

Business Case Study

SeQuential: Sustainability and Growth in the Biofuels Business

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Abstract

SeQuential, a vertically-integrated biodiesel company based in Portland, Oregon, pursued a more sustainable supply and production strategy than many competitors by securing inputs from used cooking oil (UCO) rather than new crops. A fragmented U.S. biodiesel industry produced more than 1.25 billion gallons of the fuel in 2016 from a mix of virgin materials and UCO, but the environmental impact of crop-based biodiesel was increasingly controversial. Meanwhile, UCO collection had grown rapidly in recent years, and with strong forecasted growth, offered a potential additional revenue stream for vertically-integrated biodiesel firms.

The price of the UCO used to produce SeQuential's biodiesel and the fuel itself were driven by commodity indices, creating a highly volatile market. In addition, industry profitability was heavily reliant on government support. This support was manifested through funding for Renewable Identification Numbers (RINs) and tax credits. The recent election of a U.S. President publically opposed to climate change mitigation, and the re-election of a sympathetic U.S. Congress, worsened perennial uncertainty around the renewal of these policies.

Tyson Keever, President and CEO of SeQuential, had guided the company through a period of major growth and vertical integration by overseeing a series of regional mergers and acquisitions. As a result, the company now faced growing pains linked to employee turnover, operational integration and efficiency, and instilling a culture of sustainability in all SeQuential employees. At the same time, SeQuential was developing a new strategy for future growth, while attempting to mitigate increased regulatory and market uncertainty. In this case, students are tasked with developing a series of strategic, mission-aligned growth proposals that address these challenges.

Case

Introduction

Tyson Keever, SeQuential's CEO, had just returned to his desk after a full day. The morning had started with an operations review at SeQuential's biodiesel plant in Salem, Oregon. Heading north from there, Tyson stopped at a few restaurants that supplied SeQuential with used cooking oil, where he talked to the owners and operators to hear feedback about SeQuential's services and how the company could make the restaurants' operations smoother.

By lunchtime, Tyson was back at SeQuential's Portland headquarters for a stream of one-onone meetings with his leadership team. First, Tyson and the HR Director met over lunch and discussed how to improve employee turnover, on-boarding, and employee engagement following a series of mergers and acquisitions. Following that, Tyson met with the CFO about funding and structuring the next round of system improvements for the company's CRM and ERP, which were needed to support SeQuential's rapid growth. Finally, Tyson had a one-onone with the Sales and Marketing Director to discuss her vision for building a stronger SeQuential brand. After this set of internal meetings, Tyson just made it to his last session of the day with a team of MBA students who were evaluating the company's strategy.

This full and diverse schedule was typical for Tyson, and at the end of the day he was left considering the complexity of SeQuential's business. SeQuential was a vertically integrated company, and its operations included collecting used cooking oil (UCO), servicing restaurant grease traps, refining the UCO into biodiesel, and selling biodiesel, biodiesel blends, and by-products from its production plant. While the current plant was performing well, and UCO collection and grease trap service contracts had doubled with the recent acquisitions and were still increasing, Tyson wondered how SeQuential could continue to grow while staying true to its environmental mission. Using UCO as the main biodiesel ingredient meant that SeQuential required few virgin materials for biodiesel production, unlike most competitors who used virgin soy, corn, palm, or other crops to produce biodiesel.

SeQuential's annual strategic planning process was underway. Tyson planned to coordinate with his leadership team and board on refreshing SeQuential's five-year plan and receiving early feedback about the annual operating plan. Should the company expand the plant? What would be the smartest path to build the UCO collection and grease trap servicing business? How would the 2016 elections, with Republicans taking control of the White House and retaining control of Congress, affect the broader economy and government incentives for

sustainable fuels? What was the most effective way to differentiate SeQuential's products and services? How could the company achieve all of these objectives while reducing turnover, increasing efficiencies, and maintaining a strong and committed culture of sustainability?

SeQuential History and Leadership

Tyson thought back to his visit to the production facility in Salem, and reflected on just how far the company had come since its origin as a club of biodiesel enthusiasts making fuel in a garage.

HISTORY

SeQuential was formed in 2005 as the result of a joint venture between Q Bio and Pacific Biodiesel, two biodiesel pioneers. The venture was fueled by a desire to provide a source for regional, sustainable energy. Q Bio, based in Eugene, Oregon, imported railcars of biodiesel and sold the fuel directly to consumers from the back of a truck. Pacific Biodiesel, based in Hawaii, specialized in designing and building community-scale plants that converted UCO into biodiesel.

In 2005, SeQuential completed construction on a one-million-gallon per year production facility in Salem, Oregon. The company quickly learned that this scale of operations was not sufficient to fulfill demand, nor was it large or efficient enough to be profitable. In 2008, the company built a much larger plant on the same property. The new plant was designed to produce five million gallons of biodiesel per year, with a higher yield and more valuable by-products.

