

1708174

by Jordan Gough

Submission date: 17-Mar-2023 03:45PM (UTC+0000)

Submission ID: 199697511

File name: 15327_Jordan_Gough_1708174_181701_812715654.pdf (897.74K)

Word count: 4585

Character count: 26709

Course: BSc (Hons) Electrical and Electronic Engineering
Module: SGEE6004 Engineering Management
Assignment: Strategic Management Issues
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University number: 1708174
Date submitted: 17/03/2023
Word count: 3253 words

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1. Executive Summary

Valero is an American company whose primary focus is on refining crude oil into transportation fuels across its 15 refineries. They pay close attention to the supply and demand of the transportation fuels market to ensure that they are getting the most revenue possible when selling. If the market value is low, they will store products until they are ready to sell. They have begun to expand into renewable fuels and energy sources as a method of evolving and staying ahead in the market, as specified in the company's vision statement. They are also focusing on a carbon neutral plan, with an aim to complete by 2035 – reducing their carbon emissions to zero. This will help the company turn greater profits because of the reduction in external factors, like emission tax, which are a negative impact on the industry and can be a threat to the sustainability of the business. Therefore, any measures of avoiding these factors would be welcoming.

Valero could be described as a lean company because they tend to spend the money that they have to, without exceeding it unless absolutely necessary. In general, the company has implemented methods of reducing waste or finding a way to utilise the waste in a processing capacity to increase product quality or as a secondary product to sell. However, greater focus is required to further reduce the wastage.



Valero is heavily involved in the communities local to the work sites and carries out a large amount of fundraising and other charitable work. This is one of their 'guiding principles', which also encompasses safety, environment and commitment to their employees.

2. Strategic Company Review

2.1 Company History and Background

Valero Energy, founded in 1980, is a Fortune 500 company which operates out of San Antonio, Texas. Valero is the world's largest independent petroleum refiner and one of the world's largest low-carbon fuel producers, primarily focusing on refining crude oil across their 15 refineries, based in Canada, the United States and the United Kingdom. Although initially starting with just one refinery, Valero has expanded through takeovers and mergers, entering Canada in 2001 and the United Kingdom in 2011. (Valero Energy, 2023)

Valero expanded into renewable fuels in 2009, purchasing seven ethanol plants – which became ten in 2010 and is now twelve – and built a renewable diesel refinery in 2012. Now, Valero are also the second largest producers of both corn ethanol and renewable diesel. Continuing to focus on the environment, Valero operate a large-scale carbon-capture project which offsets over one million tons of carbon emissions each year and they are currently on track to reduce global refinery emissions 63% by 2025 and 100% by 2035. (Valero Energy, 2023)

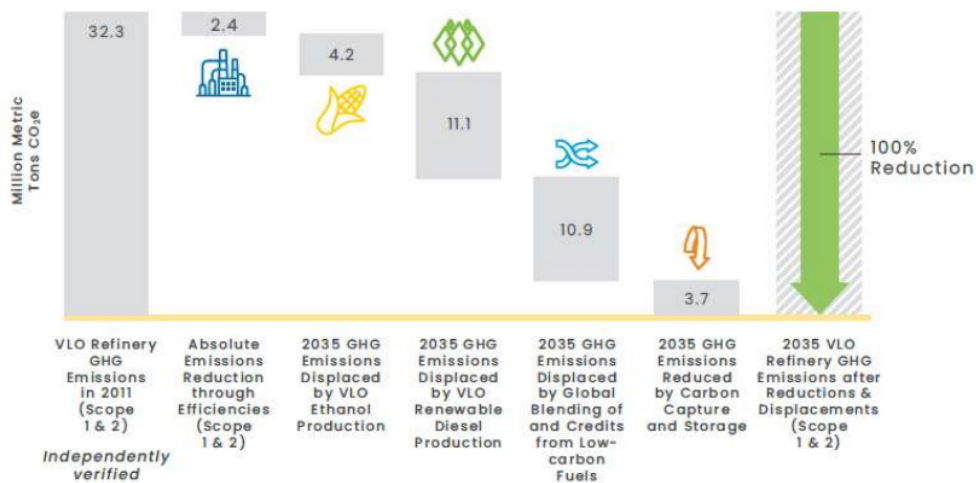


Figure 1 - Valero Emissions Reduction Plan (Valero Energy, 2022)

