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Mason Biodiesel: A Family's New Venture in a New Industry

Matthew Eriksen
Providence College, meriksen@providence.edu

George H. Tompson
University of Tampa, jtompson@ut.edu

Case Study

Mason Biodiesel: A Family's New Venture in a New Industry

Matthew Eriksen
George H. (Jody) Tompson

This case describes a real family that has been running a labor-intensive business since 1992. The father, Phil Mason, runs the business with the help of his wife and two of his sons in southwestern Rhode Island. The business is a franchisee of ServiceMaster Clean. In 2006, the franchise employed 20 full-time employees and was the 50th largest ServiceMaster Clean franchise among the approximately 1,200 franchises located in the United States. Annual revenue is approximately $2.5 million. In late 2005, one of Phil's sons began researching the biodiesel industry. As he was growing weary of the labor-intensive nature of his franchise business, Phil fully researched the industry himself. By the middle of 2006, Phil was convinced that he could profitably manufacture biodiesel in his spare warehouse space. In July 2006, he formed Mason Biodiesel, LLC and financed the $1.5 million start-up costs through a combination of personal savings and bank debt.

At the end of fall 2007, Phil Mason grumbled under his breath as he wrote a check from his personal account. At the end of each month, he felt frustrated that he was still writing checks to cover the monthly operating losses of his second start-up company, Mason Biodiesel. At the same time, however, he was optimistic that the company was on the right track to eventually become self-sufficient and a reliable source of income for his and his sons' families. When he and his three sons launched Mason Biodiesel in April 2006, he planned to carry the company's losses until January 2008. Now, in October 2007, the company was still in its prerevenue stage but had just achieved an important milestone. An independent testing lab in Nevada had certified that the company's product was suitable for sale on the open market. Before the certification was received, Mason Biodiesel was only producing biodiesel for use in its own vehicles and giving it away to friends and family.

Background of Phil Mason

Phil Mason's professional career began in the corporate dining services industry. His first jobs were in Washington, D.C., where he worked for ARA Serve for nine years as an executive chef at the Pentagon and the National Academy of Sciences. Later, he moved to the higher education division of ARA Serve, where he became the food service director at Marist College, Lyndon College, and the American School for the Deaf. In 1990, he took a job at a regional dining services company working at the IBM facility in Somers, New York. But within six months of his last move, he lost his job in a downsizing initiative.

As he wondered what to do next, Phil reconsidered his lifelong dream of owning a business. During his career in the food service industry, he had saved some money so buying into a franchise was financially feasible. Despite his food service background, he was not interested in the restaurant industry. Instead, in 1992, he seized the opportunity to purchase a ServiceMaster franchise in Stonington, Connecticut. As well as a great business opportunity, it allowed him and his family to live in Rhode Island. As Phil stated, "We were beach bums. Having a chance to live where you always want to go, it was the perfect thing. Owning your own business combined with living where you want to live is, I think, the perfect combination."

ServiceMaster was founded in 1929 and incorporated in 1947. In 2007, it had more than 4,500 franchisees located in over 40 countries around the world. ServiceMaster, a cleaning and disaster restoration business (www.servicemaster.com), was a publicly traded company headquartered outside Chicago. It controlled several well-known residential home service brands such as Terminix (pest control), TruGreen (lawn service), and Merry Maids (cleaning service).

In 1993, Phil's franchise became the first ServiceMaster Clean franchise to independently conduct large-loss drying for industrial customers and to support other local ServiceMaster Clean franchises across the eastern United States with their large cleanups. The initial investment in the large-loss cleanup equipment was only $75,000. At the time, there were only about six companies in the United States that had the ability to do large-loss clean-up. By 2007, there were more than 100. But there were only two ServiceMaster Clean franchises that provided the large-loss drying and the other franchise was located in Chicago.

Although he had been working part time for his father, in September 2001, at the age of 20, Ryan Mason joined his father in the ServiceMaster Clean business full time. Ryan is

the oldest of three sons in the family. He started at the bottom and worked his way up to an ownership position in the business. His first job in the family business was as a cleaning technician. In this job, Ryan did the physical labor required to clean the buildings or houses that had suffered water or fire damage. By 2004, he had gained experience in each area of the business and was well respected for his knowledge and work ethic by the other employees.