In 2008, one of SeQuential's smaller UCO suppliers, a plumbing company, exited the UCO collection business and, as an experiment, SeQuential decided to take over the company's operations. This first acquisition became a testing ground for a new vertical integration model. SeQuential's board then decided it was important to take more significant steps toward full vertical integration of UCO collection. Because the business operated in a commodity market, SeQuential leadership felt it would be prudent to at least partially secure one of the major variables in their company's production process. As a result, SeQuential acquired Standard Biodiesel's UCO restaurant accounts in the Pacific Northwest.

While the Standard Biodiesel acquisition provided a substantial portion of SeQuential's UCO needs, the company had expanded its plant's capacity past the original design through

continuous improvements to equipment and flow. In 2016, the plant produced more than seven million gallons of biodiesel, requiring even more UCO than in prior years.

The success of the initial acquisition prompted company management to pursue several additional acquisitions of UCO collection companies in Washington, Idaho, Nevada, and California. The acquisitions added restaurant grease trap cleaning services to SeQuential's product portfolio, though the majority of UCO accounts still received their grease trap cleaning services from other companies. SeQuential integrated the acquired collection companies into a network of depots that received, treated, stored, and transported feedstock to the Salem, Oregon plant.

LEADERSHIP

When the founding companies, Q Bio and Pacific Biodiesel, formed SeQuential, they each appointed a member to the board, which oversaw SeQuential's General Manager. Additional capital required for the 2008 plant expansion added a third board member in order to represent the plant's largest investor. In 2012, a request from minority shareholders to strengthen the board through the addition of two independent directors was approved and executed, creating a five-person board. The board was actively involved in running the company and often took on projects to support the leadership team.

SeQuential was headed by Tyson Keever, one of the original founders of Q Bio. In 2008, Tyson became the General Manager of SeQuential, a role which later transitioned into CEO. As CEO, Tyson led the company through a number of transitions and acquisitions, and successfully moved SeQuential from its startup phase to a period of ongoing growth. As SeQuential grew, the company brought in new talent and worked to add depth to the leadership team. Tyson had a COO and CFO as direct reports, with directors in transportation, operations, human resources, and sales and marketing (Exhibit 1). The company made several acquisitions in 2016 and its rapid growth, combined with the integration of these businesses, exposed gaps in the company's management team, core processes, and systems.

MISSION

Tyson's morning tour of the Salem, Oregon biodiesel plant had him watching SeQuentialbranded trucks roll in with UCO and others roll out with biodiesel. The company's strategy of vertical integration was key to its role as a regional player in the Pacific Northwest, but Tyson also considered the role environmentalism played at SeQuential (Exhibit 2). SeQuential's mission, "To build a better energy model by making responsible, local, bioproducts," emphasized the company's commitment to a more sustainable energy future, as represented by its business model and commitment to using few virgin materials in the production of biodiesel (Exhibit 3).

Biofuel: Industry, SeQuential, and Competitors

Tyson was proud of SeQuential's UCO-based biodiesel and the company's growing production expertise, but he wondered how that expertise compared to SeQuential's competitors' and whether the company was taking full advantage of the plant, brand, and team capabilities.

BIOFUELS INDUSTRY

Biofuels, or fuel made from biomass, had been in use as a petroleum-fuel substitute for transportation for more than 100 years. In 1900, a demonstration of Rudolf Diesel's newly-invented diesel engine at the World Fair ran on peanut oil, demonstrating the capacity of the internal combustion engine to run on non-petroleum based fuel.ⁱ

Biodiesel: Biodiesel was a hydrocarbon chain intended to be a replacement for, or mixed with, diesel fuel. Vegetable oils, such as canola, rapeseed, soybean, and sunflower, along with animal fat and cooking grease, were converted into biodiesel through a process called *transesterification*. This process resulted in the creation of biodiesel and small amounts of glycerin and other by-products (Exhibit 4). The resulting biodiesel was used as-is in vehicle engines or mixed with petroleum-based diesel to create a biodiesel blend.ⁱⁱ

Biodiesel mixes were described on a blending scale, so that B100 indicated pure biodiesel, while B20 was a mixture of 20% biodiesel and 80% petroleum-based diesel. Because biodiesel contained compounds that crystallized or "gelled" in colder temperatures, mixes with lower biodiesel levels, like B20, were often used when seasonally appropriate. B100 reduced carbon dioxide (CO_2) emissions by 75% compared to petrol diesel; higher biodiesel proportions were more environmentally sound. Many diesel engines could run on B100, but this capability depended on a vehicle's make and model. However, concerns about low temperature gelling and biodiesel's higher flashpoint led auto and engine manufacturers to recommend limiting biodiesel blend to B5 in many diesel vehicles.ⁱⁱⁱ **Renewable Diesel:** Renewable diesel was a relatively new product that, while made from the same ingredients as biodiesel, used *hydrotreatment* to create a chemically distinct fuel.^{iv} Renewable diesel could be used as-is in many diesel engines and met the diesel specification ASTM D975.^{v,vi} The hydrotreatment process did not create glycerin by-products. Renewable diesel facilities required significant capital expenditures to build and operate. Often, renewable diesel was made from virgin feedstocks, which came from crops grown on plantations that supplanted tropical rainforests. These virgin feedstocks were then shipped to the U.S. from around the world.

