



# The Road to Commercialization is Always Under Construction

One start-up's journey from innovation and investment to industry acceptance of its clean technology.

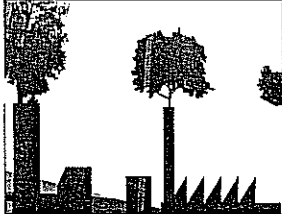
John Spurway | Atlantic Hydrogen Inc.

**A**tantic Hydrogen Inc. (AHI) began with an idea. The company's founders saw an opportunity to develop a technology that, with the right combination of science and entrepreneurship, could make a significant contribution to the well-being of the world. The road that leads any new idea to a commercial product is strewn with potholes, roadblocks, and speed traps. After many changes in course, Atlantic Hydrogen continues its drive.

## Where it all Began

The company was founded by Bill Stanley of Saint John, New Brunswick and the father and son team of David and Dan Fletcher of Montreal, Quebec. The Fletchers had the technological innovation and Stanley had the business acumen. They formed

In the spring of 2002, a successful application with the federal Atlantic Innovation Fund (AIF) program spawned the creation of Atlantic Hydrogen Inc. This wholly owned subsidiary of PrecisionH2 Inc. was based in Fredericton, where a research team was assembled at the University of New Brunswick to work under contract to Atlantic Hydrogen to build on what the McGill group had started. The object of the AIF is to fill the gap between very early research and the development of pre-commercial products. This support covered 75 percent of the approved costs of the project. As a conditionally repayable loan, it is non-diluting. And with repayment terms based on a percentage of sales of the technology, the risk to the company was low and manageable. After the initial investor input, this was the next major influx of money into the project. Using this financial input, experimentation continued for three



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PrecisionH2 Inc. and began research at McGill University. The technology destined to contribute to the well-being of the world was a low-temperature, low-pressure plasma technology that dissociated the methane in natural gas into hydrogen gas and solid carbon, a technology that came to be called CarbonSaver™. What set it apart from other natural-gas-reforming technologies was that it didn't generate carbon dioxide. Using shareholder funds, early proof-of-concept tests were undertaken. The results were encouraging and momentum behind the project continued to build. As with any start-up, money was an issue.

years. During this period, Atlantic Hydrogen and PrecisionH2 merged into one company under the name Atlantic Hydrogen Inc. Construction of lab-scale prototypes helped researchers improve on the operating characteristics of the CarbonSaver™ and understand the process in more detail.

## Where There's a Challenge, There's an Opportunity

During the AIF-supported project, AHI management realized it may be working on a technology that had

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no market. This could have been a serious roadblock. The CarbonSaver™ was being designed to produce pure hydrogen for the fuel cell market, but it became clear this market would not be established by the time the CarbonSaver™ was ready. The solution came in the form of hydrogen-enriched natural gas (HENG). Rather than separating and purifying the hydrogen output from the unit, the hydrogen would simply be left in the outgas, resulting in a greener natural gas. The combustion properties of HENG, especially of nitrogen oxides and carbon dioxide, were lower than those of untreated gas. In some jurisdictions, this was important and the research team, focused the CarbonSaver™ on the natural gas vehicle market. The benefit of following a market became evident in the reaction of the Atlantic Innovation Fund managers. They pointed out that projects often failed because they lost track of the market. With their blessings, the project moved forward.

At the completion of the AIF-supported project, AHI secured funding from Sustainable Development Technology Canada (SDTC), an organization that contributes to projects demonstrating technologies that reduce pollution and greenhouse gas emissions. This funding was in the form of a grant that covered roughly one-third of the development costs of the natural gas vehicle refueling demonstration project. Here, the company hit a stretch of poor road once again. A regulatory change involving the certification of mixes of hydrogen in natural gas has cast doubt on the North American usefulness of a CarbonSaver™. Refusing to give up, AHI management found a potential use for the CarbonSaver™ in combined heat and power (CHP) applications. At the moment, things look promising, including the potential for its use in Europe, where these regulations have been in place for some time.

### Hope on the Horizon

AHI had several small fundraising rounds, during which the share price had slowly and steadily risen. In 2007, AHI embarked on its most recent drive to bring funds into the company. This drive proved successful, as the company sold shares in excess of \$5 million to new and existing shareholders.

The company remains focused on developing its CarbonSaver™ technology and finding a market for it. With continued interest from new potential investors, AHI is moving into the next stage of development: a three-year, three-pronged plan to develop the plasma science for much higher gas volumes, understand the nature of the carbon in order to explore markets for it, and develop an innovative business model for entry into the clean energy market. This should be the final pre-commercial stage of development for the company.

The road to commercialization is a long and bumpy one. The race is more a marathon than a sprint, and there is little doubt that, at times, you feel as though you're sitting behind the wheel with the engine idling, staring out the windshield while a flagger waits for something down the road to move. At other times, the scenery is a blur. Sometimes your destination changes. Always, there are bumps along the way. AHI is still mapping out the final leg of the journey to commercialization. Through a solid idea, a strong team, a proven record of technical success, excellent communication in the best and worst of times, and unrelenting belief in the CarbonSaver™ technology, AHI has built a loyal community of investors and a roadmap to a profitable rollout of a new, green technology.



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