

GROWTH CAPITAL

MI Systems boasts \$100 million valuation

The Houston-based company has developed a new approach to electro dialysis reversal which has captured the imagination of investors. Its latest funding round has propelled Magna Imperio into a tiny elite of new water technology companies worth nine figures.

Electrochemical desalination specialist Magna Imperio Systems Corp. has completed subscriptions agreements with investors on a \$21 million funding round which will see the company valued at \$100 million pre-money, according to CEO Grant Page. It is a strong vote of confidence by investors in a technology which is only just beginning to achieve its first commercial references. The lead investor in the funding round is London-based Cohesion Investments.

The company had an order intake of around \$1 million in 2018, but the company expects this to grow to \$20 million in 2019. It has one 50 gallons-per-minute (273 m³/d) installation in operation at the Saint Arnold Brewing Company in Houston, and next quarter it will ship units to Jordan and California.

MI Systems' technology – known as electrochemical nano diffusion (END) – is an electrochemical desalination process like electro dialysis reversal, but config-

ured to deliver higher recovery, with lower energy consumption. "I didn't start by trying to make the EDR system better, but that is where we ended up," Page remarks. "I started my first company when I was 16, sold it when I was 17, and then used that money to try to figure out a better way to chrome-plate parts that didn't use high currents, heavy metals, electrolytes, and gases that can kill you. In that process I came up with some dissimilar electrode-pairs, and when I ran salt water by them, some of the ions were removed." From school he joined the Navy but returned to the concept while studying at the Naval Research Laboratories, which funded the early stage research.

Chief Operating Officer Chad Unrau believes that the opportunity for MI Systems has grown out of the fact that EDR has not seen the same level of technology investment as reverse osmosis. Among the innovations introduced by MI Systems are participatory electrodes which are less energy-intensive than standard carbon elec-

BIG EMPIRE BUILDERS

CEO Grant Page (left) and COO Chad Unrau (right) expect \$20 million of orders this year.



trodes, and the concept of configuring the membranes and the spacers to dramatically reduce the distance the current has to flow between the electrodes. "We have been able to minimise hydraulic and electrical resistance, and then we take that energy and reallocate it towards higher recovery," Unrau explains.

A 30x15x30cm END block typically consists of 200 layers of membranes and 200 spacers. These blocks can be configured to reduce total dissolved solids in steps: the more blocks, the greater the reduction in salinity. At this stage it is a brackish water desalination technology, albeit one which can recover up to 98% of the feedwater, and deliver a range of product water salinities.

The key selling point is the combination of high recovery and low energy consumption. Unrau explains: "It's up to a 60% reduction in power. Now you put that in economics to a bottler who is spending on both water supply and discharge and the savings add up fast" It means that MI Systems can offer payback periods of less than three years on its systems. This is the arithmetic that attracted such a strong valuation from investors, and it is backed by a scaleable and modular "plug-and-play" delivery model.

The next step is to increase automation and scale up production. In April, the company will move into a new 50,000ft² (4,645m²) facility. ■

UNDERSTANDING MI SYSTEMS' END TECHNOLOGY

Magna Imperio's electrochemical nano diffusion (END) technology separates the ions out of a salt solution using a pair of electrodes which pull ions of the opposite polarity through ion-selective membranes to leave a pure stream of product water. There are three main applications for the technology: 1) direct brackish water desalination; 2) brine treatment for the direct production of water from reverse osmosis reject; and 3) brine reduction from reverse osmosis reject for recirculation of the product water through the RO system. The company claims the system is upto 60% more energy-efficient than established technologies for brackish water desalination (at salinities below 15,000mg/l), and can deliver higher recovery rates of up to 98%.