Many refineries are constructing, or have constructed, cogeneration units which are used to provide both power and heat to the sites – reducing the reliance on local power grids and using clean gas, which is much more environmentally friendly. The heat generation is used to produce steam, which is put back into the refining process. The units are estimated to offset 300MW of power each year. Other methods of efficient energy production include a Texas-based refinery, which takes 50MW of power from thirty-three wind turbines, and a Quebec-

based refinery, which relies almost entirely on renewable sources – including hydropower, wind, biomass and biogas. (Valero Energy, 2023)

2.2 Core Values

Valero has six 'Cultural Values' which employees are responsible for displaying through their everyday work. These values are:

1. Safety
2. Teamwork
3. Accountability
4. Excellence
5. Caring
6. 'Do the Right Thing'

Valero pursue excellence and only accept the highest standards of responsibility, whilst appreciating that safety, environmental stewardship and employee engagement is integral to their success. Alongside this, they aim to deliver disciplined management of long-term value for shareholders, on a basis of strong governance policies and ethics. These governance policies bring accountability to the forefront and to employees, directors and shareholders – requiring them to act with integrity towards each other and take ownership of their performance. However, for the organisation to find success, the employees must build strong relationships to effectively work as team through respectful partnership, interaction and diverse perspectives. The company strives to care for the employees and the environments and communities that they live and work in. Following the cultural values allows Valero and its employees to 'do the right thing' every day and set positive examples. (Valero Energy, 2021)

Valero deems safety to be the foundation for their successes. Their approach to personal safety is to ensure that the employees go home safely every day and surrounding communities are kept safe, having spent \$1.8bn to achieve this. Maintaining a safety conscience work environment ensures that the sites continue operating reliably and Valero's long-term future is maintained – ultimately leading to increased employment opportunities and relations, a strong value in the stock market and consistent production of affordable fuels. In the United States, Valero works closely with the Occupational Safety and Health Association (OSHA) and is seen as the leading company for OSHA safety designation, with nine 'Star Sites' – the most of all companies with refineries. These 'Star Site' awards are achieved through OSHA's Voluntary Protection Program after undergoing intense audits. (Valero Energy, 2023)

2.3 Vision and Mission Statement

Currently, Valero Energy is without a mission statement. Shown below in **Error! Reference source not found.** is Valero's vision statement.

"The world needs reliable, affordable and sustainable energy. We are advancing the future of energy through innovation, ingenuity and unmatched execution." (Valero Energy, 2023)

Figure 2 - Valero's Vision Statement

2.4 Strategy Innovation and Implementation

A major component of Valero's strategy is deciding when to sell and when to store fuels. This is achieved comparing the supply and demand for hydrocarbon fuels and selling when the demand has exceeded the supply. This ensures that the price is at its highest and the most profit can be made from it. Shown below is a trend of UK gasoline prices over the last year. This shows how the price of gasoline and diesel increased during early-to-mid 2022 when demand was high, but supply was low.

