

Molybdenum-99: Privatising Nuclear Medicine

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Abstracts

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This Special Report from Business Monitor International (BMI) examines the global supply of Molybdenum- 99, looking at the likelihood of price rises and the implications of investment. The report is split into the following topics:

Molybdenum-99, The Birth Of A New Commodity

The Demand For 99mTc

Why is the Price Of 99Mo Artificially Low?

How Much Will The Price Rise And When?

Could The Market Experience An Overcapacity?

The Processing Bottleneck

The Importance Of Non-Proliferation And The Switch To LEU

Where To Invest—Reactors vs Cyclotrons

Potential Investors And Current Market Leaders Client Benefits

The Special Report draws upon the expertise of BMI's Pharmaceutical and Healthcare analysts to provide an insight into the current market, the need for price changes and the future demand for Molybdenum-99 (99Mo). The need to have a continuous supply

of medical isotopes has the potential to transform this product from a publicly-subsidised by-product to a lucrative commodity. BMI believes the rewards for investing while risks surrounding price increases remain will secure a better return on investment in the long term. The report is based on existing studies combined with BMI's proprietary growth forecasts to quantify the investment rewards, risks and opportunities. In addition, it projects the best investment strategies, looking at the current market players and the available isotope production technologies.

Molybdenum-99, The Privatisation Of The Nuclear Medicines Market

The current price of irradiating Molybdenum-99 (99Mo) is unsustainable and will have to increase by 300-500% in the medium term to allow for investment in new production facilities to maintain the global supply of the important medical radioisotope. The market is currently stuck in a low profit margin mindset that ignores capital costs and overheads. This is a legacy of manufacturers' historic roles as primary research institutes for academics, as opposed to sustainable businesses.

This should change in the next five years as governments are looking to stop subsidies, which could lead to more sustainable prices and open the market up to investment. The downside risk is that if this rise takes longer to begin than the industry hopes (one-to-three years), it will restrict profitability and delay investment in the sector. Without government intervention, 99Mo has the potential to become a commodity similar to conventional generic pharmaceutical products.

Molybdenum-99 is a radioisotope primarily produced from the nuclear fission of Uranium-235 using neutron bombardment. Its decay product, Technetium-99m (99mTc), is produced in processing facilities for 99Mo and is the most widely used radioisotope in the world for molecular and nuclear diagnostic imaging tests. In the January 2011 edition of *Science*, an article entitled 'Scrambling to Close the Isotope Gap', estimated that 99m Tc is used in over 30mn procedures a year globally. Other important isotopes produced by these reactors include Phosphorus-32, Cobalt-60 and Iodine-131, which is used to treat thyroid conditions. This report will, however, focus primarily on the 99Mo market. In the summer of 2010, 99Mo made headlines when it became apparent that there were shortages in the market caused by the 15-month closure of Canada's NRU reactor, followed by the overlapping closure of the Petten reactor in the Netherlands. Together, the reactors accounted for around 60% of the world's supply of 99Mo at the time.

Interruptions in the molybdenum-99 supply chain caused physicians to rely on lower

dosage nuclear imaging tests or an alternative isotope, Thallium-201 (^{201}Ti). This has had a negative impact on the total radioisotope market value, as it reduced the global demand for ^{99}Mo by 10- 20% in 2010, according to Don Robertson, Managing Director of South African radioisotope producer NTP.

The shortages are compounded by the fact that the isotope cannot be stockpiled, as ^{99}Mo and $^{99\text{m}}\text{Tc}$ have half lives of 66 and six hours respectively. This makes ensuring a reliable supply of the isotope extremely challenging and wastage is a constant issue. Although Canada's NRU reactor has now re-opened, it is going to need to undergo regular repairs until it closes, which the Canadian government has said will be in 2016 at the latest. In fact, all of the five nuclear reactors currently supplying 90-95% of the world's molybdenum will probably be decommissioned due to their old age in the next decade. Increases in the number of planned and unplanned closures are also expected. The five reactors in question are all between 45 and 55 years old and are experiencing an increasing number of unscheduled closures for repairs. As these reactors come offline, clinical outcomes will suffer unless there are new manufacturers already in place. France's OSIRIS reactor will be the first to close in 2015, followed by Canada's NRU in 2016 and the Netherlands' HFR reactor in 2018. South Africa's SAFARI-1 and the Belgian BRU are expected to remain operational until 2020 and possibly beyond, if circumstances permit.

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