

MARIST COLLEGE

School of Management

Memorandum

To: Professor Helen Rothberg

From: Jeff Buckwalter, Alexander Cancilla, Tristen Cascio, Melanie Fedele, &
Ashley Wohlrab

Date: November 26, 2019

Subject: BP Team Paper

Attached please find the assignment titled *BP Team Paper* which is due on November 26, 2019 for BUS477N_200, T: 6:30-9:30. The work and writing presented in this paper unless specifically specified in an appropriately cited footnote, endnote, or reference note is solely ours.

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Executive Summary

This analysis determines how British Petroleum can succeed in the energy transition. The energy industry can benefit from developing new technologies and processes that emphasize efficiency and profitability while limiting carbon emissions. The oil and gas industry is a tight oligopoly with a low concentration in a mature stage due to the well established products and participants. The industry is attractive to incumbents due to economies of scale and steep capital environments. Only following behind ExxonMobil in key success factor analysis, BP proves itself to be a strong competitor with room for improvement. British Petroleum's core competence lies in their value of sustainability in operations, along with a diversified portfolio. Given BP's SWOT analysis, BP has opportunities in other markets and they should redirect cash flow toward these other opportunities to expand their base of operations. BP is strategically positioned in differentiation and it is recommended that they diversify through expansion in both market and product development. The value chain will be impacted across the board, starting primarily at inbound logistics and spanning the value chain.

Introduction

Engaged in a dual challenge, British Petroleum (BP p.l.c.) is an integrated oil company committed to delivering energy while advancing towards lower emissions. BP operates in seventy countries worldwide while participating in both Upstream and Downstream activities.¹ Their functionalities include exploration and discovery, deepwater and basin production, petrochemical production, transportation and storage of product, and the refining and marketing of product.

The International Oil and Gas industry faces the looming threat of global warming and the repercussions that can result from sole reliance on fossil fuels in the twenty first century. With international governments being strict on regulations to alleviate climate change and pressure to explore alternative energies, BP has to find a way to remain profitable amidst the energy transition.

Brief History

April 14th, 1909 marks the start of British Petroleum.² After the company was founded, the British government became the company's principal stockholder in 1914. By 1955, BP became a holding company, a "corporation that owns enough voting stock in one or more other companies to exercise control over them."³ With two-thirds of refining being conducted in the UK and mainland Europe, BP experienced a great spike in output. Their output is up from the 740,000 barrels/day in 1954 to 3.8 million barrels/day in 1970⁴. In 1977, the British government started selling BP shares to the public, and eventually transferring the company to public ownership, selling the remaining shares by the late 1980s. BP then acquires Britoil PLC, an independent oil company that help production in the North Sea fields.⁵ In 1998, BP merged with Amoco, the largest natural gas producer in North America, combining their

¹ "Where We Operate | Home." *BP Corporate Website*

² "BP PLC - British Corporation." *Britannica*

³ "Holding Company." *Britannica*

⁴ "Post-War - 1946-1970." *BP PLC*

⁵ "BP PLC - British Corporation." *Britannica*

worldwide operations into a single organization. This merger made BP the largest producer of both oil and natural gas in the US.⁶ After undergoing multiple name changes, British Petroleum finally branded themselves as BP PLC in 2000 with their headquarters stationed in London.⁷ In March of 2005, an explosion at the Texas City Refinery killed 15 workers as well as injuring over 170. Five years later, BP experienced the biggest blunder in the oil and gas industry. April 20th was the start of an 87 day oil spill for BP, resulting in a loss of approximately 3.19 million barrels of oil.⁸ Responding to the tragedy, BP's CEO at the time Tony Hayward stepped down. The company also sold \$38 billion of worldwide assets over the span of the four years that followed.⁹

Vision Statement: “To have the best competitive corporate, operating and financial performance. To improve, and to be accessible, inclusive and diverse.”¹⁰

Mission Statement: While BP does not have a set mission statement, their five values - safety, respect, excellence, courage, and one team - “provide a fixed point of reference for the way we operate and behave. They focus our peoples’ spirit of invention and purpose, as our business transforms itself in step with the world.”¹¹

Strategic Question

How can British Petroleum succeed in the energy transition?

⁶ “Amoco - Meeting the fuel needs of US motorists since 1912.” *BP Corporate Website*

⁷ “BP PLC - British Corporation.” *Britannica*

⁸ “Gulf Oil Spill.” *Ocean.si*

⁹ “The new millennium - 2000-2012.” *BP Corporate Website*

¹⁰ “BP Mission, Vision & Values.” *Comparably*

¹¹ “Our Code, Our Responsibility.” *BP Corporate Website*

External Analysis

General Environment

Demographic

Opportunities:

Production Increases

Although there have been efficiency breakthroughs, global oil production has increased by 2.2 million barrels per day in 2018.¹² This is complemented by the 2.9% growth increase in global primary energy consumption, which is the fastest that metric has growth since 2010. Production increases present an opportunity for the industry because it goes to show how countermeasures against crude oil are not directly impacting production.