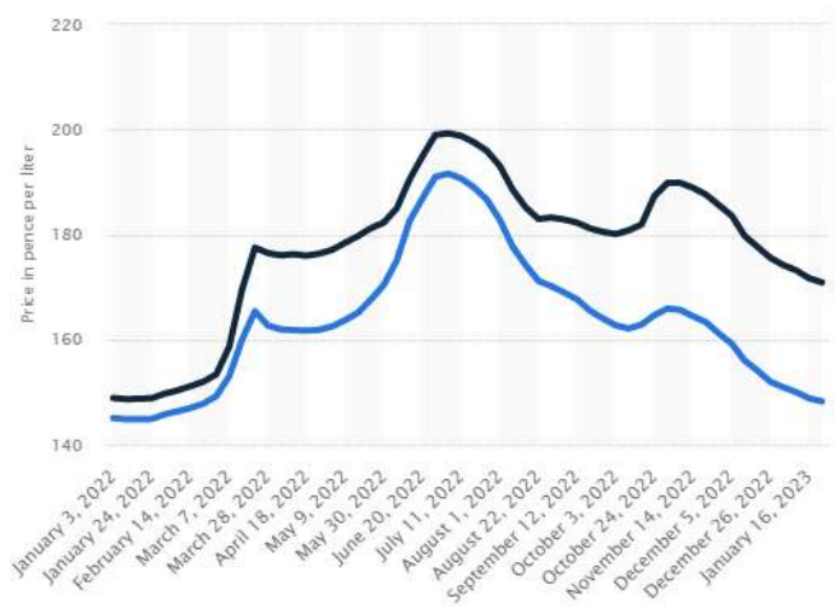


Figure 3 - Fuel Prices YTD (Statista, 2023)

Therefore, focusing on renewable liquid fuels reduces the reliance on crude oil and allows the company to maximise their profits by capitalising on supply shortages without having to pay the increased crude oil costs. Shown below are SWOT and PESTLE analyses for Valero Energy's UK refinery. Here, a large of number of factors are shown that can affect the operation of the refinery or will affect it in the future.

SWOT Analysis			
Strengths	Weaknesses	Opportunities	Threats
• Site Location • Throughput • Distribution • Complexity • Storage Capabilities • Employees	• Competition • Fuel Reserves • Crude Oil Price • Dollar to Pound Exchange Rate • Valero Capital Investment	• Mergers / Acquisitions • Expansion • Entering New Markets • International Maritime Organisation (IMO)	• Acquisition • Competition • Electric Vehicles (EV) • Fuel Duty • Covid-19 • War

Figure 4 - SWOT Analysis

PESTLE Analysis					
Political	Economic	Social	Technological	Legal	Environmental
• Taxes and Tariffs • Health and Safety Executive (HSE) • Environmental Law • 'Brexit' • Control of Major Accident Hazards (COMAH) • International Maritime Organisation (IMO)	• Inflation • Dollar to Pound Exchange Rates • Foreign Investment • Employment Rates • Globalisation • Covid-19	• Company's Corporate Social Responsibility • Demographics • Consumers • Disposable Income	• Automation, Instrumentation and Process Control • Research and Development	• Safety Standards • Employment Law	• Climate Change • Weather • Site Location • Environmental Offsets • Pollution and Carbon Emission Reduction

Figure 5 - PESTLE Analysis

3. Corporate Social Responsibilities

3.1 Guiding Principles

Valero Energy has five 'Guiding Principles' which they follow to differentiate themselves from other companies. They are:

1. Safety
2. Environment
3. Community
4. Employees
5. Governance

(Valero Energy, 2023)

However, the primary focus of Valero's 'Corporate Social Responsibilities' is on being a good neighbour. This links to the guiding principles due to the focuses on safety, philanthropy, volunteerism and stewardship of the environment. Valero states that "We manage our business to responsibly meet the world's growing demand for reliable and affordable energy while addressing global climate change risks and protecting our employees and our communities". (2023)

Valero release an annual Environmental, Social and Governance report which details what they've achieved in the last year in those fields and their upcoming aims. Some examples include:

- Environmental
 - Producing low-carbon hydrogen and renewable fuels.
 - Remaining on track to reduce 100% of refinery emissions by 2035.
 - Supporting Southwest Research Institute to develop a method of removing CO₂ from vehicle exhausts.
 - Running a hazardous waste management program to reduce the generation of solid wastes through reviews, risk assessments and waste stream prioritisation. This include 55% of hazardous waste in 2021 being recycled.
 - Using renewable sources to generate 24% of the total energy consumption across all refineries.
 - Treats contaminated water before discharging it.
- Social – Community, volunteering and philanthropy.
 - Generated \$62m in 2021 for local charities.