In 2004, an opportunity arose to purchase three ServiceMaster Clean franchises in eastern Connecticut. Phil and Ryan decided to purchase these franchises, and Ryan became a part owner of the franchises with his father. After this purchase, the Masons' service area covered eastern Connecticut all the way to Hartford and the southern part of Rhode Island. The Masons consolidated all of the franchise offices into two locations, one in Westerly, Rhode Island, and the other in Wyndam, Connecticut.

Since Ryan became his father's partner, annual sales revenue doubled to more than $2,500,000. In 2006, the Mason ServiceMaster Clean franchise employed 20 full-time employees and was the 50th largest ServiceMaster Clean franchise in terms of sales revenue among the approximately 1,200 franchises located in the United States. Phil's ServiceMaster Clean franchise revenue had grown every year since its inception, except in 2006 due to an unusually warm winter.

As Phil gained more and more experience in the business, he has reached the point where he understands the local market and business of ServiceMaster Clean better than the home office of the franchisor in Chicago. Also, the home office's expertise is lacking when it comes to providing meaningful support to the larger ServiceMaster Clean franchises. This reality is captured in Phil's statement: "As a franchisee, you have the support of a home office but once you get beyond a certain size and scale and experience it almost becomes a nuisance more than a help."

Personal Philosophy of Phil Mason

Based on his business experience, Phil has developed a few fundamental beliefs about what makes a business entrepreneur successful. Number one, Phil believed that to be successful, an entrepreneur has to develop "honest relationships" with a lot of people by doing a job honestly, even when it hurt. "Developing those relationships goes a long way. We've been burned before by being upfront and honest with people but overall we have made out a lot better." Even at the cost of being burned sometimes, Phil believes it is valuable to always be honest and upfront in every business transaction to develop trusting relationships with insurance companies, other franchisees, municipalities, businesses, banks, and school systems. "They have come to trust us when they call because they have to call us after a disaster. When they call us they understand that we are going in there with honest numbers and are able to handle the job. It is about trust and confidence." Through trust, Phil has been able to develop long-lasting and profitable relationships with clients.

Second, Phil believes that by providing a quality service or product he will always have customers that remain loyal to him. In conversation, Phil often communicates his business beliefs through the use of metaphors from the restaurant business (e.g., "How good are you? You are as good as your last meal" and "Do a good job, make a nice meal, and people will appreciate that and will pay you for that"). These metaphors pointed toward his belief that a company's reputation is only as good as its last job and that high-quality work will always attract profitable customers.

Third, Phil recognizes in himself a permanent optimism that he did not always see in competitors, vendors, or other small business owners. All three of Phil's sons were state champions in high school wrestling, so he believed his values of optimism, hard work, and perseverance have been passed along to his children. His youngest child, a daughter, had competed through three seasons on the state champion high school track team. Overall, he felt that his family was blessed with common sense and a "we can figure this out" attitude.

The Diesel Industry

In 1892, a German engineer named Rudolf Diesel invented the engine that now bears his name. The engine received a German patent in 1893 and a U.S. patent in 1898. In 1900, Diesel demonstrated his engine at the World's Fair in Paris. At that time the Diesel engine burned peanut oil for fuel.

In the global economy, the transportation sector uses more liquid fuel than any of the other three sectors (residential, commercial, industrial) of the economy. According to the Energy Information Administration, the transportation sector consumed about 58 percent of the world's liquid fuel demand in 2004, and is projected to demand 63 percent of the total by 2030. The growth is expected based on forecasted world economic growth, which would require more vehicles on the roads based on the increased transfer of products, people, and materials around the world. For example, in the United States, vehicle miles traveled by freight trucks are expected to increase at a rate of 2.2 percent annually through 2030. In the United States, the transportation sector burned about 140 billion gallons of diesel per year (Svoboda 2007). In China, energy use for transportation is projected to grow by an average of 4.9 percent per year over the same period and India's annual growth is forecasted at 3.3 percent. Figure 1 shows the worldwide consumption of all liquid fuels, classified by sector. The transportation sector demands the largest portion of the total.

