

URANIUM ON THE RISE - TIME FOR INNOVATION?

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ABSTRACT

Uranium market prospects are improving due to falling inventory, increasing interest in nuclear as a clean energy for base load power, and the potential of small modular reactors (SMRs). According to the IAEA, SMRs offer better upfront capital cost affordability, are suitable for cogeneration and non-electric applications, offer options for remote regions with less developed infrastructures, and the possibility for synergetic hybrid energy systems that combine nuclear and alternate energy sources, including renewables.

Since 2011, the downward trend in uranium price has made the development of new projects uneconomic, apart from those able to use in-situ mining. Other challenges include declining ore grades, more refractory ores, the need to use saline process water, and tightening environmental regulations. Although the industry slowed down and limited funding has been available, process development has continued and has resulted in innovations which will be available to new projects and expansion of existing operations to meet the projected future demand.

Innovations which have reached commercial application include:

- Ablation and U-pgrade™ ore preconcentration processes.
- NF Membranes for upgrading IX eluate and SX strip liquors and recovering and recycling reagents.
- IX and SX systems for high chloride acid leach solutions.
- Fluidized bed precipitation system

A rising market should lead to funding becoming available for the new innovations. Candidates could include:

- Application of NF membranes to feed solution upgrading.
- Application of IX to strong acid SX strip or IX eluate solutions
- Application of SX to alkaline leach solutions.
- Application of ISR to hard rock ores after permeability enhancement.

Keywords: Uranium Ore Processing, Innovation, Uranium Price, Small Modular Reactors, Clean Energy, Preconcentration, Nanofiltration, IX, SX, ISR.