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Role of circular economy in the direction of sustainability and safe management of radioactive waste

Like all industries, the nuclear industry produces waste as it operates to produce electricity. A very small amount of fuel is used by the nuclear industry to generate enormous amounts of energy. The development of nuclear power plants benefits the economy, human welfare, and the fight against global warming. Numerous activities, such as nuclear medicine, nuclear research, nuclear energy production, nuclear decommissioning, rare-earth mining, and nuclear weapons reprocessing, result in the generation of radioactive waste. Moving from a linear economy (take-make-use-dispose-pollute) to a circular economy (take-make-use-reuse-remake-recycle) should prioritize reducing, reusing, repairing, recycling, remanufacturing, re-development, and permanently safe disposing of radioactive waste and spent fuel of nuclear power plant. The circular economy is the best possible opportunity for effective and proper management of nuclear waste, and radioactive waste and provides several important approaches that can help to boost the resilience of nuclear power plants, such as nuclear decommissioning, the circularity of nuclear goods, and fixed assets outside the site boundary of used items, and repurpose local buildings to help with nuclear back-end management, where the circular economy can act as a tool to achieve the 2030 Agenda for Sustainable Development Goals.

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