

Case Studies in Entrepreneurship

Getting into Hot Water in the United States: The Case of EnerWorks¹

Ryan Walters²

*Ted Rogers School of Management, Ryerson University
Toronto, Ontario, Canada M5B 2K3*

Dr. Phil Whiting, President & CEO of EnerWorks Inc. found himself staring out of his office window pondering the firm's next step. As a Canadian developer and manufacturer of solar thermal hot water systems, EnerWorks was on the cusp of a potential boom in the use of renewable energy products for the residential and commercial markets. The company was entirely financed through Venture Capital firms and was still in its infancy. Shareholders, management and employees of EnerWorks had high expectations for industry growth in solar-heated hot water in North America, especially given the impact of high prices in conventional energy sources such as natural gas, oil and electricity as well as the emerging social trend towards the use of renewable energy. The technology used by EnerWorks was leading-edge, proprietary and had applications both in residential and commercial hot water usage. However, Phil was concerned that as a start-up venture, they were still unclear as to what market segment provided the greatest opportunity for growth and, given that segment, what their marketing strategy should be. He knew that they needed answers to those questions as EnerWorks was quickly using up its working capital and would need to raise additional capital in the short term. Phil wondered if focusing their efforts on a specific market with the appropriate sales strategy could provide encouraging sales figures that would support additional capital investment and continued growth.

¹ This is an excerpt from a published case study with additional research, analysis and insight available from http://www.ecch.com/casestudy/product_details.cfm?id=93158&rc=2&pg=1&tc=45&adv_search=1

² **Corresponding Author:** Ryan Walters is a Research Associate at the Ted Rogers School of Management, Ryerson University. He can be contacted at r2walter@gwemail.ryerson.ca.

Company History

Following successful developments in the European solar hot water market, EnerWorks was founded as a start-up attempting to introduce solar thermal solutions to the North American market. Based in Dorchester, Ontario, Canada, EnerWorks develops and manufactures proprietary renewable energy appliances for residential and commercial markets. Harnessing the sun's solar radiation, EnerWorks' solar thermal collectors can heat water and displace the use of traditional fuel. More specifically, the solar thermal products generate energy for applications in domestic hot water heating, space heating, pool heating and commercial/industrial process heat requirements.

In 2006, EnerWorks secured its first major sales contract to supply over more than 800 commercial collectors and 52 full residential systems (102 residential collectors) to the Drake Landing solar community in Okotoks, Alberta. The Company has a scalable, automated manufacturing facility with capacity to supply 40,000 square meters (m²) of solar collectors, representing potential sales of approximately \$20 million per year. At the forefront of solar thermal engineering design, EnerWorks has been recognized for its innovation prowess and has received awards such as the 2007 Temple W. Harris Innovative Product and Technology Award and the Energy TV 2008 Top Energy Efficient Product Award.

Fast Forward: Development of Engineering Innovation

With strong links to university-led solar research, EnerWorks prides itself on the

latest engineering innovations in the solar thermal product offering. By 2008, EnerWorks had grown to a company of 30 staff and secured several patents for solar components. EnerWorks went on to develop a "total" solution for residential solar water heaters. Phil Whiting compares this to an appliance, where the entire system is sold instead of separate components. EnerWorks now has patents on some of the components involved in the complete system.

Having secured a strong engineering team, EnerWorks is confident in its product quality, innovation abilities, and future R&D prospects over competitors. Innovation is always flourishing at EnerWorks as they customize products for a rapidly changing market. For example, in addition to domestic hot water heating, EnerWorks' systems can be used to deliver pool heating and space heating through integration with new or existing heating systems, including forced air, hydronic (hot water radiators) and geothermal.

Improvements to product quality and functions are not the only innovations at EnerWorks, the team also believes that aesthetics will play a large role for people interested in installing solar thermal products. For example, EnerWorks's solar panels can be engineered to match the look of a skylight, where people are concerned about the appearance. After all, "the biggest investment for most people is their house" states Phil Whiting. With a strong focus on product innovation, EnerWorks specializes in the design and manufacturing of collector and system development. EnerWorks can be

considered an “integrator,” sourcing separate components to manufacture to form a total solution, system product. As such, EnerWorks is positioned further down the supply chain from component suppliers. Figure 1 highlights the various industry activities and can be seen below.