In 2007, diesel engines were less common than gasoline-powered engines, but the popularity of diesel engines was growing. Typically, passenger cars with diesel engines were

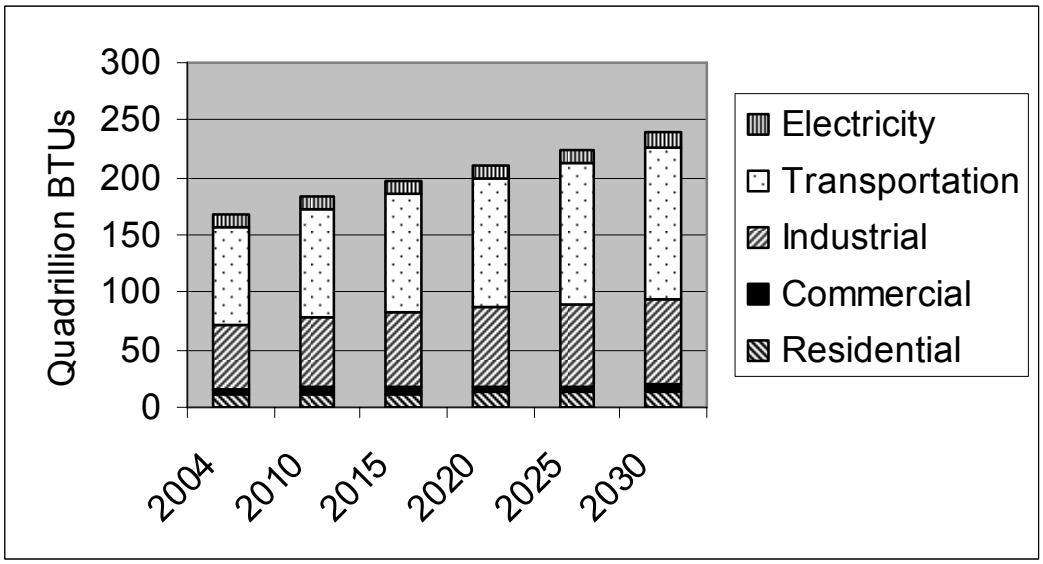

Figure 1. World Liquid Fuel Consumption by Sector

more fuel efficient than cars with gasoline engines. On average, the benefit was about 5 miles per gallon. Consequently, passenger vehicles are a growing source of diesel consumption. According to R. L. Polk & Company, the number of passenger vehicles with diesel engines increased by about 80 percent from 2000 to 2005 in the United States (see Figure 2). In 2005, about 3.5 percent of new passenger vehicles were equipped with a diesel engine. By 2015, forecasts indicate that diesel-powered cars will account for about 10 percent of all new passenger car sales. According to a study by the U.S. Department of Energy, if diesel-powered cars accounted for 30 percent of new car sales, oil consumption in the country would be reduced by about 340,000 barrels per day.

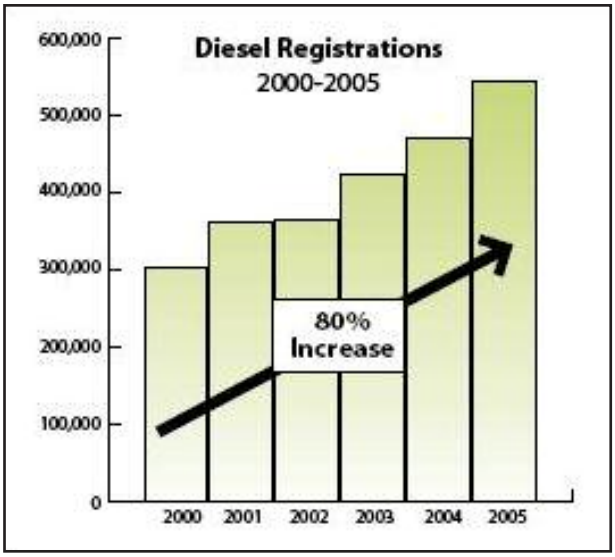

Figure 2. Growth in Diesel Passenger Cars in the United States
Source: R.L. Polk & Company, 2005

In contrast, diesel engines accounted for 50.2 percent of new car sales in Europe during 2006 (Road to Data Euro Index, www.rtdeuroindex.com). Furthermore, Europe's demand for diesel fuel exceeded the demand for gasoline, and the difference is increasing (see Figure 3).

