

Nuclear Fuel Reprocessing

Reprocessing is when waste from a commercial nuclear reactor is put through a process that recovers around 30% of the spent nuclear fuel. This allows a reduction in waste and a reduction of uranium mining.

Economics

ITEM:	COST:
Nuclear Reactor	\$3 to \$5 Billion (upwards of \$9 Billion)
Reprocessing Reactor	\$16 Billion¹
AP1000 Advanced Pressure Water Reactor (expected)	\$1400 USD per kW ²
Average Nuclear Reactor	\$2555 USD per kW ³
Reprocessing Fast Reactor	\$3828 USD per kW⁴
Storing Uranium	\$520 per kg ¹
Storing Reprocessed Uranium	\$630-\$1255 per kg^{1,5}
Uranium Prices	\$45 per lb ²
Cost to use reprocessed Uranium	\$454 per lb⁵

¹Boston Consulting Group [2007], ²Energy Information Administration [2009], ³The World Nuclear Association [2007], ⁴Grupert [2009], ⁵Zwaan, Holdren, Fetter, & Bunn [2003]

Quick Summary of Information:

Total amount of uranium available: 3,910,000,000 metric tons
 Amount currently used per year: 66815 metric tons
 If the usage does not change reserves will last: 58,500 years
 If usage of nuclear power is increased by a factor greater than 4 world wide, uranium reserves will last 14,200 years.

The main benefits of reprocessing include the reduction in nuclear waste that must be stored and increase the amount of fuel available.



Nuclear reprocessing is not necessary for sustainability of resources, nor is it economically beneficial in either reducing the cost of nuclear power or the cost of nuclear waste storage. Reprocessing is however, viable for reducing or lessening the effects of nuclear waste storage on the environment. If reprocessing is further developed, it would enable nuclear power to become a major source of energy in the United States, without the presence of consequence of large amounts of nuclear waste.