- Over 600,000 hours volunteered by employees in the last 5 years – activities include beach clean ups, renovations and working with students.
- Employees
 - Employs nearly 10,000 people.
 - Equal pay commitment – 99% gender ratio and 100% minority ratio.
 - Pays all employees above the living wage.
 - Comprehensive benefits provided to employees.
 - Healthcare
 - Pension
 - Bonus
 - Shares

(Valero Energy, 2022)

3.2 Microeconomic and Macroeconomic Effect Examples

Valero's responsibilities can be both positively and negatively affected by both microeconomics and macroeconomics. Macroeconomics is concerned with the economy of a country or countries and how they are impacted by factors including inflation and exchange rates. Microeconomics is concerned with the individual market and how it is impacted by factors including changes to supply and demand. (Rodrigo, 2017)

In December 2020, contract workers, who work to the terms of the National Agreement for the Engineering Construction Industry (NAECI), at Valero's UK based refinery – along with other UK refineries – went on strike over an hourly bonus payment. The action lasted many weeks and, although it didn't cause any issues for refining, it caused disruptions to the distribution of fuel and the travel of those not on strike, due to road blockages. This impacted morale and caused tension amongst teams within the workplace and Valero was also portrayed negatively to its local communities. (Unite the Union, 2023)

In the past, Valero would import crude oil for refining in the United States due to a domestic shortage. However, in recent years, abundant supplies of both crude oil and natural gas have become available within the United States, which provides a feedstock advantage and, ultimately, removes the need for additional shipping in the ocean – reducing environmental impact. Cash flow is no longer as volatile as it once was and shareholder returns have become much higher with an annual dividend increasing from \$0.32 to \$3.92 and liquidity funds increasing from \$5bn to nearly \$10bn, thus providing assurances for investors and shareholders. (Valero Energy, 2022)



In the UK, the crude oil is imported via oil tanker. In January 2020, the International Maritime Organisation (IMO) introduced a limit on the sulphur content that ship fuel could contain. This was reduced from 3.50% to 0.50%, outside of emission controlled areas, and 0.10% within emission controlled areas. The switch to higher quality, cleaner fuel oils means there will be an annual drop of 8.5m tonnes of sulphur oxide to protect the sea and the local environments surrounding the ports. To comply with these laws, refineries now have to blend fuel oil with other additives to account for the lowered sulphur content. (International Maritime Organization, 2020)

The share prices took a heavy hit in March 2020 due to the global covid-19 pandemic, reaching a low of \$34.95 on March 19th, after trading at \$83 in February 2020. With the exception of an increase in June 2020, the share price remained low for an entire year, until March 2021 – but it still fluctuated between roughly \$65 and \$82. These increases were attributed to the easing of lockdown restrictions, but were limited because the demand for fuels was still low. (Forbes, 2021)

Although some predicted that the Valero shares wouldn't recover following the pandemic, the invasion of Ukraine by Russia in February 2022 saw a massive increase in share prices – higher than the pre-pandemic prices. A cap was placed on the price of Russian oil to prevent them from funding their side of the war, meaning they could only sell oil for a price of up to \$60/barrel. Russia opted to stop exporting the oil to anybody who agreed with the oil cap, ultimately driving the oil price up. This led to an increase in the prices of everyday fuels, such as petrol, and caused the Valero share price to hit \$145 in June 2022, due to the need for Valero to replace their supply. The lowest the shares have been since then was \$97.89. (Liang & Thomas, 2022)

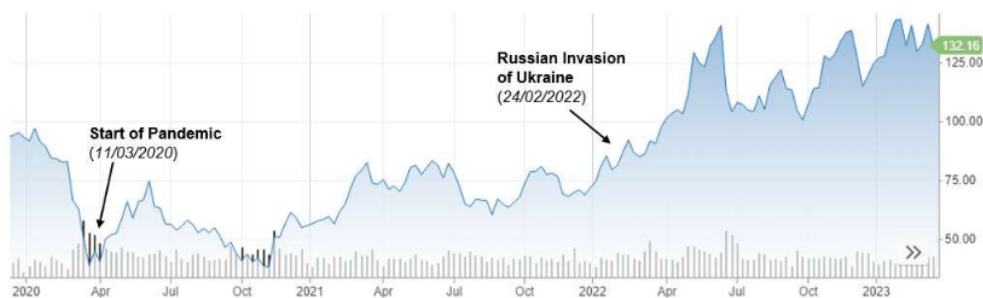


Figure 6 - Valero Share Price (since December 2019) (CNBC, 2023)

