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## The Vision of Envision

*In Alberta's booming economy, small start-up companies face stiff competition. But Gerard Monaghan (Chemical '89) is confident that his industry experience will help Envision Technologies succeed.*

By Debby Waldman

Envision Technologies is Monaghan's answer to resolving upgrading issues.

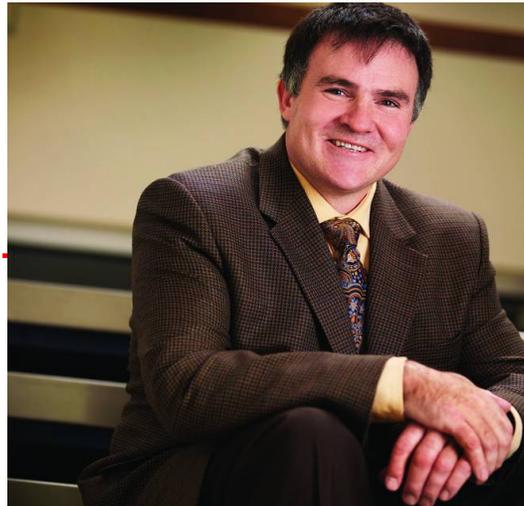
Envision now has seven employees including Monaghan as CEO, and he recently incorporated a spin-off company, ETX Systems.

Envision's first shareholders were Monaghan's brother and his cousin, who put up enough money to keep the company afloat until consulting jobs began to come in. ETX now must raise roughly \$30 million to get its signature product, the ETX Upgrader, up and running. Monaghan isn't worried.

"We certainly are doing the right thing at the right time," he says. "The macro environment for heavy oil has never been better than it is now, and there's a lot of appetite in Alberta for this type of investment."

ETX raised \$2.5 million in the first round of funding for the Upgrader. As the supply of light oil decreases and the world grows more reliant on heavy oil from sources such as the oil sands, the coking process is increasingly necessary. Envision's Upgrader, which should make the process more efficient, is still in the design stage.

Monaghan expects that by July of this year the company will be able to start up its feed pumps and commission its one-barrel-a-day pilot project at the National Centre for Upgrading Technology in Devon, Alberta. Two



**Gerard Monaghan (Chemical '89)**

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years from now, he expects to have a 500-barrel-a-day demonstration project up and running. Monaghan has set a 36-month goal to produce results that will convince companies to adopt the technology.

Academic rigour is important at Envision. The company often relies on academic consultants like U of A Chemical Engineering professors Dr. William McCaffrey and Dr. Murray Gray.

Monaghan first became aware of McCaffrey and Gray when he was at Syncrude and read about a novel process they'd developed to process bitumen—spreading it out as a thin film and heating it up quickly to decrease the coke yield. When Monaghan immersed himself in academic journals after starting Envision, those two names kept coming up.

"We didn't want to reinvent the wheel, so we started with an exhaustive search of the public domain," Monaghan explains.

"When it comes to heavy oil upgrading, if you search the public domain, the U of A figures heavily in the results of those searches."

Monaghan contacted McCaffrey and Gray, who are generous about sharing their expertise. Two years ago, Envision provided funds for a student in McCaffrey's lab to determine the possible benefits of using the ETX Upgrader. When new research is published, Monaghan or Wayne Brown, Envision's chief operating officer, will call one of the professors and ask his opinion. The professors have also been helpful as unbiased evaluators who offer feedback when the company reaches milestones.

Of course, it's one thing to make something work in a highly controlled laboratory environment; it's quite another to get it to work reliably in the field, day in and day out. Monaghan knows that. That's why Envision has put its many other ideas on hold for now and is concentrating its energies on the ETX Upgrader.

Heavy oil contains molecules that are much larger and more complex than those found in motor-vehicle gas tanks. The problem is that getting heavy oil to the transportation-grade fuel stage requires breaking down those molecules. Coking refers to the thermal conversion process that cracks the bonds of the big molecules to produce smaller ones. It also reshuffles the hydrogen from the big molecules to stabilize the smaller ones.

What's left after the process is coke—a hydrogen-deficient substance that's highly condensed, almost as dense as coal. Monaghan calls it "a low-value by-product" while others call it junk. The ETX system is designed to produce less coke and more fuel than existing technology.

Monaghan has no illusions that the world's oil-and-gas companies are

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going to abandon current equipment. As new facilities are built, however, the newest, most efficient technology will be purchased. "All companies have expansion plans," he says.

"They will need to support much higher throughputs than what they currently produce. I certainly see companies like Syncrude, Suncor, and Canadian National Resources Ltd. being customers of ours."

At Syncrude, Monaghan performed a wide range of tasks, in engineering design as well as technical services. He spent a year in the field doing shift-work, turning valves along with plant operators. The latter wasn't exactly what he was educated for at the U of A but, he says, "it was a valuable experience to try and figure out what we should be incorporating into the design to make it practical for the field."

Syncrude provided Monaghan with other excellent opportunities, including the chance to earn his MBA from the U of A. "It's nice to be able to know how to design things. But to determine if there's a need, it's useful to have an appreciation of the business fundamentals," he says.

"To a certain extent, business has always interested me. But it also provided a key complement to my engineering skills, and that's helping to move engineering ideas beyond what's interesting to what's actually economic." Syncrude also whetted Monaghan's appetite for research and development, when it sent him to New Jersey to work with a thermal conversion research group at Exxon. He spent nearly two years there, helping develop upgrading technology and writing patent applications. The experience opened his eyes to what's possible when working for a multinational company with seemingly unlimited resources.

He had been thinking for some time about what it would take to optimize heavy oil, to make the process more efficient. "When I saw the type of resources and what a company like Exxon can bring to bear on those problems, I wasn't afraid of doing that through a venture," he says.

"The New Jersey experience gave me the confidence that I could try and do something like that on my own." Within six months of returning to Fort McMurray, Monaghan left Syncrude, moved his wife and two young daughters to Calgary, and started his company.

"There is competition," he says, "but we come close enough to that ideal coking process that we believe the chance of a competing technology coming in and surprising us with a totally innovative approach to the process is small. We keep track of the competitors out there, and we're confident."

Monaghan says that by 2030, the world will need roughly 15 million

barrels a day of heavy oil. Right now it uses about five million barrels a day. "We're presenting investors with the opportunity to put their money in, and if our investment pays off, they're looking at a 100-fold or 1,000-fold return on their investment.

"If a person has capital to wager, the upside of this is so compelling, and if you look at the rigour of our development process, and the return we've found there, there's a huge interest in getting involved."

Debby Waldman is an Edmonton-based freelance journalist.

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