuel suppliers may find new business opportunities in the U.S. market.
- Challenges in Export Control Compliance: South Korean entities using U.S. nuclear technology for international projects may face increasing regulatory hurdles due to U.S. jurisdiction over exported nuclear items. For example, the KEPCO-Westinghouse confliction case highlights potential issues in U.S. control over exported nuclear designs and technology transfers.
- Potential Policy Shifts and Industry Impact: The Trump administration is expected to introduce strong industrial support policies and further deregulation to boost the U.S. nuclear sector. However, export control regulations may remain strict, particularly in China and

Russia. These developments require South Korean entities to proactively strategize their market engagement.

5. Conclusion

Over the past year, significant legislative and executive actions have reshaped U.S. nuclear policy. The ADVANCE Act facilitates nuclear technology exports and licensing efficiency, while the Prohibiting Russian Uranium Imports Act strengthens domestic energy security. Executive orders further reinforce energy independence and deregulation.

For South Korea, these developments create new business opportunities in the U.S. nuclear sector but also introduce regulatory challenges requiring strategic adaptation. Ongoing monitoring of U.S. export control policies and proactive engagement with regulatory bodies will be crucial for South Korean entities seeking to navigate this evolving landscape.

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