Fuel duty is applied to petrol at 49% of the final price and to diesel at 46% of the final price. With the increasing fuel prices following supply issues, it is estimated that the fuel duty will earn the UK government £26.2bn in 2023, which is still comfortably higher than alcohol and

tobacco duty at £23.6bn. However, a 5p per litre cut was applied to fuel duty for 12 months and was estimated to cost the government £2.4bn in income. This income is based purely on the price of fuel and doesn't include the tax being paid by individual refiners. (Seely, 2022)

Per Valero's 2022 Q4 earnings report, the total income tax paid was \$3.428bn – however, this is company-wide and not UK-focussed. Therefore, the sheer income the government is making from fuel duty and income taxes proves that the government cannot afford to take a hit on losing the market. (Valero Energy, 2023)

Arguably the biggest threat to the industry is the plan to ensure all road vehicles will be electric vehicles by 2050, with all light-duty vehicles being sold to be electric by 2032. This, in theory, will help towards the UK achieving its 'net-zero' goal. However, the current number of electric vehicles in the UK needs to increase from roughly 400,000 to 23.2m by 2032 and 49m by 2050. If this is to be realistically achieved, the government will have to become heavily involved by making changes to policies and markets, whilst also working towards reducing the wider emissions in the transport sector. Should it unfold as expected, there should be a huge reduction in emissions, with the transport sector specifically accounting for 22%. (Climate Change Committee, 2020)

Valero's ESG report, however, details that an electric vehicle with zero miles driven has already produced an extra six tonnes of CO₂ than a car fueled by gasoline. This is due to the emissions produced during the mining and refining of vital metals – due to the location and capacity of the supplies - for the battery production, along with the battery production itself. Fossil fuels will also likely be used for the implementation of the infrastructure to support the electric vehicles. (Valero Energy, 2022)

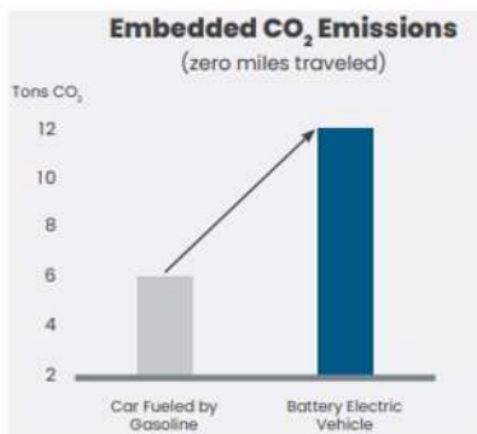


Figure 7 - CO₂ Emissions - Gasoline vs EV (Valero Energy, 2022)

4. Discussion on Lean Manufacturing

4.1 Lean Manufacturing

Lean manufacturing can be described as the systematic approach to reduce or eliminate wastes from a manufacturing process. In the case of lean manufacturing, waste is identified as something that has no value to a customer. However, it can also relate to the use of the waste of time spent working due to delays caused by defective production, or overproduction. Applying this approach to a manufacturing process yields many benefits. These include:

- Reduction in use of raw materials – leading to lower costs and lower inventory levels.
- Reduction in lead times.
- Reduction in energy costs.
- Maximisation in productivity from the work force.
- Maximisation the usage of manufacturing equipment and work space.