Ethanol: Ethanol was the chemical name for ethyl alcohol, the same alcohol used in spirits. It was made from crops such as corn, sugarcane, and sweet potatoes and was often mixed with gasoline, rather than diesel. Ethanol was about 30% less energy-dense than gasoline.^{vii} In the US, most gasoline was blended with at least 2% ethanol, as required by U.S. Environmental Protection Agency (EPA) regulations. Ethanol generated between 19% and 48% less CO₂ than traditional gasoline when analyzed using a full life-cycle approach. The average U.S. consumer sometimes confused biodiesel and ethanol, although they were separate products made from distinct feedstocks. In 2008, for example, a controversy in the U.S. over the environmental effectiveness of ethanol hurt all biofuel sales, including SeQuential's UCO-based biodiesel.^{viii,ix, x}

SEQUENTIAL AND BIODIESEL

SeQuential's biodiesel was made from UCO, which was supplied and transported to the Salem, Oregon plant by SeQuential's collection system. SeQuential's regional depots shipped UCO to Salem, where it was stored in large tanks at the facility. The plant was run 24/7 by a team of trained employees who repaired problems and performed routine maintenance. Many systems and procedures had been standardized into a set of Standard Operating Procedures (SOPs) that were widely referenced and continuously improved.

SeQuential sold biodiesel to a variety of business customers, including international petroleum companies, regional fleet customers, retailers, and regional distributors. Large fossil fuel multinationals, like British Petroleum, purchased biodiesel to mix with conventional diesel to satisfy renewable fuel obligations with national or state governments. Regional distributors ("jobbers"), such as Tyree Oil, purchased SeQuential biodiesel for blends for their retail and fleet customers.

Some regional fleet customers, such as the Organically Grown Company and the City of Portland, purchased biodiesel from SeQuential to fuel their vehicles. These customers were mission-aligned with SeQuential and valued the company's sustainable sourcing model. The city of Portland, Oregon developed a pilot virgin fuels program with SeQuential and farmers in Eastern Oregon. In this pilot, Oregon farmers grew canola seed that was crushed into canola oil and was then processed into biodiesel at SeQuential's facility. This canola-based biodiesel was used to power vehicles throughout the City of Portland's Water Bureau fleet. The participating farmers concluded that they could earn more money selling canola oil for human consumption than as a biodiesel feedstock, so the pilot was discontinued. However, the process demonstrated the collaborative power of biodiesel production within the regional economy.

Local retailers, like Leathers Fuels, purchased biodiesel from SeQuential and sold blended B20 diesel at their stations, where they had the option to brand their biodiesel pumps with the SeQuential logo. SeQuential was more directly involved in two biofuel gas stations through one of its founding companies, Q Bio. Both stations were located in Eugene, Oregon, where the SeQuential brand was licensed to Q Bio and the biodiesel was supplied by SeQuential. These stations were considered among the most sustainable refueling centers in the U.S., and each had a wide selection of biofuel and petroleum blends, electricity generated by solar power, and a market that featured organic foods (Exhibit 2).

Tyson and the SeQuential board considered expanding the company's direct-serve model, which had grown to deliver about one-half of the company's biodiesel. SeQuential made its biodiesel available at the Salem refinery and at a leased tank in a major petroleum terminal in Portland, where retailers could buy blends of biodiesel, pre-mixed with diesel. This convenience brought in up to \$0.20 per gallon more for the biodiesel blend than sales through other channels.

BIODIESEL COMPETITIVE LANDSCAPE

In 2016, the National Biodiesel Board was comprised of more than seventy member companies controlling 166 plants across the U.S.^{xi} Across a fragmented industry with a few large and many small to medium players, about 1.26 billion gallons of biodiesel were produced in the U.S. in 2015.^{xii, xiii} Imported biodiesel represented about one-third of the market that year, or about 670 million gallons, according to the Environmental Protection Agency.^{xiv} The largest producer of biodiesel in the U.S. was the Renewable Energy Group (REG), which produced 375 million gallons of biodiesel in 2015 and generated revenues of \$1.4 billion.^{xv} They operated a network of eleven biodiesel plants, which had a total operating capacity of more than 450 million gallons per year.^{xvi} This expansion occurred primarily through the acquisition of biodiesel production facilities that were often in financial distress. REG plants used UCO and virgin oils to make biodiesel, and they held long-term supply contracts from a number of feedstock providers.