Consumption Increases

Global consumption of crude oil increased by 1.5% as 1.4 million more barrels of oil are consumed per day.¹³ Additionally, major countries continue to consume at consistent rates and developing nations are increasing their consumption drastically. The top 10 largest oil consumers account for 60% of the world total in 2016.¹⁴ Developing nations have since increased their demand for oil and will continue to do so throughout the future. This is a result of developed nations being able to minimize their increases in crude oil demand, while developing nations require greater year-over-year increases for growth. This is opportunistic for the industry because they receive consistent demands from developed nations and increasing demands from developing nations.

Threats:

Electric Vehicles (EVs)

All forms of transportation require some variation of gasoline, but motor vehicles are on the fastest track to eradicating gasoline consumption. This is a major threat because these light-duty vehicles consume more energy than all modes of freight transportation, including heavy trucks, marine, and rail combined. “Global transportation energy consumption is dominated by two fuels: motor gasoline (including ethanol blends) and diesel (including biodiesel blends).”¹⁵ These two fuels combine for 75% of total delivered transportation energy use in 2012, the most recent year that detailed international transportation data was available. Jet

¹² “BP Statistical Review of World Energy.” *BP Corporate Website*

¹³ “BP Statistical Review of World Energy.” *BP Corporate Website*

¹⁴ “FAQ Page” *EIA*

¹⁵ “Transportation sector energy consumption.” *EIA*

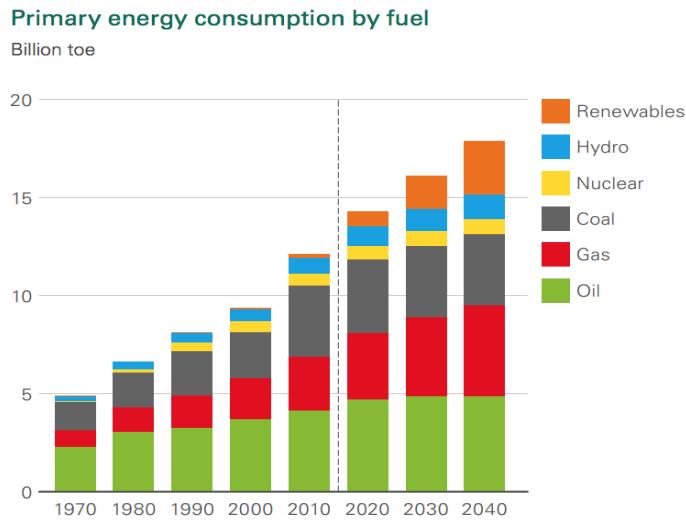
fuel accounts for 12%, so the transition towards electric vehicles will have a substantial impact. More recently in 2018, electric vehicle sales were up 40% compared to 2017.¹⁶ Finally, about 890,000 electric vehicles on the roads in the U.S.¹⁷

Economic

Opportunities:

A Shift in Demand

In an energy outlook released by British Petroleum, it has been predicted that oil demand will reach its peak between 2030 and 2040. Demand for renewables, hydro power, and natural gas is shown to increase in that time period.¹⁸ This demonstrates a clear opportunity for oil companies to explore alternate forms of energy to adhere to the shifting demand.



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A Steady Rise in Oil Demand for the next 10-20 years

While renewables are becoming increasingly more popular and an energy transition is warranted for international oil companies, the demand for oil is still expected to increase until the 2030's. This is opportunistic for oil companies that are still unsure of their strategy for the energy transition.

The Largest Form of Energy Growth is Renewables

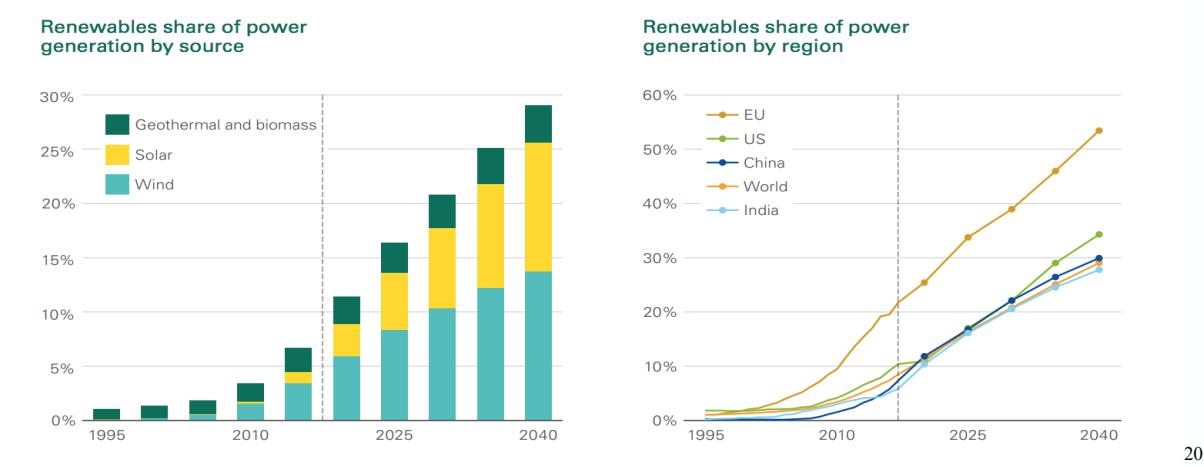
Renewables in power consumption are the fastest growing energy source as they account for around two thirds of the increase in global power generation, and are projected to become the single largest source of global power generation by 2040.