Product Offering

Solar thermal collectors are divided into the categories of low-, medium-, and high-temperature collectors. Low-temperature collectors provide low-grade heat (less than 110 degrees Fahrenheit), through either metallic or nonmetallic absorbers and are used in such applications as swimming pool heating and low-grade water and space heating. Medium-temperature

collectors provide medium-to-high grade heat (greater than 110 degrees Fahrenheit, usually 140 to 180 degrees Fahrenheit), either through glazed flat-plate collectors using air or liquid as the heat transfer instrument or concentrator collectors that concentrate the heat of incident insolation to greater than “one sun,” and are mainly used for domestic hot water heating. High-temperature collectors are parabolic dish or trough collectors designed to operate at a temperature of 180 degrees Fahrenheit or higher and are primarily used by utilities and independent power producers to generate electricity for the grid

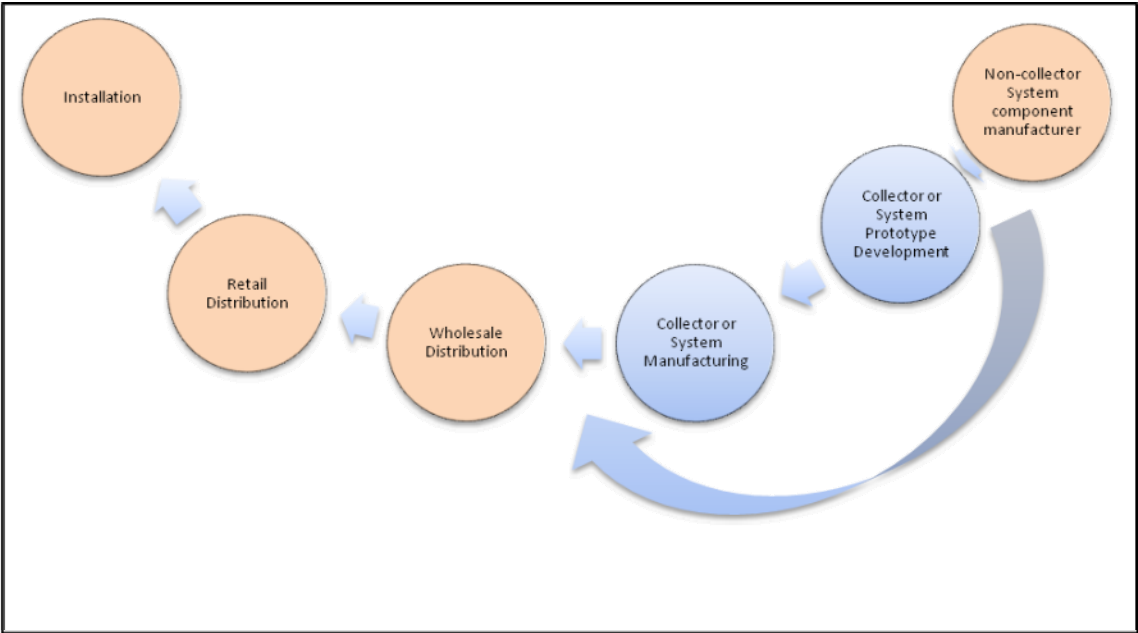


Figure 1 – Type of Industry Activities and EnerWorks Involvement.

EnerWorks manufactures a line of medium temperature solar collectors which are designed exclusively for use in residential applications. Collector performance is reliable in all climates using a patented technology which prevents overheating. Designed to look like roof skylights, the solar collector panels can be mounted on sloped or flat roofs, south-facing walls, outbuildings or ground racks. The panels have a self-regulating mechanism that ensures hot air is vented to prevent overheating on a hot summer day, and are designed to absorb 94% of the sun's energy. EnerWorks makes a residential solar thermal system which is comprised of one, two, three or four solar collectors, racking, and the energy pack. The most common application is a two panel solar thermal system for domestic hot water heating. Currently, approximately 16% of residential energy comes from water heating.