Archer Daniels Midland (ADM), an international, publicly-traded food processing company with annual revenues of \$67.7 billion in 2015, was also a leading producer of agro-based biodiesel in the U.S. ADM owned an 85-million-gallon capacity plant in Velva, North Dakota; a 70-million-gallon unit in Lloydminster, Canada; a 54-million-gallon unit in Rondonopolis, Brazil; and other joint ventures in the U.S. and worldwide. ADM generated about \$6.8 billion in revenues from biodiesel and ethanol production in 2015. xvii,xviii

Cargill Foods, another leading food processing firm, was one of the largest private companies in the world, with \$120 billion in revenues in 2015. The company had two U.S. plants, which produced biodiesel from soybean oil in Iowa and Missouri. Each plant had a capacity of 56 million gallons. Biodiesel production was only a small component of Cargill's overall production business.^{xix}

The largest worldwide producer of renewable diesel was the Finnish company Neste, which produced more than 420 million gallons of renewable diesel in 2014.^{xx}

Used Cooking Oil Collection: Industry, SeQuential, and Competitors

As Tyson continued to ponder his day of meetings, he reflected on his visit to the restaurant chain supplying some of SeQuential's UCO. SeQuential's business model was different than most of the players in the biodiesel industry—not only did SeQuential make biodiesel, but its vertical integration supplied the company with the UCO feedstock used to make biodiesel. Tyson considered where SeQuential stacked up in the industry and whether the company's actions were sufficient to stay competitive.

USED COOKING OIL INDUSTRY

Used Cooking Oil collection was a \$1.9 billion industry. Since 2000, the industry had experienced growth nearly every year, and was expected to grow through 2020. A significant

factor in the growth of the market was an increase in UCO prices as the demand for biodiesel established more value for the commodity. ^{xxi}

UCO was almost pure fat, and was obtained by draining restaurant fryers and other cooking vessels on a regular basis.^{xxii} UCO collectors often provided restaurants or food processors with containers of varying capacities into which the facilities could manually transfer and store UCO. A more capital-intensive UCO collection process was a direct plumbed system, where UCO was automatically transferred from a fryer directly to the collection bin after use. Manual transfer systems often had collection tanks ranging from 40 to 400 gallons in size, while the direct plumbed systems often had collection tanks with a 50 to 300-gallon capacity. The manual systems supplied the majority of the UCO.

Collection involved removing the UCO from the storage tanks on site. This service was accomplished through the use of a pumper truck. Sometimes access was simple, but other times accessing the narrow alleys in urban areas was difficult. Historically, restaurants had paid service providers to haul away the UCO, but beginning around 2005, entrepreneurs who saw UCO as a valuable resource for biodiesel production started paying restaurants for the resource. This repurposing of a waste product became standard procedure. The price paid to restaurants often depended on the commodity indices for UCO.

A secondary service provided by UCO collectors involved collecting oily water stored in a grease trap, which was a system used by most restaurants to prevent oil from entering the sewer system. The grease trap cleaning was a fee-based service that UCO collectors often used as a secondary revenue stream. The grease trap fluid contained small amounts of UCO.

If the UCO collection bin overflowed or was improperly handled, the UCO could spill and create a safety hazard. As a result, UCO collectors kept track of the rate of use for each facility and balanced collection times to maximize efficiency. The payment received by the restaurant for the UCO was often insignificant when compared to the restaurant's overall business. Therefore, the main value added to a restaurant was the service of having its UCO safely and expediently removed.^{xxiii}

Hotels and restaurants generated between 50 to 100 gallons of UCO per month, with food processors also contributing to UCO production. This lead to an overall world-wide market of about three billion gallons of UCO produced each year.^{xxiv} In 2015, about 70% of the UCO went into the production of biofuels, primarily biodiesel with a small fraction to renewable diesel.^{xxv}

The Jacobsen (the "Jac") was a commodity index for UCO and animal fats (collectively referred to as yellow grease). It was used by the industry to establish the buying and selling relationships for UCO, which helped standardize feedstock transactions for the industry. Yellow grease indices were created on a regional basis. The historical Jac demonstrated the volatile nature of the commodity, with a strong correlation to prices of petroleum and virgin soy oil (Exhibit 5). The higher the price of UCO, the more valuable collection operations became to SeQuential. The spread between diesel's NYMEX index and UCO was another important determinant in the profitability of the biodiesel business (Exhibit 6). The larger the spread, the more profitable the biodiesel business became.

SEQUENTIAL AND UCO COLLECTION

As access to its main ingredient was key to the production process, SeQuential ran its own collection business through a subsidiary, SeQuential Logistics. The acquisitions of UCO collectors helped SeQuential establish a strong presence on the West Coast base in the UCO business. The logistics of servicing thousands of restaurants were complex, and Tyson had plenty of work ahead of him to ensure that SeQuential successfully grew the efficiency and scope of the collection business.

As SeQuential's team on-boarded UCO and grease trap customers from their acquisitions, they were able to more than meet the supply needs of the plant. SeQuential worked to integrate these customers into the company's existing collection system, which took several months to fully normalize. Many of the restaurant routes SeQuential inherited from its acquisitions had used hand-drawn maps and route calculations. SeQuential implemented an electronic GPS-based logistics and routing system called RoadNet, which provided route optimization. However, because each customer was unique, it was crucial that pickup routes contained driver notes, such as "the bin is located inside the premises and cannot be accessed on weekends." Drivers made many stops as they traveled along the routes and tracked this individual information. Driving the pumper trucks and servicing the accounts was a difficult job, and driver turnover was high.