¹⁶ "Electric Vehicle Sales: Facts & Figures." EEI

¹⁷ "Electric Vehicle Sales: Facts & Figures." EEI

¹⁸ "BP Energy Outlook 2019 edition." BP Corporate Website

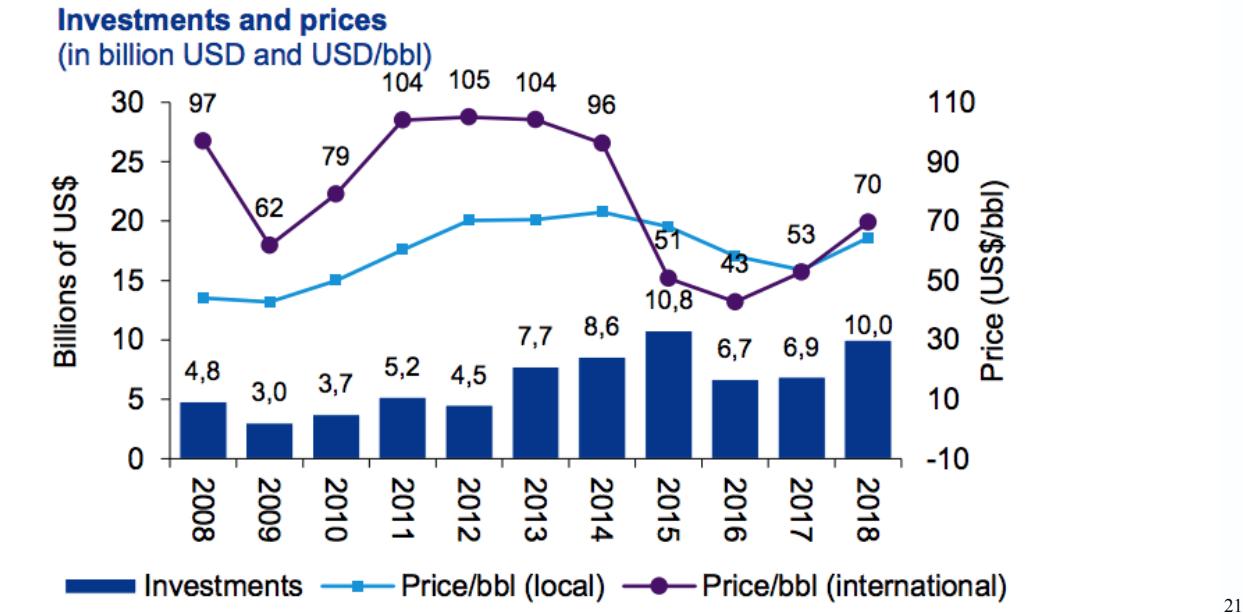
¹⁹ "BP Energy Outlook 2019 edition." BP Corporate Website



Investments in the Oil Industry

After a severe drop in investments in 2015/2016, the investment component demonstrated a significant recovery in 2017/2018. It is also displayed that the local and international prices can have a decisive effect on investments in the industry. Prices and investments fluctuate, but in 2018, investments were the second highest they've been in the past eleven years - presenting an opportunity for the oil and gas industry to continue growing.

Investments and local prices in the O&G industry 2008-2018



²⁰ "BP Energy Outlook 2019 edition." *BP Corporate Website*

²¹ "Oil & Gas Industry 2019 Trends." *KPMG*

Threats:

Clean energy

Clean energy is becoming one of the largest threats to the oil industry. With the cost of renewable energy continuing to fall, its competitive pricing is making fossil fuels look more expensive to consumers.

Solar Energy

Solar energy is the most abundant energy resource on Earth.²² The demand for solar energy today is the highest it has ever been at an increase of more than twenty-three times the installations over the past 12 years.²³ Additionally, within the past five years, the cost of solar energy has dropped dramatically. This cost decrease is mainly due to the more than sixty percent decrease in hardware costs over the past nine years. SunShot Initiative has a goal in place to make the cost of solar energy competitive with the cost of traditional forms of electricity by the year 2020.²⁴

Biofuels

Biomass is an organic source of renewable energy.²⁵ Biofuels have decreased significantly in terms of price per gallon and that number continues to drop. In the near future, the price per gallon of biofuels will be able to compete with the price per gallon of traditional fossil fuels and eventually be able to replace them.