EnerWorks' residential systems can deliver up to 90% of this energy, depending on a variety of variables including proximity to the equator, storage capacity, pitch, orientation and demand profile. Residential systems have a warranty of 10, 5, and 2 years on the collectors, energy pack, and electrical components respectively. In addition to integrating with the domestic hot water system, the solar thermal system can include a heat exchanger integrated with a pool heater, boiler, or existing ductwork to further displace traditional energy consumption.

Framing the Opportunity

The solar industry, although technically not new, is still emerging as an infant industry in North America. As such,

EnerWorks faces many uncertainties. For one, financing has been difficult to secure. Experience has shown that venture capitalists can have limited investment horizons when waiting on long-term market development. Government support and regulation has played an important role for the development of European markets, but there is still uncertainty around North American political support for renewable energies. EnerWorks is uncertain whether they will receive full championing support from political and regulatory bodies for the adaption of solar water heaters. In this sense, other renewable energies compete for the public spotlight and "solar" can often be associated with photovoltaic-based solar panels, used in converting the sun's rays into electricity.

Despite these concerns, management of EnerWorks believes there is a tremendous opportunity for solar thermal products and applications in North America. Although the industry for solar thermal systems is considerably more advanced in Europe, the North American market has begun to adopt solar thermal systems as a viable method of displacing traditional fossil fuel consumption and electricity demand. Management is very confident in their product offering. Their challenge is building the right channels to reach the right markets. They believe residential has the highest market potential in the US, but are unsure how to design an effective marketing strategy to build scalable channels to reach their target markets. EnerWorks also faces the same challenge as most companies attempting to introduce a discontinuous innovation. Today's solar

water heaters are high-tech and represent a new market in North America, so convincing early buyers to adopt the technology can be difficult. However, this also presents an opportunity for EnerWorks to secure early-mover advantage when solar water heaters become a mainstream product.

Costs of Solar Water Heaters

Solar water heating systems range from \$5,000-\$10,000, depending on the installation requirements, type of system, and distribution costs such as shipping. In most cases, up to 50% of the initial cost can be recovered through government grants or tax credits. Operating costs can include: a pump replacement to fix a leak (\$200) and suggested maintenance including: tank flushing, changing anti-freeze, collector cleaning every 5 years, averaging \$75-300. Some maintenance and part replacement will be covered under a manufacturer's warranty. An EnerWorks system usually costs \$7,000 installed. Compared to EnerWorks, European systems typically cost \$10,000 and Chinese units cost approximately \$5,000 installed.

Calculating the Economic Value

Proposition: EnerWorks' System Performance

With no pipe fittings or joints inside, the EnerWorks Collector is very robust and is designed to have a long life expectancy of 20 or more years. Using other proprietary technologies, EnerWorks solar water heater also reduces the wear-and-tear on pipes, limiting the chances that leaks can emerge from the unit. This helps improve the payback period relative to

competitors, although the superior product attributes also contribute to a higher initial cost of the unit. However, with standard NPV calculations, a higher initial cost is desirable if most operating costs are eliminated, due to the discounting rule.

In terms of performance, the solar system can reduce the hot water heating costs by between 50% and 90%, depending on the proximity to the Equator. As well, the amount of energy that is displaced can be further increased if discretionary consumption (ie laundry, dishwashing etc.) activities are scheduled at peak sunshine times. EnerWorks' typical cost structure follows a standard margin increase down the distribution line. A typical EnerWorks solar water heater costs approximately \$2000 to build. A manufacturer then sells to a distributor, who then sells units to local dealers, both parties collecting a margin. Dealers then sell to homeowners for approximately \$5,000-\$6,000. From here, customers must also pay \$1,000 for installation for a total cost of \$7,000. The homeowner, however, can typically get up to 50% of the total cost recovered through government grants.

