



Nuclear waste disposal and fuel leasing: A nonproliferation opportunity by Aiko Shimizu, Thom Dixon, and Miha Hribernik

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A long-term solution to the growing amounts of waste generated by the world's nuclear power plants has proved elusive. As a result, nuclear waste is piling up in potentially dangerous, temporary waste sites. A solution may be on the horizon, however. South Australia's Nuclear Fuel Cycle Royal Commission is exploring the feasibility of an international used fuel (high-level waste) disposal facility. While this is not the first such facility to have been proposed – others are being planned in Finland and Sweden – it would be the first in the Asia-Pacific and could play a vital role in regional nuclear safety, security, and nonproliferation efforts.

The Commission's May 2016 report focused on economic opportunities associated with building an interim storage facility and a deep geological disposal facility. The potential total annual revenue is approximately AU\$5.6 billion over the first 30 years and AU\$2.1 billion per year until the planned conclusion of waste receipts 43 years later – a net present value of AU\$51 billion profit over the life of the project.

While the profit is substantial, there is more to the project than revenue and those benefits would accrue to the entire region. For example, construction of such a facility would alleviate much of the apprehension surrounding the construction of nuclear power plants, particularly in ASEAN countries. Main concerns revolve around safety and nuclear waste disposal, along with the high costs associated with the development of civil nuclear programs. These concerns are well entrenched among both the general population and the region's political elites. Despite increasing energy demand, the 10 ASEAN states do not have any operational nuclear power plants. Vietnam had planned to construct two nuclear facilities, but Hanoi postponed the project indefinitely in November 2016 amid mounting costs.

Another less publicized concern is the impact of civilian nuclear power programs on regional nonproliferation efforts. Although ASEAN states are actively involved in global and regional nonproliferation initiatives, they lack the expertise,

resources, and political will required to implement necessary measures.

Given capacity and budget restraints and a long list of priority areas, it appears unlikely that regional governments can put in place sufficient safeguards if the number of civilian nuclear programs increases, there is likely to be an accompanying rise in the movement of controlled goods and materials. Growing trade of these items heightens the risk that they will fall into the hands of countries under international sanctions (principally North Korea), transnational criminal networks, or terrorist organizations. Indeed, the scale of the task is daunting. Although uranium generally tops the list of concerns, the number and variety of controlled goods and materials related to nuclear programs are substantial, including other radioactive materials (plutonium or neptunium-237), as well as a many ordinary civilian items that can be used for military purposes (dual-use items), such as graphite, steam generators, optical sensing fibers, coolant pumps, and zirconium metal tubes.

These challenges present opportunities for Australia and the private sector to play a leading role in regional nuclear security and nonproliferation. First, for the world's third largest exporter of uranium to host an international used fuel disposal facility would underscore and reinforce Australia's commitment to nonproliferation.

Second, the facility's proposed location in a geologically safe and politically stable site would alleviate longstanding concerns regarding the use of nuclear power in the region. This could revive civilian nuclear programs in a number of countries, especially among ASEAN states.

Third, the Commission raised the possibility of a cradle-to-grave fuel leasing service, which has been promoted by the International Atomic Energy Agency (IAEA) as a nonproliferation measure. This service would entail the provision of fuel to overseas nuclear utilities on the condition that the used fuel would be returned to Australia and safely stored in the proposed waste facility, ensuring that nuclear fuel would be followed through its entire lifecycle and providing enhanced assurance regarding regional safety, security, and nonproliferation. Australia's tracking of uranium shipments could also offset some of the capacity constraints facing ASEAN states, allowing them to channel finite resources into other priority areas, such as managing trade in dual-use materials.

To bring this project to fruition, Australia must cooperate with a wide range of relevant stakeholders, both domestic and international.

While rejecting Royal Commission's recommendations as a basis for Parliamentary action, the South Australian government has said that it remains open to the opportunity,

but that the only path forward would be through the generation of broad domestic consent secured through a country-wide referendum. This would involve formulating a bipartisan agreement and building social consent through dialogue with relevant parties, including landowners and indigenous communities in South Australia.

Since safeguarding the increasing stocks of used fuel in the region cuts across public and private interests, Australia would need to coordinate with neighboring governments and enlist the support of private sector expertise from across the Asia-Pacific to generate consent at home and to alleviate nuclear safety and security concerns abroad.

Step one would be to set up an underground laboratory in South Australia to test the feasibility of the area as a disposal site. Any such laboratory would need to be active for a decade prior to the construction of a facility. During this time, a public-private partnership would work to craft agreement for the eventual construction of a regional disposal facility.

Second, Canberra should offer assistance to ASEAN states to improve their domestic regulations governing nuclear safety and waste disposal; engage with ASEANTOM to provide training and expertise to national nuclear regulators across the region; and organize an Australia-ASEAN summit on nuclear safety and security, to enlist support for the proposed waste disposal facilities and the fuel leasing service.

Finally, cooperation with the private sector is required to help regional states track the movement of controlled goods and materials through their territories. Companies with expertise – including those from Australia and Japan – could help regional law enforcement agencies with capacity building, training, and the provision of modern scanning equipment to enhance controls at regional ports, airports, and transport hubs. More effective trade controls would also benefit the private sector by improving supply chain transparency and ensuring that any controlled goods ultimately end up in the hands of legitimate end users.

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