²² “Top 6 Things You Didn’t Know About Solar Energy.” *Department of Energy*

²³ “Top 6 Things You Didn’t Know About Solar Energy.” *Department of Energy*

²⁴ “Solar.” *Department of Energy*

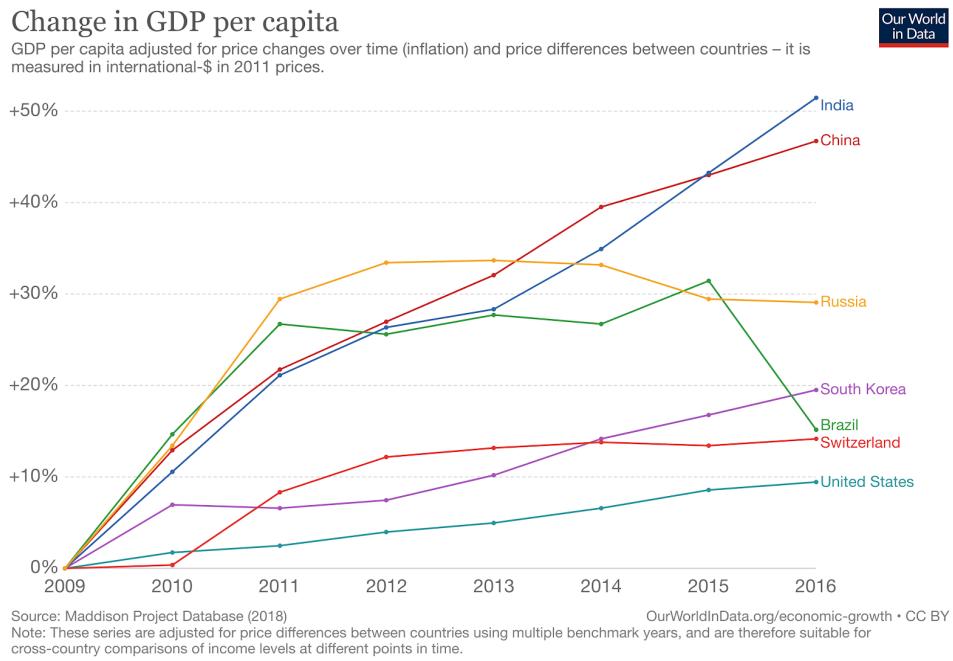
²⁵ “Bioenergy.” *Department of Energy*

Global

Opportunities:

Industrialization of Developing Countries²⁶

Brazil, Russia, India, China, and other emerging markets have been experiencing rapid GDP growth and increasing demand for oil and gas. Expansion of emerging markets and economies is the main driver for the continued industry and not the advanced economies.



International Trade

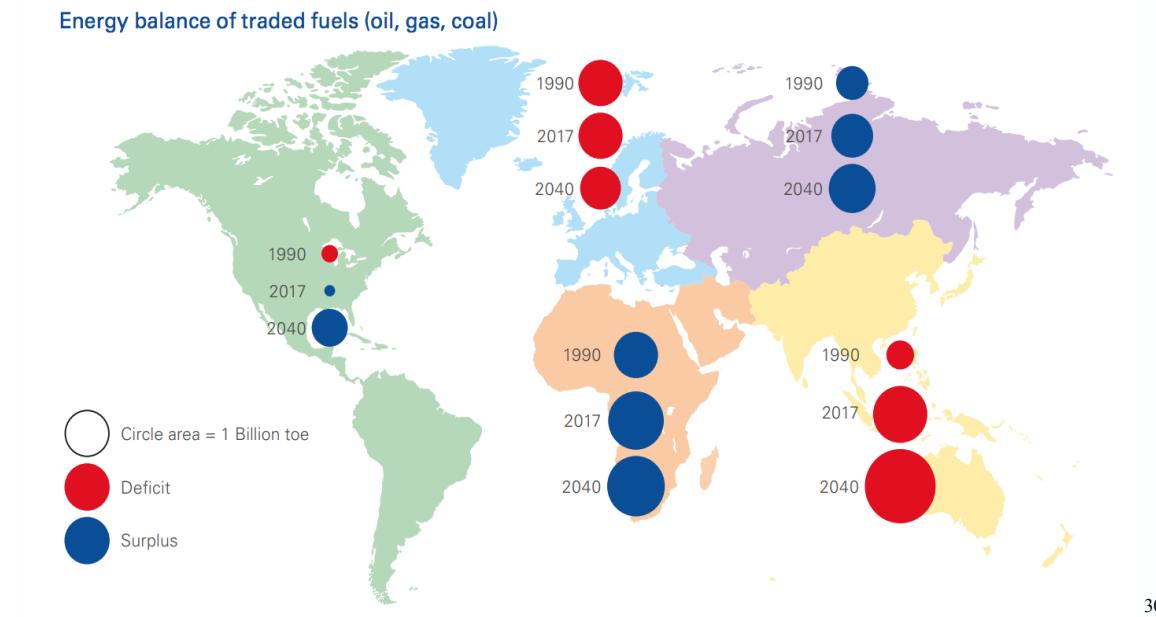
In 2019 so far, 45% of oil output was traded internationally.²⁸ Regional trends in energy consumption and production can lead to significant shifts in the energy trade pattern across the world. With the United States' tight oil and shale gas in rapid growth, there is a significant increase in net energy exports from the Americas. It is believed that by 2040 the Americas will be an integral source of energy exports to the rest of the world. With the rapid growth of energy demand in Asia, mostly led by India and China, the largest market for energy imports is secured by Asia.²⁹

²⁶ “Global Oil & Gas Exploration & Production Industry Performance.” *IBIS World*

²⁷ “Which countries achieved economic growth? And why does it matter?” *Our World in Data*

²⁸ “Global Oil & Gas Exploration & Production Competitive Landscape.” *IBIS World*

²⁹ “BP Energy Outlook 2019 edition.” *BP Corporate Website*



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Threats:

Crude Oil and Natural Gas Price Fluctuations³¹

Although production of crude oil and natural gas has risen and is expected to continue rising, this is to combat the high volatility of their respective prices. 2014-2019 has seen decreasing industry revenues of 8.1% annually, totalling \$3.3 trillion in profit margin losses. The industry has vamped up production in order to bring in more revenue at lower profit margins.

