Record Uranium Price - What is Behind and What are the Consequences

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The nuclear lobby envisions a bright new dawn for nuclear power based on increasing fossil fuel prices and, ironically, on increasing public concern for the security of energy supply. Much is written elsewhere addressing nuclear power plant design and security. In the present article, though, we take a look at cost and supply issues of the fuel itself, uranium.

Potential nuclear energy investors must look carefully. What, for instance, is the actual security of supply that they will get with nuclear power? On top of the well known problems with waste handling and the high safety demands that increase the risk of shutdowns in cases of smaller incidents, problems of nuclear fuel supply seems to emerge. The spot-market prices of uranium jumped to a historical height of 139 US$/pound of U_3O_8 during some weeks of June and July, 2007. This was the end of a continuous increase from 10 US$/pound at the end of 2002. From July to September the spot market price has decreased to below 100 $/pound.

Supply Covered by Stockpiles

The reason for the sharp price increase in uranium is a steady demand, combined with flooding of two uranium mines in, respectively, Canada and Australia. Such high price fluctuations show a market with a limited supply and with little price-elasticity. When expected supply ceases, the price jumps high. Of course these are spot market variations and many nuclear plants buy uranium on various kinds of long-term contracts. Eventually, though, most uranium users will be affected, as uranium is becoming a seller's market. Behind all this is a global uranium market where only about 63% of the supply comes from mines and 37% comes from uranium stockpiles. These stockpiles were mainly made for nuclear weapons; but are now used for civilian nuclear power. The largest of the conversion programs of weapons uranium ends in 2013: the *"Megatons to Megawatts"* program, converting Russian nuclear warheads to reactor uranium.

Note 1. This and other costs estimated with the Wise Uranium calculator with a burn-up of 42 GW-days/t U and 34% electric efficiency.

Sources: - www.wise-uranium.org/upeur.html
- www.uranium.info (spot prices)
- www.marketoracle.co.uk/Article1074.html
- www.energiekrise.de/uran/docs2006/REO-Uranium_5-12-2006.pdf.

Then uranium could be in short supply, leaving new reactors without fuels. 2013, however, might not be the crucial year, as there are other stockpiles that could be brought into the market, postponing the end of the "stockpile market" until about 2020.

Uranium Mining: Dirty and Unpredictable

The ordinary way of increasing supply of a metal is to increase mining. During the last few years, prospecting for uranium mines has been booming in many countries, including traditional producers as Canada, Australia, and Kazakhstan, as well as "new" countries such as Sweden and Finland. There is potential to mine more uranium; but uranium mines take time to establish and are very often dirty affairs.

Environmental NGOs are increasingly trying to stop uranium mining, and with some success, such as the *"Nej till Uranbrytning"* network in Sweden.

In that country uranium mines need a municipal permit, and if the local municipality prefers to keep their environment clean and to live from cleaner and often more income-intensive activities, they can simply say no. Experience from current mining developments also shows delays and cost-overruns in the construction of mines. A particular unlucky case (from the point of view of the investors) has been the largest mine under construction in the world today, the Cigar Lake mine in Canada, where the start of operations was postponed from 2005 to 2011 because of above-mentioned unexpected flooding.

Further High Costs & Effects

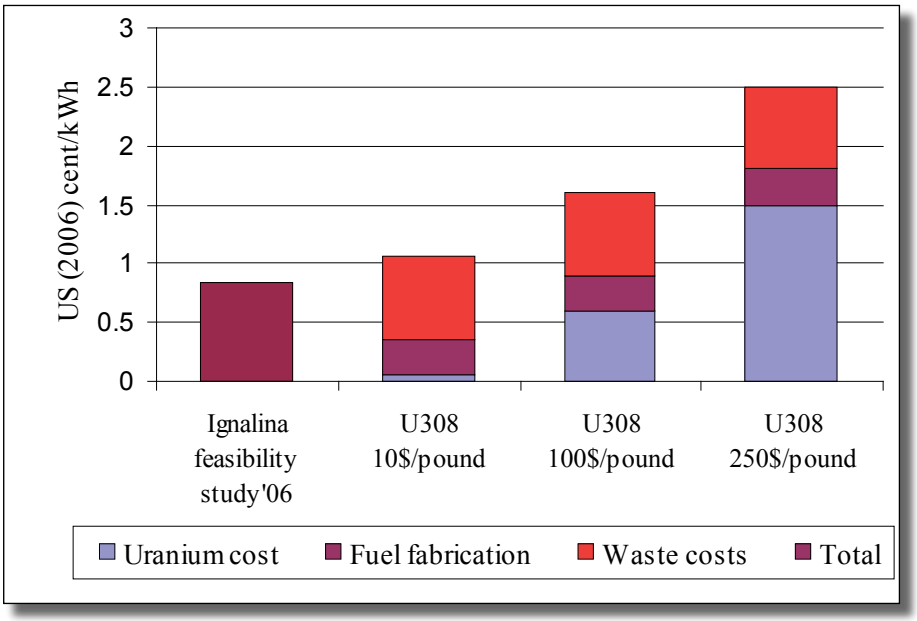
These are the main reasons why some analysts foresee higher uranium prices in the future, as high as 250 $/pound U_3O_8, at least for a period. While uranium costs of 10 $/pound only contributed to the nuclear electricity price with 0.06 US cent/kWh[1], uranium costs of 100$/pound contributes of 0.6 US c/kWh and 250 $/pound 1.5 c/kWh, making nuclear power less competitive.

The graph shows the effects of these higher costs on the electricity price. It provides a more comprehensive picture by showing fuel-fabrication and enrichment costs (0.3 c/kWh) as well as an assumption of waste management costs (0.7c/kWh). The results are compared with the total fuel cost estimate used in the 2006 feasibility study for a new Ignalina Nuclear Power plant in Lithuania , a study that is currently used as a basis for decisions about a new nuclear power-plant project.

The graph clearly shows the very inaccurate economy created by this too-low cost estimate and, further, by under estimating major expenses such as waste handling and disposal. Future electricity users will have to pay the difference.

With the uranium cost of 100 $/pound, the total cost of nuclear fuel becomes equal to the cost of biomass used in efficient CHP plants in places like the Baltic countries that have large supplies of biomass.

Efficient biomass CHPs are often considerably less costly investments than nuclear power plants. They are also more flexible in their fuel needs, and, of course, they are immeasurably safer.



Graph: Nuclear Fuel Cost Comparison per kWh electricity