In the United States, compared to passenger vehicles, diesel engines were more common in commercial transportation vehicles like buses, heavy trucks, tractor trailers, and even trains.

The Home Heating Oil Market

Another important market for biodiesel, especially in the Central Atlantic and New England states, is the home heating oil market. Home heating oil, also known as "Number 2 Heating Oil," is similar to diesel and is burned in home furnaces during the winter months. Tests show that up to 20 percent biodiesel can be blended with home heating oil with excellent results. According to Krishna (2001:3), "The results demonstrated that blends of biodiesel and heating oil can be used with few or no modifications to the equipment or operating practices in space heating. The results also showed that there were environmental benefits from the biodiesel addition to home heating oil in terms of reductions in smoke and in nitrogen oxides (NOx)."

In the United States, 8.1 million households used heating oil to heat their homes, and about 6.3 million of those were located in the Northeast region of the country. In 2005, 5.1 billion gallons of heating oil were sold to residential con-

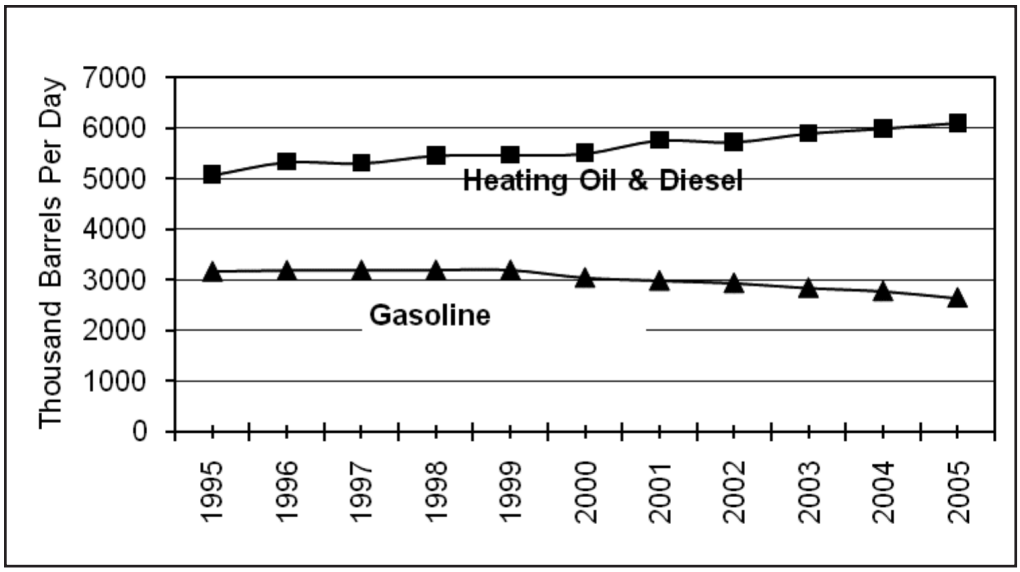

Figure 3. European Petroleum Consumption
Source: Energy Information Administration website

sumers in the Northeast; this was 83 percent of total residential fuel oil sales. In April 2007, the average price of No. 2 heating oil was $2.48 per gallon in Rhode Island and $2.50 in Connecticut (Energy Information Administration website).

The Biofuels Trend

A biofuel is any kind of fuel that was derived from biological material. The definition excludes organic material that has been transformed into a fuel (like coal or petroleum) by a geological process. The popularity of biofuels has increased because they burn cleaner than fossil fuels and create less greenhouse gas emissions. The main ingredient in biofuels is renewable crops, commonly known as "feedstock" within the industry. Specifically, corn is commonly used in the United States to produce ethanol (a substitute for gasoline) and soybean oil is commonly used to produce biodiesel (a substitute for petroleum diesel). Other common feedstocks are canola, rapeseed, and palm oil. The U.S. government set a goal for the country to consume 35 billion gallons of biofuel by the year 2017, which could decrease gasoline and diesel consumption by about 15 percent. In 2006, the United States consumed about 5.2 billion gallons of ethanol and about 250 million gallons of biodiesel (*Wall Street Journal*, 2007). The goal is to increase production and consumption of biofuels by a factor of 7 during the next 10 years. Proponents have described many benefits of using biodiesel instead of petroleum diesel. The two most important are probably the lower tailpipe emissions that biodiesel produces and the fact that it is a renewable energy that can be produced locally, thereby reducing the country's dependence on importing petroleum. According to a study by the U.S. Environmental Protection Agency (EPA), a vehicle run on pure biodiesel produced 50 percent less harmful particulates than conventional diesel, and reduced carcinogenic hydrocarbon emissions by over 75 percent (EPA 2002).