Global Efforts to Combat Climate Change

The Paris Climate Agreement sets specific goals to combat climate change, and these stated goals are to be met in a collective global effort. The attempt to reduce greenhouse gas emissions worldwide directly counters the industry's push to increase their production efforts. This puts the industry in a position where alternatives must be explored in order to adhere to the laws regarding climate change while still keeping production levels high.

³⁰ “BP Energy Outlook 2019 edition.” *BP Corporate Website*

³¹ “Global Oil & Gas Exploration & Production Industry at a Glance.” *IBIS World*

Natural

Opportunities:

Plastic Pollution³²

Since the 1950s, around 8.3 billion tons of plastic have been produced worldwide - and only 9% of this plastic has been recycled. Despite this being a growing concern in the current society, the abundance of plastic could prove beneficial for a new process that converts recycled plastics into crude oil. This, in turn, could be a huge opportunity for energy companies to adapt to the energy transition as well as finding a productive solution to an abundant world problem.

Threats:

Greenhouse Gas Emissions³³

Energy companies produce greenhouse gases as a result of hydraulic fracturing - which is the forcing open of fissures in subterranean rocks by introducing liquid at high pressure, especially to extract oil or gas. According to the Union of Concerned Scientists, when burned under optimal conditions, natural gas typically emits between 50 and 60 percent less CO₂ than coal does, and as an automobile fuel, between 15 and 20 percent less greenhouse gases than gasoline. Natural gas also generates far less in the way of harmful pollutants like mercury and nitrogen oxide than do coal, gasoline, and diesel. Natural Gases may burn cleaner than other combustible fuels, but even so, they are still damaging to the environment. Carbon Dioxide has a lower capacity for heat storage than methane, but can still linger in earth's atmosphere for hundreds of years.

Greenhouse effect is a direct result of when the atmosphere traps heat radiating from Earth toward space.³⁴ This can lead to adverse effects on the environment and irreversible damage.

Increased Natural Disasters³⁵

With increasing global surface temperatures, the possibility of more droughts and increased intensity of storms will likely occur. With the increase of natural disasters, pipelines are at risk for damage or destruction.³⁶

Oil Spills

Oil spills are impactful environmental disasters that have long lasting effects to the landscape, native species, and inhabitants who depend on the area - as they are the release of oils or other harmful chemicals into the environment.³⁷

³² Mwamba, Seneo. "10 Facts About Plastic Pollution You Absolutely Need to Know." *Global Citizen*

³³ Turrentine, Jeff. "The Natural Gas Industry Has a Methane Problem." *NRDC*

³⁴ "Greenhouse Gases Effect on Global Warming." *NASA*

³⁵ "How Can Climate Change Affect Natural Disasters?" *USGS*

³⁶ "API: Hurricanes And The Pipeline Industry's Preparation." *American Petroleum Institute*

³⁷ "What is an Oil Spill?" *Climate Interpreter*

Political/regulatory/legal

Opportunities

Energy Policy Act of 2005, Public Law 109-58. August 8, 2005³⁸

This act amended the Safe Drinking Water Act of 1974³⁹ in order to exempt the hydraulic fracturing process from federal oversight by the Environmental Protection Agency. With less regulation and the ability to participate in hydraulic fracturing without legal consequence, production in the United States is opportunistic for oil and gas companies to grow and prosper.

Threats

The Hepburn Act of 1906, Public Law 59–337. June 29, 1906.⁴⁰

This act established regulatory rights over interstate oil pipelines and gave the government rights over them.

The Paris Climate Agreement, United Nations Report. December 12, 2015.⁴¹

This was a piece of legislation put forward by the United Nations, which committed countries to legislation and goals that would combat climate change. With the provisions of the Paris Climate Agreement, energy companies have to pay close attention to their greenhouse gas emissions as a result of hydraulic fracking and production operations.

Socio-cultural

Opportunities

*Increase in Total Vehicle Miles*⁴²

Simply put, Total Vehicle Miles measures the amount of miles that US vehicles travel annually. This is expected to increase for the year of 2019. The sociocultural trend is that people will be driving more in 2019 than in previous years. Gasoline currently accounts for 50% of the products and services sold by operators in the industry.

Threats

“Going Green”

Implications of climate change have spurred an urgency to reduce emissions that are detrimental to the atmosphere. Phasing out fossil fuels for cleaner and more “green” alternatives has been the narrative following The Paris Climate Agreement.