However, there is a possibility of putting extra pressure on employees due to the negligible margin of error. Additionally, something deemed waste at one point is not necessarily going to be waste in the future and it must be ensured that it can be re-introduced, should it ever be required, and hasn't been cut-out completely. (International Labour Organization, 2017)

4.2 Applied Lean Manufacturing Methods

In many cases, applying lean manufacturing doesn't refer to change major components of the manufacturing process, but instead refers to how the company is run, and the process is managed. Initially, organisation is key to maximising product. This is to ensure that the resources the company has available to it, the strategies put in place and the systems being used are all aligned, and everybody knows what their roles are by assigning responsibilities to improve or maintain lean manufacturing – also known as 'kaizen', which strives for continual improvement. This typically works well because the employees are technical personnel who excel at problem solving. If any technical improvements are required, they are put through the project team. This team contains experience and knowledge from a variety of fields to ensure any upgrade projects are completed to a high standard using a range of management techniques. (Wilson & Farley, 2010)

One of the major waste products in the refining process is off-spec product. To combat that, the process is controlled using a series of analysers and instruments to measure the specific process conditions and chemical compositions to ensure that the product quality is maximised. The off-spec product is not wasted and can be re-blended to bring it within specification.

However, this does mean that the wastage is found from time lost by having to re-blend and additional energy costs for equipment usage.

There are also cases of 'accepting losses', in which there are times when it is more expensive in time or money to deal with waste. A common example would be a steam leak. Generally, smaller steam leaks are allowed to continue because they don't take priority over other work and aren't a big enough loss to become an immediate concern. They don't tend to be repaired until they are much larger.

4.3 Lean Manufacturing Opportunities

Introducing a Six Sigma (6σ) approach to manufacturing would help to remove any manufacturing defects in blending process of fuels. This approach is used to identify any variations that initially lead to opportunities for error and, consequently, lead to product defect risks. The production of off-spec fuels can lead to increased re-blend and energy costs, poor customer satisfaction and possible reputation damage which could lead to increased business for competitors.

To implement this, the organisation needs to take an analytical approach and focus on defined metrics to identify the discrepancies causing the defects – rather than relying on process knowledge and experience. However, the knowledge and experience are still vital to the process as a means of recognising the defects, on a base of mathematical and statistical analysis, and applying methods of prevention to ensure the highest quality product with minimal waste. (The Council for Six Sigma Certification, 2018)

5. Recommendation for Management Team

One of the biggest threats to an oil refinery is the UK's carbon tax policy, which is based on emissions produced. If the emissions produced lead to a tax bill larger than earnings, the business isn't sustainable. Therefore, this tax policy is designed to alleviate the carbon emissions.

The natural gas in use on the refinery is imported and is rising in price. Looking for alternative fuels, such as blue or green hydrogen, would reduce the costs of importing gas and would produce less emissions – easing the stress of a tax bill. The chart below shows that hydrogen demand has almost tripled since 1980 and will only continue to increase as company's move to use it as a cleaner fuel.

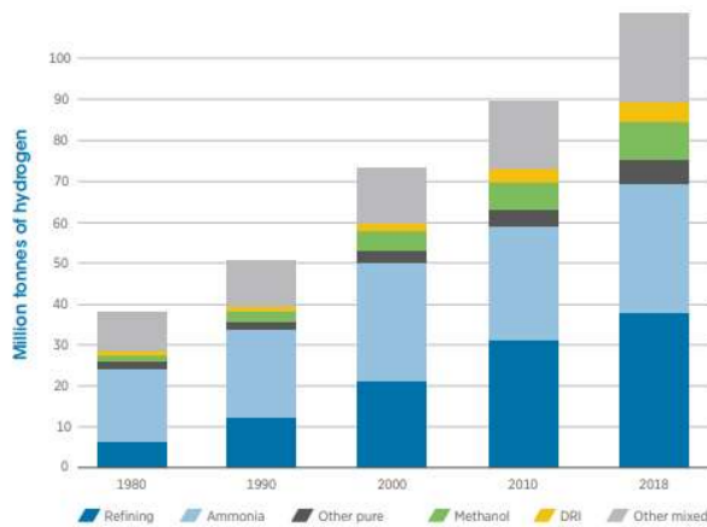


Figure 8 - Hydrogen Demand in Processing (*International Renewable Energy Agency (IRENA), 2019*)

Additionally, to avoid large tax bills, the refinery could implement a system to recover flare gas, which would prevent waste gas from being burned to atmosphere and instead put it back into the process to be used in place of natural gas. One example of a similar method is sulphur recovery, in which sulphur is removed from crude oil, processed back into its pure form and sold as a by-product.