According to McKinsey & Company, three variables impact the profitability of biofuels: (1) cost and availability of feedstock, (2) government regulations, and (3) conversion technologies (Caesar, Riese, and Seitz 2007). All three variables influence the cost of producing biodiesel and the retail price per gallon that consumers pay. While the environmental benefits of biodiesel are compelling, the cost to produce it was higher than petroleum diesel, so the retail price of biodiesel remains higher. For example, Table 1 presents a comparison of the cost of the most popular feedstocks [soybean oil and waste vegetable oil (WVO)] used to produce biodiesel versus the cost of petroleum used to produce gasoline.

Table 1. Forecasted Production Costs for Biodiesel by Feedstock versus Petroleum
(in 2002 U.S. dollars per gallon)

Year	Soybean Oil	WVO	Petroleum
2004/05	2.54	1.41	0.67
2005/06	2.49	1.39	0.78
2006/07	2.47	1.38	0.77
2007/08	2.44	1.37	0.78
2008/09	2.52	1.40	0.78
2009/10	2.57	1.42	0.75
2010/11	2.67	1.47	0.76
2011/12	2.73	1.51	0.76
2012/13	2.80	1.55	0.75

The cost and availability of feedstock is crucial because in most biofuels, feedstock represents 50 to 80 percent of total production costs. Consequently, the cost of feedstock has had a huge impact on the profitability of the producers in the industry. In 2007, ethanol (a replacement for gasoline) was more common than biodiesel, so farm acres dedicated to corn have increased substantially in recent years. According to the U.S. Department of Agriculture, total corn acreage is estimated at 92.9 million acres in 2007, up 19 percent from 2006 and14 percent higher than 2005. Demand for corn has grown so much that many farmers have switched from growing soybeans to growing corn. Total soybean acreage in 2007 was 15 percent lower than in 2006. When the Masons were researching the economics of producing biodiesel in 2006, they planned to pay about $0.24 per pound for soybean oil. By the time they were ready to begin buying supplies and producing fuel, the price had increased to $0.34 per pound. At that price, the cost of feedstock represented about 80 percent of total manufacturing costs for Mason Biodiesel.

U.S. government regulation of biodiesel has occurred in two main areas: tax credits that give incentives for companies to produce biodiesel and usage mandates that require some fuel users to switch to biodiesel. A tax credit reduces a taxpayer's liability by the full amount of the tax credit. In 2004, the U.S. Congress passed a biodiesel tax credit, which gave blenders (i.e., companies that blend biodiesel with petroleum diesel) a $1.00 tax credit for each gallon of biodiesel that they blended. The bill also provided a tax credit of $.10 per gallon for manufacturers of biodiesel. The purpose of the credit is to encourage more companies to produce biodiesel. The tax credit made it easier for the companies to produce biodiesel profitably. However, with the tax credit set to expire on December 31, 2008, Congress devised the Renewable Energy and Energy Conservation Act of 2007, which extended the tax credits for two more years, to December 31, 2010. In June 2007, the act passed the Ways and Means Committee of the U.S. House of Representatives.

One example of a usage mandate occurred in San Francisco in April 2007. Mayor Gavin Newsom announced that by the end of 2007, all city-owned vehicles with diesel engines would be using B20 fuel (a blend of 20% biodiesel and 80% petroleum diesel). The mayor believed that by switching the city's fleet of almost 3,000 vehicles to B20, the city would have cleaner air and would be less dependent on petroleum. While the announcement by the mayor of San Francisco was a good sign that biodiesel was gaining credibility at the level of local governments, federal agencies are also involved in mandating biodiesel usage. Beginning June 1, 2005, all U.S. Navy and Marine nontactical diesel vehicles began to operate on a B20 biodiesel blend as part of the military's efforts to increase the use of domestic and clean fuels.