Through detailed data collection, SeQuential designed and ran variable collection routes that optimized the UCO pickup so that containers were emptied when full, rather than on a particular day of the month. SeQuential's leadership team estimated that production patterns of their restaurant customers were learned over the course of several months, and pickup frequency was optimized accordingly. Pick-up frequency ranged from two or three weeks, to once every other month.

SeQuential also provided grease trap cleaning services, which typically required routes distinct from UCO collection due to the larger average volumes of the grease traps. By providing grease trap cleaning service to a portion of its accounts, SeQuential was able to receive an additional revenue source and better serve the customer, although this did not provide a significant amount of UCO for biodiesel production. SeQuential believed that there was potential to grow this part of the business. Less than 20% of SeQuential's UCO restaurant accounts also contracted the company for grease trap services, and most of the grease trap business came with the recent acquisitions. Pricing of this service varied depending on capacity and accessibility, but a monthly grease trap service price was often \$100 or more, with perhaps half of that contributing to the bottom line.

SeQuential believed that an important way to differentiate themselves was to provide superior customer service. Some customers considered price first when making a decision about who would collect their UCO, but after experiencing sub-par customer service, customers would accept a lower price per gallon for clean and timely collection. SeQuential observed this first hand as customers unsubscribed and re-subscribed to its services.

Improving efficiency while also improving service levels was a major challenge. Although SeQuential had modernized its logistics with RoadNet, the rapid growth from the acquisitions put a great deal of stress on the system and the team. The company found that driver productivity had a great deal of variance, about half of which could be explained by route density. For example, some of the best drivers serviced more than twenty-two locations per day, while others barely serviced ten or twelve. The remaining explanation was related to gaps in standardization and management of the drivers, vehicle fleet, and facilities.

Additionally, the fleet needed to be further standardized and modernized in order to meet the efficiency and service level requirements expected by SeQuential's new customers. Also as a result of the acquisitions, SeQuential had a number of depots, which spread operations out over several facilities. With a modest capital investment of several hundred thousand dollars, a central oil collection and drying facility was estimated to save up to \$0.10-0.20 per gallon.

Over one-half of SeQuential's employees were drivers. With lower petroleum prices, the demand for drivers in North American oil fields had dropped, making it a little easier to hire drivers, but turnover in 2016 had skyrocketed as a result of SeQuential's recent acquisitions.

The company believed that it needed to reduce driver turnover significantly to improve efficiency and reduce HR costs.

The original goal of vertical integration had been to secure feedstock for the plant, but as the UCO collection business grew, SeQuential saw the potential to increase margins as collection costs dropped below the Jacobsen Index. With the recent acquisitions, the company's collection costs had achieved that turning point, even in a volatile market. The company's variable costs of collecting were even lower, so the growth of new accounts was worthwhile. This intrigued Tyson. With better marketing of SeQuential's story, would 20% account growth per annum be possible for his team? At the same time, the high churn rate of customers given the frequency that restaurants went out of business added unpredictability.

UCO COMPETITIVE LANDSCAPE

The UCO collection industry was fragmented. Many of the lower volume oil collectors started out as a small business, essentially one person with a truck. These businesses made informal arrangements with a handful of local hotels and restaurants to collect their used cooking oil. Other players were large companies that had sophisticated logistics systems and collected UCO from thousands of locations. As the demand for UCO increased, these companies began to acquire and consolidate some of the smaller players.

The three largest players in the U.S. market were Darling Ingredients, Baker Commodities, and Valley Protein. Each company had been in business for a number of years and, in recent years, had used acquisitions to grow their business. They collected a diverse set of waste and by-products from food processors, restaurants, bakeries, and delis which were then refined and rendered into products that were sold to a variety of end markets in the chemical, feed, and fuel markets. UCO collection and grease trap services were a substantial portion of the portfolio and represented perhaps 20-40% of the company's revenue streams.^{xxvi}

Darling Ingredients, Inc., a Texas-based publicly traded company, led the field in UCO collection with about \$462 million in segment revenue in 2015 and \$3.4 billion in worldwide revenue. They accounted for 23.8% of the total UCO market share in 2015. Like other suppliers, Darling's UCO was used primarily for the production of biodiesel and renewable diesel (in a joint venture with a subsidiary of Valero, Inc.). Additionally, Darling used UCO for the manufacture of various chemicals and as a livestock feed additive.^{xxvii}

The second-largest player was Baker Commodities, a private, California-based company that specialized in rendering and grease removal services. They supplied the biodiesel, chemical, and livestock industries with UCO. Baker controlled about 8.8% of the market share and had an estimated \$166 million in segment revenues in 2015.^{xxviii}

The third largest UCO collector in the U.S. was Valley Proteins, a privately-held company based in Virginia that focused the majority of its operations on the East Coast. Most of its UCO went toward providing food for livestock and pets. Valley Proteins controlled about 7.8% of the market with an estimated \$148 million in segment revenue in 2015. ^{xxix}

By-Products of Biodiesel: Industry and SeQuential

Tyson believed that one of the advantages of biodiesel production was that by-products could be resold or repurposed. This helped the company minimize waste and align with an environmental goal of closed-loop operations.