³⁸ “Energy Policy Act of 2005.” *United States Government, 109th Congress*

³⁹ “The Safe Drinking Water Act.” *United States Government, 106th Congress*

⁴⁰ Kim, Joon. “Students Corner: Regulating Energy - Oil.” *FERC*

⁴¹ “The Paris Climate Agreement.” *United Nations, Framework Convention on Climate Change*

⁴² “Petroleum Refining: Industry Performance.” *IBIS World*

Fuel Efficiency⁴³

Crude oil and refined petroleum prices have been rising and are expected to increase more in 2019. There has been a push for fuel-efficient vehicles and consumers have been opting for options that will save them money on fuel costs, such as electric cars and flex fuel cars. Electricity for an electric car roughly estimates at \$0.11/kilowatt-hour; which means it would cost about \$2.64 for a 70 mile radius charge. Ethanol(E85) is roughly \$0.40 cheaper per gallon than regular gasoline - which is used in flex fuel cars. Alternative energy cars appeal to the consumer due to the fuel savings they will receive as a benefit. This shift away from traditional gas vehicles is a threat to the oil and gas industry - as they will lose revenue from consumers.

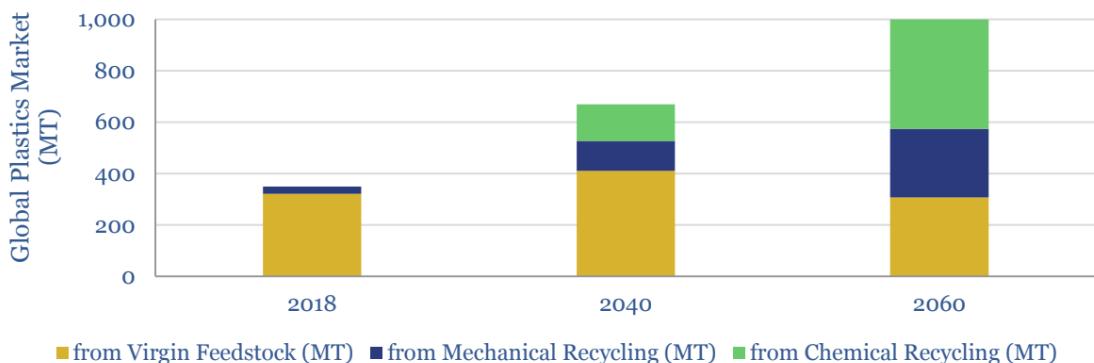
Technological

Opportunities

Pyrolysis

The newly discovered process of converting plastics back into fuel is known as pyrolysis and involves using high temperatures to breakdown organic materials. Plastics are made from organic petrochemicals, which are derived from petroleum and natural gases.⁴⁴ This process presents an opportunity for oil and gas companies who are looking to diversify their portfolio and position themselves as global proponents for sustainability - while simultaneously making progress on the global plastic pollution crisis.

Figure 12. Pyrolysis could cut oil in plastics by 5% by 2060 even as the market grows



Oil Field Machinery⁴⁶

The oil and gas industry has been showing signs of growth as of the late 2010s. The average number of rigs in 2016 was 510. In 2017, the average rose to 875 and jumped to 1,001 as of June 2018. Between March 2018 and May 2019, the international rig count has increased from

⁴³ "Petroleum Refining: Industry Outlook." *IBIS World*

⁴⁴ "Petrochemical." *Britannica*

⁴⁵ "The Energy Transition and Oil Companies' Hard Choices." *Oxford Energy*

⁴⁶ "Oil and Gas Field Machinery and Equipment Manufacturing." *Business Insights: Essentials*

972 to 1,039⁴⁷ The larger machinery and oil field industry is expected to continue growing, with an estimated Compound Annual Growth Rate (CAGR) of 3.81% from 2017 to 2024.

Maximizing Recoveries and Profits⁴⁸

Unexpected equipment outages are costing companies billions of dollars a year. Advanced Learning (AI), machine-learning applications are becoming more popular in the oil and gas industry with companies adopting the practice with the hope that it will help prevent such outages.

Threats

Need for Alternative Technology

With the proposal of the Green New Deal in the United States Congress, the potential threat to oil and gas industries in the United States is high if companies do not begin to invest in alternative energy sources and technologies.

Macro Red Thread

Developing new technologies and processes that emphasize efficiency and profitability while limiting carbon emissions is opportunistic for the oil and gas industry amidst the energy transition.