Of the three variables that influence the profitability of biofuels, the impact of conversion technologies is the most uncertain. Producing biodiesel is a relatively simple process. Neither extreme heat nor high pressure is needed in the production process, and the ingredients are simple to acquire. But despite new mandates to use biodiesel and tax incentives, the retail price of biodiesel typically has remained at least $.50 per gallon higher than petroleum diesel. However, experts predict that as conversion technologies improve, the costs will also decline.

One promising technology involves using algae as biodiesel feedstock instead of soybean oil. According to research conducted at Washington State University, an acre of soybeans could produce about 48 gallons of biodiesel, rapeseed could produce about 127 gallons, and palm oil could produce about 635 gallons (Collins, et al. 2006). Researchers at the University of New Hampshire Biodiesel Group studied the biodiesel yields of algae (University of New Hampshire website). They claim that algae farms could produce enough oil to yield more than 5,000 gallons of biodiesel per acre (personal interview with I. Farag).

Several entrepreneurs have responded to the research and started companies with the goal of producing biodiesel from algae. Some examples are GreenFuels Technology Corporation in Massachusetts and Solix Biofuels in Colorado. The upshot of these conversion technologies is that by the middle of 2007, a dominant design still had not emerged in the biodiesel industry. There are at least three methods for producing biodiesel, and there are several varieties of feedstock that are already being used, or are showing some promise in the future.

Launching Mason Biodiesel

Background Conditions

Before Ryan joined ServiceMaster Clean, Phil was content with the level of sales revenue and profitability of his franchise. He was earning more money than he needed and thus, had no motivation to expand his business. He came from a very modest upbringing and had continued to live a lifestyle similar to that of his family's during his childhood. However, when Ryan joined ServiceMaster Clean, he became motivated to grow the business. As he passed his 50th birthday, Phil noticed the "entrepreneurial itch" beginning to emerge in him again. For two reasons, he began considering launching another business.

First, he had owned the ServiceMaster Clean franchise for 15 years, and it was a hard, labor-intensive career. When clients called in the aftermath of a fire or flood, there was no time to spare. Calls for disaster recovery came in the middle of the night, on weekends, and during times when Phil thought he was "on vacation." One of the most memorable jobs was two days before Thanksgiving. A call came in for a big and lucrative job. It was an especially eventful Thanksgiving, because

Phil was hosting a family reunion at his house. Since he was an executive chef in his first career, he was planning to cook the whole meal for the family. Sue, his wife, was terrified of the prospect of having to cook the large meal all by herself. In spite of the personal sacrifice, Phil and Ryan drove all night with a crew and their equipment to the disaster site. They arrived at the jobsite in the morning, worked all day and part of the next night, rented a hotel room that night, then drove home the next day and arrived home just in time for Thanksgiving dinner. All the way home on his cell phone, Phil coached his wife through the cooking of the turkey, gravy, and other dishes for the dinner.

Sacrifices like these were necessary to grow the business. But Phil wondered whether another type of business could be equally rewarding, yet require less physical labor, unpredictable scheduling, and being on call around the clock.

Second, Phil's middle son, Tyler, majored in physics at the University of Rhode Island and after graduation, while living in Vermont, developed a personal interest in renewable energy. He started and owned a small solar panel installation company. In January 2006, he saw a television program about renewable energy on Vermont public television. He became intrigued with the idea of actually producing biodiesel. "It really sparked my interest and created a taste for energy efficiency." Immediately, he began to conduct "Google searches" to learn as much as possible about biodiesel. Initially, he was thinking about starting a small biodiesel plant just large enough to fuel his car and sell to his neighbors in Vermont. As his interest in biodiesel grew, Tyler began to devise more ambitious plans. A few months later, he presented the idea to his father, trying to convince him to build a biodiesel production facility.