By-PRODUCTS OF BIODIESEL PRODUCTION PROCESS

The main by-products of biodiesel production were glycerin, free fatty acids, and methanol.^{xxx} The methanol could be recovered and reused in the system to make more biodiesel, leaving the glycerin and free fatty acids for other uses.

Because the free fatty acids produced as a by-product of biodiesel production could be burned as a heat source, they were most often sold as boiler fuel.^{xxxi} Biodiesel-produced boiler fuel was a high-quality product, but faced significant competition, because almost anything with some carbon content could be turned into a low-cost boiler fuel. Matching customer need to biodiesel-based boiler fuel quality was an important element for successful boiler fuel sale.

The glycerin produced in biodiesel production was useful in a variety of applications, depending on the purity of the glycerin. Uses included compost material, feed stock, and propylene glycol. Facilities that produced highly-refined glycerin could pursue a wider range of uses for glycerin, including the cosmetics industry. ^{xxxii}

SEQUENTIAL AND BY-PRODUCTS

By 2016, SeQuential's production efficiency had exceed 95%, reducing the amount of byproducts produced. SeQuential's glycerin and boiler fuel were more refined than most. This generated a strong revenue stream for a handful of industrial customers. As SeQuential continued to improve its conversion efficiency, yielding more biodiesel, fewer by-products were available for sale.

Government Policy

While Tyson considered the biodiesel industry and SeQuential's role in each sector, he also thought about the impact that government policy had on SeQuential's business. Government policies had been a substantial driver of the industry, but following the establishment of a Republican White House, Senate, and House of Representatives, would they continue? How well would the company be situated should the level of support change?

FEDERAL RENEWABLE FUEL STANDARDS

The U.S. government had implemented policies to ensure a viable market for renewable fuels. This was motivated by a goal of reducing greenhouse gas emissions from petroleum, and a desire to attain greater independence from imported fossil fuels (Exhibit 7).

The minimum demand set by the federal government was in the form of the U.S. Renewable Fuel Standard (RFS2). Created in 2005, RFS2 was a national policy requiring a specified volume of fossil fuel to be replaced by one of four types of renewable fuel. The minimum demand set for "Advanced Biofuel," the broader category biodiesel fell under, was 7.25 billion gallons for 2016 and 15 billion gallons by 2020.^{xxxiii} This standard helped biodiesel producers by creating a predictable market in which to sell biodiesel, by obligating fossil fuel refineries and importers to use a required amount of renewable fuel mixed with their petroleum products. This requirement created a strong source of revenue for biodiesel producers.

When renewable fuel was produced or imported, each gallon (or batch) of that fuel was tagged with a 38-digit number, called a Renewable Identification Number or RIN (Exhibit 8). When biodiesel was sold or blended, the RIN assumed monetary value and became detached from the gallon or batch of the fuel. Fossil fuel refineries were required to fulfill their renewable fuel quotas either by turning in RINs associated with the biodiesel they purchased to blend with diesel, or by paying a penalty. Consequently, refiners either produced their own biodiesel and created and turned in their own RINs or, more commonly, they purchased RINs from renewable fuel manufacturers like SeQuential. Depending on the source and type of the fuel, the RIN had a value that varied directly with the environmental benefit of the associated renewable fuel. SeQuential obtained a high value for its RINs because of the lower carbon footprint of biodiesel. For every gallon of biodiesel produced, SeQuential earned 1.5 RINs. Under the RFS2 program, RIN values for biodiesel made from UCO and virgin vegetable oils were treated equally.

The significant value associated with the emerging RIN market tempted scam artists. Houston-based Green Diesel sold \$48.5 million from biodiesel RINs that were never produced. Rodney Hailey of Maryland sold \$9 million worth of bogus RINs before being caught.^{xxxiv}

In 2011, Genscape, a company that had provided real-time monitoring technology to energy companies, created the first RIN verification service and set up a voluntary program created with input from a National Biodiesel Board task force.^{XXXV} This fee-for-service model helped verify the authenticity and value of RINs. SeQuential was an active subscriber to Genscape's service to ensure that its customers knew that its RINs were legitimate.

FEDERAL TAX CREDITS

Tax credits were available to the biodiesel industry in two ways: a tax credit of \$1 per gallon for consuming pure B100 biodiesel, or a credit of \$1 per gallon for blending B100 biodiesel to create a 1% biodiesel or higher mixture that was subsequently sold or utilized.^{xxxvi} Credits were provided to the blender instead of the producer, which allowed foreign producers to access credits derived from U.S. taxpayer income if the product was blended in the U.S.

