



# Nuclear Power: Uranium Supply

There are adequate supplies of conventional Uranium already known for a moderate nuclear expansion. As easier reserves are exhausted, more difficult and more expensive Uranium seams will be used, but there is very unlikely to be a long-term shortage.

In the event of a large nuclear expansion, new reserves may be found or it will become economic to extract Uranium from seawater, to use Thorium as a nuclear fuel, or to develop fast reactors (see separate fact sheet). Just one of these options would lead to a many-times multiplication in the longevity of available reserves.

TABLE III. COMPARISON OF YEARS WHEN PRODUCTION CENTRES WITH DIFFERENT COST RANGES WILL FIRST BE COST JUSTIFIED

	US \$52–78/kg U	US \$ >78–130/kg U	>US \$130/kg U
Middle demand case			
RAR	2019	2024	2028
RAR + EAR-I	2021	2027	2034
RAR + EAR-I + EAR-II	2021	2029	2041
High demand case			
RAR	2013	2019	2023
RAR + EAR-I	2015	2022	2026
RAR + EAR-I + EAR-II	2015	2023	2031

RAR: Reasonably Assured Resources

EAR: Estimated Additional resources.

*Falling into two categories, category one is of a higher confidence, category two is usually by inference with no direct evidence (e.g. geological area).*

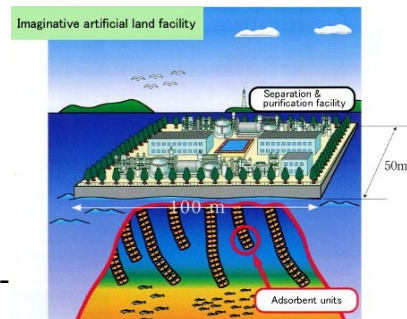
*Speculative resources (SR) are not included.*

*The figures above DO NOT include unconventional supplies of Uranium (sea water, black shale, lignite and coal deposits), except for phosphates by product uranium (about 2% of total).*

## Uranium from sea-water [3]

Estimated tonnage of uranium in sea water: 4 billion tonnes (enough to last many hundreds of years)

- Seawater contains  $3.3 \times 10^{-9}$  (3.3 parts per billion) of uranium, so the  $1.4 \times 10^{18}$  tonne of seawater contains  $4.6 \times 10^9$  tonne of uranium
- Insoluble uranium on the sea bottom exceeds that in the water by a thousand times.
- Other useful elements such as cobalt, titanium, molybdenum, etc. can be recovered, too. These are materials with wide range of applications.
- Estimated cost of extraction: \$300 /kg U



[1] <http://www.iaea.org/Publications/Booklets/Development/devseven.html>

[2] <http://www.world-nuclear.org/why/nucsafety.html>

[3] <http://www.jaeri.go.jp/english/ff/ff43/topics.html>