At \$7,000, EnerWorks' system is above the average industry price, reflecting the benefits of an EnerWorks system as it is marketed relative to competition. These prices vary depending on regional factors, transportation costs, and commissions along the distribution line. This also reflects the importance of the economics involved in the unique distribution system needed for solar water heaters. A product characterized by discontinuous innovation, a regional

basis for markets, and a high shipping cost are some of the considerations in designing the appropriate distribution pipeline. *In general, EnerWorks needs to pinpoint the regional areas with the highest potential for solar water heater adoption.* If, for example, there was a region of the United States with high expenses on heating water, sunny climates, and a 40% grant producing payback periods averaging 7 years, how could EnerWorks find the regional localities where a 7 year payback is a worthwhile investment for homeowners given the demographics? Ideally, Enerworks could find regions with lowest payback to find distributional economies of scale, because of the high shipping costs of water heaters. From here, EnerWorks must decide the appropriate distribution channel choices and marketing tools to target these markets.

EnerWorks Marketing and Financial Activities

Present Day Financial Concerns

As an entrepreneurial firm, EnerWorks has burned through much of its capital in order to emerge as the leader in product innovation. Investors and management believe that capital spent in early stage product development will secure a superior product offering as the industry moves from introductory to growth and the buyer market expands. Figure 2 shows management's projections for sales into 2012. Marketing efforts and securing the right distribution channels will be the single most important factor to reach these projections. EnerWorks, being in a delicate financial position, must frame this problem, and the solution, around financial constraints.

Figure 2 – EnerWorks Current and Pro Forma Revenue and Projections (millions \$C)
(Source: EnerWorks)

	2008	2009	2010	2011	2012
Revenue					
Residential	3.0	5.0	8.1	12.0	16.7
Commercial	2.0	5.0	6.1	7.3	8.9
Total Revenue	5.0	10.0	14.2	19.3	25.6
Cost Of Goods Sold	3.0	5.5	8.1	11.3	15.0
Gross Profit	2.0	4.5	6.1	8.0	10.6
Operating Expenses	4.5	5.5	6.1	7.2	8.5
EBITDA	(2.5)	(1.0)	0.0	0.8	2.1

Marketing Efforts

Although EnerWorks offers a superior product, they have struggled with the appropriate marketing strategy. The company's marketing manager believes many consumers are confused between the wide arrays of solar product offerings. There is also a long buying cycle associated with solar thermal products. Such is the nature of disruptive technologies, where customers are uncertain of product reliability and cannot easily comprehend the information available. As such, solar thermal products are a niche area, but have the potential to broaden to wider markets in the future.

EnerWorks now faces the challenge of targeting niche market segments. For example, EnerWorks has struggled with classifying the "green" customer. This is complicated because energy wasters can financially gain from solar water heaters, but are not often concerned with the environment. Reaching the mainstream market will be a huge challenge for EnerWorks, but represents an opportunity to be a market-mover. The challenge is "marketing solar thermal as a prime source of hot water," says Kathleen, the company's marketing manager. EnerWorks' product has more flexibility for aesthetic designs, and could be used to match the color of rood with the molding of the solar panel.

Framing the Challenge: Building the Right Distribution Channels

EnerWorks' distribution strategy focuses on addressing the market through a distributor network. Distributors may be traditional stocking distributors or in many cases may be design build firms,

architects, commercial HVAC engineering firms, or energy management companies who specialize in energy retrofits. These tier 1 distributors may sell EnerWorks systems directly to the customer or through a sub contractor, installer or sales agent. Because the solar water heater installation is technically complicated, many parties are involved along the distribution channel. For example, one project may include project management consultants, EnerWorks sales team, installers, government accreditation, and so on. EnerWorks is thus reliant on many people for industry--and its own--success. Effectively marketing the benefits of EnerWorks' product through the various agents in the distribution line is important element of the overall marketing strategy. EnerWorks must rely on the skills, sales, and reputation of sellers down the industry chain, such as HVAC workers.

EnerWorks's staff is confident in the product offering, but the challenge is building sales channels. EnerWorks is worried that the fragmented nature of the solar water industry means companies with mediocre products are getting a geographical advantage by monopolizing regional, niche markets. EnerWorks needs to find the right distributors, and sales channels, to reach these regional markets. The challenge for EnerWorks is not how to chase everything, but rather, how to chase the right segments.