Unlike certain tax incentives for the petroleum industry or other renewables, these credits were not permanently written into the tax code. xxxvii,xxxviii The U.S. Congress had been inconsistent year to year in their legislation of when the tax credit would be available, and occasionally even passed legislation to apply it retroactively. For example, when the Federal tax credit ended in 2010, there was a 42% drop in biodiesel production and thousands of jobs were lost.xxxix Another gap occurred in 2015, when no tax credit was in place until the U.S. Congress passed legislation in early 2016 that applied retroactively to 2015 biodiesel sales. That measure also covered biodiesel sales through 2016, but renewal was uncertain given the incoming administration's stated opposition to climate change initiatives.

STATE RENEWABLE FUEL STANDARDS

California: Some state and local governments also established unique renewable fuel standards and incentive programs. The California Air Resources Board implemented a Low Carbon Fuel Standard (LCFS), which encouraged production and use of cleaner fuels and the reduction of greenhouse gas emissions within California. As laid out by the LCFS, each producer submitted a certified fuel pathway for carbon intensity (CI), which documented the carbon footprint of their fuel. The LCFS mandated that total CI should be reduced by 10% by 2020 and set annual targets for producers to meet.^{xl}

In-state refineries generated an environmental deficit with a higher-than-target CI, which was overcome either by producing or blending renewable fuels, or by purchasing credits. Renewable fuel producers also generated credits when they produced and sold low-CI fuels. The amount of credit depended on how much the CI overage was balanced out by the renewable fuel. For example, diesel has a CI of 94.71 and biodiesel has a CI of 11.76.^{xli} In order to reach the LCFS target of 94.60, diesel producers had to either blend equivalent volumes of biodiesel or purchase credits. One credit equaled one metric ton of CO_2 emitted, and in September 2016, one LCSF credit was worth about \$0.91 per gallon of biodiesel.^{xlii}

Oregon: In 2016, the Oregon Department of Environmental Quality (DEQ) launched the Clean Fuels Program to reduce the carbon intensity of transportation fuels by 10% percent over the following ten years.^{xliii} This initiative emulated California's model, but the market evolved slowly through 2016.

In addition, the Oregon DEQ mandated that all diesel fuel sold in the state must be blended with at least 5% biodiesel.^{xliv} In 2015, this equated to about 35 million gallons of biodiesel, or 5% of the 700 million gallons of diesel used in the state that year.^{xlv} In 2010, the City of Portland mandated a 10% percent biodiesel requirement that was temporarily suspended in favor of a 5% percent mandate, as the higher percentage was deemed infeasible due to technical and economic factors.^{xlvi}

Challenges for SeQuential

As Tyson prepared to leave the office, he thought back to the discussion he had with the MBA students about SeQuential's sustainability strategy. He knew that this was an essential and motivating part of the company's mission and model, but he wondered how it factored into

the other challenges SeQuential faced. How should sustainability best be integrated into the fabric of the company in a way that supported the mission without constraining growth?

THE NEED FOR GROWTH

Tyson knew that economies of scale in the collection and biodiesel business mattered. The company had seen improved results through organic growth and acquisitions, but rapid growth was a challenge to the culture and mission of the company. What was the best way to continue this growth? Should they pursue another plant expansion, or expand grease trap servicing and UCO collection as part of an expanded upstream integration strategy? How could they keep SeQuential's staff aligned and motivated? How could the company continue to create a stronger infrastructure and better customer service?

As SeQuential continued to grow, the continued acquisition of new businesses was a possibility, but would have an impact on company culture and operating procedures. How could the company continue to work toward becoming an integrated organization that would remain competitive in a changing market landscape?

GOVERNMENT POLICY

From the beginning, SeQuential had worked with policymakers at the local, state, and federal level. Given the inconsistency of legislation, changing political priorities, and unpredictable outcomes at all levels, SeQuential needed to carefully consider its plans and strategies. What could SeQuential do to maintain a favorable environment for UCO-based biodiesel? Could SeQuential maintain profitability without government programs? How would the market react to changes in government regulation?

MARKET IDENTITY, BRANDING, AND SUSTAINABILITY PHILOSOPHY

In 2016, SeQuential modernized and unified its brand after acquiring a series of UCO companies. While the rebranding gave SeQuential a unified message and appearance, Tyson wondered how SeQuential could continue to differentiate itself in the market. What indicators could be used to develop a superior service model? How could SeQuential connect with customers who supported its environmental mission? How central should sustainability be to its messaging?

Sustainability was an embedded value at SeQuential, given the product's superior environmental footprint. Through the use of UCO as feedstock, SeQuential contributed to a more sustainable energy future. Could the company's sustainability philosophy contribute to its bottom line, or would it hinder profitability? How would SeQuential stay competitive while also staying true to its mission? Should SeQuential pursue external verification, like B Corp Certification, to strengthen its branding and commitment to social, environmental, and economic sustainability? B Corp Certification had become increasingly popular and wellknown among consumers, but could be time-consuming for staff and expensive for larger companies.