⁴⁷ "Support Activities for Oil and Gas Operations." *Business Insights: Essentials*

⁴⁸ Blackmon, David. "Technology Is A Huge Driver Of The U.S. Oil And Gas Boom." *Forbes*

Competitive Environment

Industry Structure

The international oil and gas industry is structured as a tight oligopoly but with low concentration, meaning that although there are a few major players that dominate the industry there is still a high level of competition present. This industry is ruled by a few strongest companies once known as the “Seven Sisters.” After several name changes and mergers and acquisitions, the seven companies consolidated to four of the strongest remaining peers: BP, Chevron, Royal Dutch Shell, and ExxonMobil.⁴⁹ Nowadays, the “New Seven Sisters” are as follows: Saudi Aramco, Russia’s Gazprom, CNPC of China, NIOC of Iran, Venezuela’s PDVSA, Brazil’s Petrobras and Petronas of Malaysia.⁵⁰ Together, these companies control roughly one third of the world’s oil and gas production, as well as one-third of its total oil and gas reserves. The “New Seven Sisters” differ from the four strongest remaining peers because they are not integrated. The industry revenue is \$9.19 trillion, below are the top seven peers out of the total 3,775 players by revenue and market cap standard:

Member Companies	Member Ticker	Ind Rev	Market Share
CHINA PETROCHEMI	SINZ CH Equity	535,034,167,534.16	6%
CNPC	CNPZ CH Equity	452,240,561,513.97	5%
SINOPEC CORP-H	386 HK Equity	439,624,801,724.39	5%
ROYAL DUTCH SH-A	RDSA LN Equity	388,336,000,000.00	4%
SAUDI ARABIAN OI	131861Z AB Equity	315,063,872,576.57	3%
PETROCHINA-H	857 HK Equity	305,650,218,391.11	3%
BP PLC	BP/ LN Equity	297,949,000,000.00	3% ⁵¹

The data above shows how the oil and gas industry is a tight oligopoly with low concentration since the top few players hold a significantly higher market share given that the industry has over 200 companies. The oil and gas industry is made up of several diverse sub-industries; commonly broken down into upstream or downstream. However, the industry consists of four total segments that create the energy value chain: exploration and production (upstream), midstream, oil and gas services and equipment (energy services), and refining and marketing (downstream).⁵² Below is a structure breakdown of each operating segment industry:

Upstream

The upstream division of the oil and gas industry is responsible for the exploration and production of oil and natural gas. This segment is B2B as customers include downstream

⁴⁹ Sampon, Anthony. “The Seven Sisters: The Great Oil Companies and the World They Shaped.” *Energy Today*

⁵⁰ Hoyos, Carola. “The New Seven Sisters: Oil and Gas Giants Dwarfs Western Rivals.” *Financial Times*

⁵¹ “Bloomberg ICS Function.” *Bloomberg LP*

⁵² “Bloomberg ICS Function.” *Bloomberg LP*

companies and refineries. The exploration and production companies generally sell the crude at spot market prices- as they are price-takers- to major refineries where the product travels further down the supply chain and makes it way closer to the customer, becoming more refined along the way. Thus, upstream companies perform better when oil prices are high.⁵³ The table below shows the top upstream companies in order by 2018 fiscal year revenue, the overall industry revenue is \$1.63 trillion, which each company's revenue was compared to in order to calculate their market share out of all 1,606 companies. Given the result, this is an oligopoly with duopoly power and a fragmented bottom, as Saudi Arabian Oil and Chevron have a double digit market share out of 1,606 upstream companies world wide.⁵⁴

Member Companies	Member Ticker	Ind Rev	Market Share
SAUDI ARABIAN OI	131861Z AB Equity	207,236,297,390.56	13%
CHEVRON CORP	CVX US Equity	158,902,000,000.00	10%
ROSNEFT	ROSN RM Equity	75,447,914,220.42	5%
ROYAL DUTCH SH-A	RDSA LN Equity	53,656,000,000.00	3%
LUKOIL	LKOH RM Equity	43,212,386,807.74	3%
TOTAL SA	FP FP Equity	42,162,000,000.00	3%
PETROLEOS DE VEN	PDVSA VC Equity	40,942,000,000.00	3%
CONOCOPHILLIPS	COP US Equity	36,417,000,000.00	2%

Midstream

Midstream operations are responsible for transportation, storage, and trading of crude oil, refined products and natural gas. This industry is B2B as their services are provided to oil and gas producers, as well as drilling companies.⁵⁵ The table below calculates the market share given an overall industry revenue of \$572.29 billion and a 313 company count. Thus, this is a tight oligopoly.⁵⁶

Member Companies	Member Ticker	Ind Rev	Market Share
ENERGY TRANSFER	ET US Equity	41,904,000,000.00	7%
PLAINS GP HOLD-A	PAGP US Equity	34,523,000,000.00	6%
PLAINS ALL AMER	PAA US Equity	34,523,000,000.00	6%
ENTERPRISE PRODU	EPD US Equity	29,956,100,000.00	5%
PETROBRAS-PREF	PETR4 BZ Equity	27,552,815,465.76	5%
NGL ENERGY PARTN	NGL US Equity	23,715,221,000.00	4%
TRANSNEFT PJSC	TRNFP RM Equity	15,853,361,602.56	3%

⁵³ Glickman, Stewart, Yang Chuah, Shang. "Industry Report: Oil, Gas & Consumable Fuels Industry." *CFRA*

⁵⁴ "Bloomberg ICS Function." *Bloomberg LP*

⁵⁵ Glickman, Stewart, Yang Chuah, Shang. "Industry Report: Oil, Gas & Consumable Fuels Industry." *CFRA*

