

Helium

Softening demand ahead?

Global helium supply shortages, coupled with a stable worldwide demand, have caused frequent price increases and a notoriously tight market. As new capacity enters the market and there is a balancing of supply, a less strained supply chain should ensue as 2014 unfolds. But there are also questions as to whether helium demand will actually be marginally smaller than it once was.

This is of course related to the 'price elasticity of demand' concept; as prices go up, demand falls – as long as there are suitable substitutes. The so-named Helium Shortage 2.0 and impending Helium Cliff scenario of the last few years has enforced fresh thinking in the industry, with significant innovation effort invested in developing both alternatives to helium, and recovery and recycling technologies. Technology development in certain end-user applications is also ongoing, potentially heralding the dawn of a less voracious helium demand. One such example is magnetic resonance imaging (MRI).

MRI – Peaked consumption?

The relationship between helium supply and MRI applications is well documented. As a technical challenge in cooling down these machines, **gasworld** understands an MRI magnet could use up to 1500 litres of liquid helium for supercooling.

With potentially more than 1000 people waiting in hospitals for an MRI scan at any given time, and with emerging healthcare systems and preventative care driving annual growth in this application, there are typically around 80 million MRI's performed each year around the world. The MRI share of the helium market is, therefore, now thought to be around 20-30%.

But a topic for discussion has

emerged in this area – whether the level of consumption has peaked. While emerging healthcare systems are fuelling incremental growth in the number of scanners being used in the developing world, on the other hand the MRI technology being manufactured today is considerably more efficient than it was five years ago, for example, and the average amount of helium required per scanner while in operation is decreasing.

Tom Rauch, GE Healthcare's Global Sourcing Manager for Services and Aftermarket Supply Chain, told **gasworld**, "It certainly will grow at a slower rate than it has over the past 20 years. Estimates range between 25-28% of today's global helium demand is due to MRI, and that number will probably only grow 1-2% over the next 10 years."

"I think it will be flat up to 1-2%, then start to decline out in 7-10 years. This will be caused by a combination of factors: older, less efficient machines that can be in the field upwards of 10-15 years are progressively being replaced by more efficient 'zero boil-off' magnets; MRI manufacturers are increasingly more judicious about helium conservation; and new MRI technologies will be introduced that require less helium."

Rauch added, "Newer machines have become increasingly more efficient when it comes to helium usage both in the factory, during shipment, and at the clinical site. Developments in superconducting wire, refrigeration and cryogen vessel design will make future MRI machines even less reliant on helium as a cryogen."

The big 'unknown' is whether significant new applications for helium will emerge in the years to come, similar to MRI, fibre optics or semiconductors.

Helium recovery

Some MRI manufacturers have, for

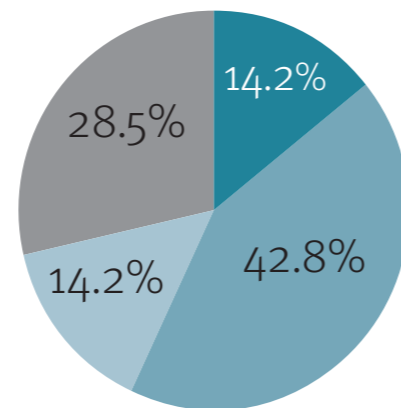
many years, managed to capture helium, re-liquefy it and put it back into their processes. So while the amount of liquid helium required to cool-down an MRI unit after the manufacturing process is relatively constant, the amount of product recovered increases.

Linde Kryotechnik is understood to have been installing such liquefiers at a number of manufacturing facilities throughout the world. In addition, next generation liquefiers allow scientists and medical laboratory professionals to produce liquid helium from helium gas, thereby removing the previous requirement to start operations with liquid helium. The new liquefier technologies came at a time when laboratories and medical facilities have been struggling to obtain and afford the liquid helium they require.

Quantum Design is another company active in this area, producing Advanced Technology Liquefiers (ATL) along with innovative helium recovery, storage and purification systems. In the past year the company has installed many ATL recovery systems in physics labs, MEG centres and NMR facilities around the world.

Is helium demand likely to be less than it once was due to measures taken during global shortages?

Poll live on the **gasworld** website from 25/11/2013 to 13/12/2013



■ Yes ■ Marginally
■ No ■ Unsure

Illinois-based Ability Engineering Technology Inc. (AET) is also seeing an upward curve in helium purification and recovery systems. In addition to providing standard models and associated accessories, the company can provide custom-designed purification and recovery equipment to meet specific requirements – and has seen an increase in enquiries for its technology.

Eugene Botsoe, President and CEO of AET, told **gasworld**, "With the ongoing shortage of helium and the high costs associated with its purchase, we are seeing an increase in inquiries for helium recovery and purification systems. In the last six months of 2013, AET Inc. has experienced a doubling of inquiries for helium recovery and purification systems used in both scientific R&D and industrial applications. The inquiries have been global (Asia, Europe, Africa, the Middle East), and potential clients have expressed an interest in both low

and high pressure systems."

Recent enquiries are understood to have been from US Department of Energy (DOE) laboratories and academic institutions involved in scientific R&D. "These inquiries have been for our LP60P low pressure helium purifier systems,"

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said Botsoe. "The LP60P purifier has a 30-year track record of successful operation in scientific R&D application, and it is designed for a helium flow rate of 60 grams/sec with an MAWP of approximately 350 psig for the helium circuit. AET is currently developing the LP30P and LP100P models, which

should be commercially available by the summer of 2014."

"Interest in AET's high pressure systems have been from industrial companies focused on helium recovery and purification," Botsoe added. AET offers a high pressure system rated for gas pressures of approximately 3000 psig, with two models are available based on the impurity level of the helium gas stream. A 150Nm³/hr flow rate system is currently available, while the company is developing both 25Nm³/hr and 50Nm³/hr models which will be available in 2014 – highlighting the growing thirst for conservation and recovery technologies.

With initiatives in place, the question exists in 2014 whether the demand for helium coming out of the market shortages will be less than it was before; market indicators appear to suggest a marginal softening in demand in the post-shortage helium business. **gw**

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