Conclusion

As he got in his biodiesel-powered car, Tyson revisited the topics he had considered through the day as he ran SeQuential. A host of challenges to ongoing growth faced him, from managing the staffing and logistical challenges of the company's new acquisitions and mergers, to evaluating the importance of customer service and branding to their clients, to navigating the uncertainty of political change. What actions could he take to ensure that SeQuential remained competitive and true to its mission, while fulfilling its potential for growth and profitability?

EXHIBIT 1: SEQUENTIAL



EXHIBIT 2: SEQUENTIAL'S VALUE CHAIN





EXHIBIT 3: SEQUENTIAL'S MISSION STATEMENT

SeQuential: Sustainability and Growth in the Biofuels Business



EXHIBIT 4: TRANSESTERIFICATION PROCESS





Comparison of biodiesel feedstock amounts

(source: U.S. Energy Information Administration, July 2016)



EXHIBIT 6: NYMEX vs. Yellow Grease Index

(source: The Jacobsen, October 2016)



EXHIBIT 7: GOVERNMENT POLICIES RELATED TO BIOFUEL

(source: Biofuel.org.uk, October 2016)

Energy Policy Act of 1992 Directed studies on alternative fuels to be undertaken	
Sets guidelines and requirements for the Secretary of Energy	
Authorizes several avenues by which the federal government can finance alternative energy research	
Sets a timeline for the adoption of certain alternative energies as well as rules for fleet program purchases of alternative fuel vehicles	
Energy Policy Act of 2005	
Increased Power of congress to regulate the biofuel industry	
Directed the Secretary of Energy to conduct H&D to demonstrate the commercial application for bioenergy	
increased duties for secretary of Energy and secretary of Agriculture in regard to biomass reedstock development	
Including development of the reductor themselves	
Diversification into areas like concertation	
Funding for education and outreach regarding biofuels	
Tax credit for investment in alternative motor vehicle technology	
Tax credit for installation of refueling system that dispenses at least 85% ethanol by volume	
Requires FTC to monitor the ethanol industry for price-setting and anti-competitive behavior	
Provides for funding for anyone involved in the development of biofuels or related technology	
Established the Advanced Biofuel Technologies Program	
Funds demonstration projects to develop conversion technologies for cellulosic biomass	
Energy Independence and Security Act of 2007	
Sets requirements for the Corporate Average Fuel Economy (CAFE) to encourage use of more fuel efficient vehicles.	
Any vehicle using 20% blodeser is eigible for a CAFE create Secretary of Energy establishes creat program for alternative biofuels that emit at least 80% less GHG than current fuels	
Sets as de funding to study the effects of biodesel on engine performance and durability	
Sets aside funding to evaluate and develop a fuel production and distribution infrastructure	
Sets a expressed wish" that renewable resources provide at least 25% of all U.S. energy needs	
The Food, Conservation, and Energy Act of 2008 (aka The Farm Bill)	
Increases funding for advanced biofuel research	
Biomass Crop Assistance Program	
Support production of dedicated cellulosic feedstock	
Assist agricultural and forest land owners in collection and transport of eligible material for use in biomass conversion facilitie	s
Biorefinery Assistance Program	
Grants and loans for development, construction, and retrofitting of commercial-scale refineries to produce biofuels	
Requirements for funding and evaluation of these programs	
Provides a tax credit for rule blenders using certain cellulosic teedstock	
Extends the ethanol import tax to the end of 2010	
Dublic Low 110 252	
This is the act that established the Troubled Asset Belief Program	
Included the Formula memory and Extension Action 2008	
Extends and increases income and excise tax credits for biodiesel and renewable diesel fuels	
Extends the tax credit for alternative fuel and fuel mixtures	
American Recovery and Reinvestment Act of 2009	
Provides funding to the Department of Energy for:	
Research into energy efficiency and renewable energy	
Advanced Research Projects Agency - Energy	
Other energy research	
Speeds up timeline for deployment of renewable energy and electric power transmission projects	
Renewable Fuel Standard (started by the EPA 2005 and expanded by EISA 2007)	
Gives power for regulating fuel quality, blend, and safety to the EPA	
Mandated that the 0.5, use so billion gallons of renewable rulei annually by 2022 Mandated that 21 hillion gallons of advanced biofuels he used by 2022	
Mandated that 1 billion callons of biomass-based biodiesel be used by 2022	
mentation and a select gallerie of meridae states provided of Mark by EVIE	



EXHIBIT 8: RENEWABLE IDENTIFICATION NUMBERS AND BIODIESEL



Biodiesel falls under both D4 (biomass-based diesel) and D5 (advanced biofuels) categories. Revenue from RINs depend on both the number of RINs per gallon for the fuel type (1.5 for biodiesel, for example) and the market price per RIN of the category applied.

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