Since she and her husband would be taking on major financial risk, Sue Mason's buy-in was essential to expanding the family business into biodiesel manufacturing. After returning home from the Netherlands where they had examined the BioKing® biodiesel equipment, Sue became excited about the possibility of a new family business venture and the opportunity to bring a new industry into her local community. She loves the fact that everyone in her family is involved. Sue has even become the bookkeeper for the Mason Biodiesel, a role that is new to her. But of course, this also exposes everyone in the family to the financial risks and volatility of the new business in an emerging industry which can be quite stressful. She often feels the stress of leveraging their personal assets to support the biodiesel business in its nascent state. Thus, she believes communication among family member is of utmost importance; no one can be left out of the loop. Since she works from home, Sue sometimes feels a little disconnected from the daily activities of the company and wonders if Phil might not communicate certain challenges the business is facing to protect her. But, in the end, the fact that her whole family is involved outweighs any of these concerns and challenges.

Research Continues

Tyler's initiative became the catalyst for Phil's and Ryan's interest in opening a biodiesel production facility. After seeing Tyler's enthusiasm, they also began actively researching biodiesel production industry. In April 2006, Phil and Ryan visited Keystone BioFuels, Inc. (www.keystonebiofuels.com) in Harrisburg, Pennsylvania. The purpose of the trip was to have first-hand exposure to a family-owned business that was already producing biodiesel from soybean feedstock. Keystone opened its facility in March 2005 and was the first biodiesel manufacturer in the state of Pennsylvania. After visiting Keystone, Phil's interest in biodiesel remained high. He was getting a clear picture of what was required to open and operate a biodiesel manufacturing facility. The next step was to consider what equipment he might buy to build a facility in his existing warehouse. Google searches led him to discover the next step in the process.

In early summer 2006, Phil and Sue traveled to the Netherlands to visit BioKing (www.bioking.nl), a manufacturer of biodiesel production equipment. After studying the equipment of many manufacturers, Phil chose BioKing because he believed he and his sons could install the equipment themselves. BioKing was willing to sell them the equipment only, while the U.S. vendors required a customer to buy the equipment and then pay the high fees for installation. Phil knew that the installation would require a lot of hard work, but it would also provide a considerable cost savings. Typical U.S. manufacturers charged about $1/gallon of production capacity to install the equipment. Since the Masons planned to build a 3 million gallon facility, the cost would have been approximately $3 million to purchase the equipment and have it installed. BioKing® was willing to sell the equipment only, without installation, for about one-third the price of U.S. equipment manufacturers.

Figure 4. Production Equipment at Mason Biodiesel

The Masons had three choices of production processes: batch, continuous flow, and a modified batch system. A batch production process, as its name suggests, produces batches of products. The production processes is broken down into distinct operational steps. Each step must be completed on a batch of product before it moves on to the next step in the production process. This type of production process allows great flexibility. As opposed to the batch process, a continuous flow production process runs without any interruption but is not very flexible. The modified batch process is composed of both batch and continuous flow processes.

Although the continuous flow system is the most efficient because it can run 24/7 and requires less labor, its purchase price was prohibitive. Since the modified batch system was affordable and more efficient than the batch system, it was chosen.

The Decision to Launch Mason Biodiesel

Phil began to realize he owned two resources that could serve as the basis for the biodiesel venture. First, the ServiceMaster Clean franchise office and warehouse space he owned in Rhode Island was larger than he needed to run the franchise. The extra space could be dedicated to setting up a biodiesel production facility. From his research, he knew that making biodiesel was not too complicated and the process required only a few steps. In fact, many people made biodiesel as a hobby and several websites provide instructions and discussion forums on the topic (www.biodieselathome.net/; biodieselcommunity.org).

The warehouse contained almost 10,000 square feet of available space. Furthermore, the town of Westerly had rail service that would allow direct delivery of soybean oil from the Midwest. In fact, one line ran just behind the Mason's warehouse and in the future, it could be used to accept delivery of soybean oil directly from a rail car into the Mason Biodiesel storage tanks. Currently, the oil is delivered at a rail terminal in downtown Westerly and then trucked to the Mason's tanks.

Second, Phil Mason had well-established relationships with several banks in Westerly. While Phil knew these banks would not finance the start-up of Mason Biodiesel on its own, he was willing to collateralize the loan with the assets of his ServiceMaster Clean franchise. For these two reasons, it made sense to open a plant in Rhode Island rather than Vermont. With his brother's assistance, Phil wrote a business plan and presented it to a local bank. It was accepted by the bank in June 2006, and he was approved to borrow approximately $700,000 to partially fund Mason Biodiesel. Phil formed Mason Biodiesel as a Limited Liability Corporation (LLC) in July 2006.