6. Company Vision and Mission Statement

Valero's vision statement states that "the world needs reliable, affordable and sustainable energy. We are advancing the future of energy through innovation, ingenuity and unmatched execution". (2023)

Valero's vision statement is short enough that it is easily communicable to employees, or other interested parties, but not so short that that company's aims are omitted. The statement avoids colloquialism and remains professional, using clear and concise terminology to set out challenging, abstract goals which unite the varied departments and influence the company's employees, without causing tangible focus that restricts the flexibility of the daily actions that they carry out.

The statement has two main focuses: the present and the future. It avoids oversimplification about the world's current need for energy in the short-term by specifying 'reliable, affordable and sustainable', but also recognises that the world of energy and fuel production is changing and that they need to remain innovative in the long-term to remain as a top company. These goals are realistic in achieving and provide a base for the employees to build upon when developing new, intuitive ideas. Although the goals are somewhat detailed in nature, they are still generalised to a degree that market competitors cannot use it as a means of developing products or services as a direct challenge. This statement is relevant, and no updates are warranted.

As previously stated, Valero Energy does not have a mission statement – however writing one could prove beneficial towards gaining interest from potential investors.

7. Conclusions

Valero energy prides itself on its commitment to safety, its employees and the work it does to help local environments and communities. They are also already a company that makes massive profits due to their capitalisation of the market trends and the lean approach they've taken to spending, by only spending what is necessary and, generally, no more. However, through statistical analysis and process upgrades, the revenue generated by its refineries and other plants could be further increased, by looking to reduce the defects in the blending process to a minimum and make the waste products into useful components that can be used during the refining process.

In recent years, Valero has been negatively impacted by many external factors – such as a global pandemic and a war. However, the negative impacts of these were short term and actually led to an improved performance in the long term, with the company making more revenue than they had throughout the majority of their history and the share price reaching an all-time high.

To prevent stalling as the fuel market changes and government policies are put into place, Valero is already focusing on expanding into renewable fuels and energy. This is identified in the company's vision statement, which highlights their intended approach and potentially attracts new investors who may want to play a role in the cleaner fuels and energy. This approach will also keep them at the top of the market above other competitors and will maintain the relevancy. It also helps the company's desire to reduce their impact on the environment as they progress towards becoming entirely carbon neutral by 2035.

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FINAL GRADE

GENERAL COMMENTS

Instructor

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GRADING FORM: CSG-RUBIC

JORDAN GOUGH

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RESEARCH-INFORMED LITERATURE



Excellent research used to support background information and research for SWOT and PESTLE. Extensive list of referenced sources in Cited References but no separate Bibliography. Citations used to identify sources throughout but sentence structure needs to improve with use of citations as part of sentence instead majority are at end of paragraph.

7

KNOWLEDGE AND UNDERSTANDING



Excellent background knowledge of company with history in introduction and business interests used to establish current position for impact of macrolevel influences.

23

ANALYSIS



Excellent knowledge of strategic issues and potential for future opportunities highlighted in SWOT and PESTLE analysis but could have drilled down into reasoning to link to strategies in more detail. Excellent analysis of stages of oil prices and timeline to illustrate economic position. Very good identification of CSR and Lean manufacturing but a more in-depth analysis would benefit explanation of microlevel management of plant when linking strategy to vision statement.

14

PRACTICAL APPLICATION AND DEP.



Very good use of research and knowledge to identify influencing markets that drive oil prices. Clear awareness of strategy forward into renewable fuels, etc. to meet government plans for future markets with contradictory points of not enough vehicles, tonnage of CO₂ to produce EV and lack of raw materials.

22

SKILLS FOR PROFESSIONAL PRAC.



Excellent layout and details. Improve use of citations in sentence structure. Report lacks depth for Lean manufacturing processes.

7

