method used most being the Girdler Sulfide ("GS") process invented in 1943. The large-quantity production and use of D_2O has been described. Other technologies to make D_2O and the places those technologies are used can be found online. In all these methods, the greatest cost is the cost of energy. The methods vary in the extent of adverse environmental impact.

The needs for D_2O in heavy water reactors were fully met by the early 1990s. This is in large part because used D_2O can be recycled. The specification for D_2O used with a heavy water reactor is 99.8% enrichment. Once the level declines to 99.6%, the heavy water is returned to a facility for re-processing back to 99.8% enrichment and to remove the tritium that forms. The re-processing of used heavy water is much less energy intensive that its manufacture, and therefore much less costly. One million kilograms of ultra-pure heavy water was lent to the Sudbury Neutrino Observatory in Ontario, Canada in 1999; its mission ended in 2006 and the heavy water in it is now being sold for other uses. Although there is optimism that synergy between hydrogen production and heavy water production may exist,[4] for these reasons D_2O is no longer made from H_2O anywhere in the world that we know of. Stockpiles of D_2O have fulfilled the demand for deuterium for thirty years, and until recently there was no reason to think it would ever be necessary to make more D_2O. Facilities that were used to make heavy water are aging, as are the people expert in its production.

Nuclear power reactors that use light water exist, but these require 3-5% enriched ^{235}U fuel. Heavy water reactors, currently about 11% of reactors world-wide, are able to use naturally-occurring ^{238}U as fuel.

The utilization of D_2O in heavy water reactors makes its production not only expensive, but geopolitically fraught. National regulatory agencies worldwide have in place strict requirements for the transport of D_2O.

Despite all this, debate is emerging over whether or not we must begin planning to make D_2O again. New uses for deuterium are emerging: in pharmaceuticals, in semiconductor manufacturing, in OLED screens. Perhaps even in the manufacture of alcoholic beverages with fewer deleterious health effects. Deuterated compounds may prove to have a wide range of improved properties and therefore

[4] Alastair Miller, one of the long-standing pioneers in heavy water production methods, has described his view that current efforts to manufacture 'green' hydrogen for fuel will bring a side-benefit of cheaper heavy water production.