In the end, including the installation costs, the Masons estimated the cost to build the plant at about $.50/gallon ($1.5 million total cost). Although the cost was substantially lower than the quotes from several U.S. providers, the Masons had to do all the installation themselves. Since they were one of BioKing's first customers, they had to resolve many technical problems without much help from BioKing. For example, the electric motors were 50 hertz and 360 volts (European standard) versus 60 hertz and 480 volts in the United States. Thus, the Masons needed to purchase transformers so that the European equipment could run on U.S. voltage.

Setting up the plant and getting their biodiesel certified took much longer than they had anticipated. The Masons incurred a lot of unexpected costs and experienced "a nasty learning curve" (interview with R. Mason, May 16, 2007). With some input from BioKing, the Masons changed the floor plan (footprint) of the facility three times to find the most efficient layout. The "do-it-yourself" engineering reduced the start-up costs for Mason Biodiesel, but also slowed down the production schedule. The Masons were reliant on subcontractors for semiskilled labor like plumbing, electrical, and welding. Hiring subcontractors was something they were unaccustomed to doing in their ServiceMaster Clean business. The lack of responsiveness of the subcontractors also slowed down the build time.

Delays in setup and production created stress for the family. The bills piled up with no revenue coming in and thus, there have been unexpected cash flow crises. Mason Biodiesel has borrowed more money than it intended, the cost of soybean oil has increased, potential profit margins have shrunk, and the timeline to expected stable profitability has lengthened. Most disturbing was that the point at which the Masons believe they can fully replace the revenue of their ServiceMaster Clean franchise has moved from five to eight years. This would delay the sale of their ServiceMaster Clean franchise and Phil's goal to leave this demanding, labor-intensive industry.

While managing his Service Master Clean franchise and simultaneously launching Mason Biodiesel, Phil has seen his time, energy, and cash flow dwindle. Now that the factory is able to produce certified biodiesel, his efforts could change from engineering and testing the biodiesel to sales and marketing. He wondered whether he should focus on one market, or pursue any customer that seemed interested in buying biodiesel. He also wondered where in the industry value chain he should compete—wholesale, retail, or both? In any scenario, Phil remained confident that public interest in biodiesel would continue to grow, and eventually customers would recognize Mason Biodiesel as a reliable source for a renewable fuel.

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Note: The instructor's manual is available upon request from the author at meriksen@providence.edu

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About the Authors

Matthew Eriksen (meriksen@providence.edu) is an associate professor of leadership and organizational behavior at Providence College where he teaches leadership development and organizational behavior. He is an associate editor of *Culture and Organization.* Previously, he was employed as a professor at the University of Tampa, U.S. Coast Guard Academy, and University of New Haven. At the University of Tampa, Dr. Eriksen served as associate director of the TECO Center for Leadership.

Dr. Eriksen has also taught courses on organizational design, strategy, organization theory, corporate social responsibility, and finance. He has published articles in the *Journal of Organizational Change Management, Journal of Management Education, Culture and Organization, Intervention Research: International Journal on Culture, Journal of International Business and Entrepreneurship, Central Business Review, Academic Exchange Quarterly,* and *Tamara Journal for Critical Organization Inquiry*. Prior to joining academia, he worked at Ford Motor Company as a financial analyst. In 2002–2003, Dr. Eriksen served as the acting director of the Leadership Institute at Transportation Security Administration (TSA).

George H. (Jody) Tompson (jtompson@ut.edu) is an associate professor of management and entrepreneurship in the Sykes College of Business at the University of Tampa. He earned a PhD in strategic management from the University of South Carolina in 1995. Before joining UT in July 2000, he lived and worked in New Zealand for four years. At UT, he teaches courses in entrepreneurship and strategic management to both undergraduates and MBAs. His research interests are top management team decision making, turnaround strategies, and new venture strategies. He has published articles in *Strategic Management Journal, Entrepreneurship Theory & Practice, Small Business Economics,* and *Journal of Business Venturing.*