⁵⁶ "Bloomberg ICS Function." *Bloomberg LP*

Downstream

Downstream companies are responsible for refining and marketing of crude oil. They are B2B as well as B2C. For B2B, customers include commercial airlines, business jet operators, aircraft and helicopter operations, JV operators, airport authorities, private pilots, GAS and FBO, air cargo/logistics, the Military, and National Oil companies.⁵⁷ B2C is directed towards homeowners and transportation users in the working class. Unlike upstream, downstream companies perform better when crude oil prices are low, since they are also in competition with independent refineries.⁵⁸ The table below uses 2018 industry revenue of \$5.65 trillion to calculate each companies market share, with an overall company count of 850. The results display a tight oligopoly with a fragmented bottom.⁵⁹

Member Companies	Member Ticker	Ind Rev	Market Share
CHINA PETROCHEMI	SINZ CH Equity	506,415,087,155.09	9%
SINOPEC CORP-H	386 HK Equity	409,383,625,777.43	7%
CNPC	CNPZ CH Equity	335,990,792,881.33	6%
ROYAL DUTCH SH-A	RDSA LN Equity	334,680,000,000.00	6%
PETROCHINA-H	857 HK Equity	287,610,893,406.18	5%
BP PLC	BP/ LN Equity	270,115,000,000.00	5%
EXXON MOBIL CORP	XOM US Equity	221,334,000,000.00	4%

Industry Life Cycle

The international oil and gas industry is currently in a mature stage of the industry's life cycle. This maturity can specifically be seen in the emergence of key players with set products and services, as well as a slowing down of the annual growth rate of the industry. The contribution that petroleum refining brings to the economy in terms of industry value added will be seeing a decline of 3.7% over the next handful of years though 2024.⁶⁰ Although a decline can be seen for this industry in the near future, a demand for refined petroleum products will always exist.

⁵⁷ "Global Product and Services." *BP Corporate Website*

⁵⁸ Glickman, Stewart, Yang Chuah, Shang. "Industry Report: Oil, Gas & Consumable Fuels Industry." *CFRA*

⁵⁹ "Bloomberg ICS Function," *Bloomberg LP*

⁶⁰ "Global Oil & Gas Exploration & Production." *IBIS World*

Porter 5 Forces for the Oil, Gas, and Energy Industry

Threat of New Entry

Barrier of entry into the oil/gas/energy industry is high and steady as a result of the high-risk nature of oil and gas exploration and development, the difficulty in locating economically viable deposits and the large amounts of capital companies that require bringing fields into production.

⁶¹ To establish itself as a viable competitor, a company must be able to operate cost-efficiently, while also maintaining a sizable refining capacity or access to a proven oil and gas reserve. The tough operating environment in this industry is reflected by the roughly one hundred seventy five oil and gas companies in the United States and Canada that have filed for bankruptcy protection in the past four years.⁶² In addition, many of the major oil and gas producers are vertically integrated companies, with interests in downstream operations, such as petroleum refining and marketing. New entrants lacking such linkages may find it difficult to penetrate the market.⁶³ Despite the difficulty, opportunities for only small companies do exist to a certain extent as there will always be a demand for oil. Being that the industry is in the maturity stage of its lifecycle, small companies will however find it difficult to penetrate the market and compete with the big names.

Bargaining Power of Buyers

The bargaining power of buyers in oil and gas industry is relatively small due to the nature of this industry. Buyers are interested in the price and the quality of a product, but the global oil benchmarks determine the oil price. These global oil benchmarks are Brent Blend, West Texas Intermediate (WTI), and Dubai/Oman. Only large companies that consume enormous amount of oil have any bargaining power in oil prices. These countries are the EU, China, USA, India, and Japan.⁶⁴

Bargaining Power of Suppliers

Within the oil drilling and gas extraction industry, the bargaining power of suppliers is high with the major companies being ConocoPhillips Company, Chevron Corp., BP PLC and Exxon Mobil Corporation⁶⁵. The bargaining power of these companies is high due to their business involvement on all of the segments of the oil and gas industry. Another set of suppliers with high bargaining powers are OPEC countries. OPEC nations own at least 70% of the world's oil reserves, so in addition to those countries having bargaining power, countries that are oil-rich and not an OPEC nation will also have high bargaining power.⁶⁶

⁶¹ "Oil Drilling & Gas Extraction." *IBIS World*

⁶² Krauss, Clifford. "U.S. Oil Companies Find Energy Independence Isn't So Profitable." *The New York Times*

⁶³ "Oil Drilling & Gas Extraction." *IBIS World*

⁶⁴ Pitatzis, Athanasios. "Porter's Five Forces Model for Oil and Gas Industry." *Energy Routes*

⁶⁵ "Oil Drilling & Gas Extraction." *IBIS World*

⁶⁶ Pitatzis, Athanasios. "Porter's Five Forces Model for Oil and Gas Industry." *Energy Routes*

Threat of Substitutes

If the energy transition resulted in the elimination of fossil fuels, any oil company that had not invested in alternative energy sources would be negatively impacted in both the upstream and downstream. There is a heavy reliance on fuel for revenues, which means that there is a need for the oil industry to explore alternative energy for use in the near future. Some of the feasible renewable energy technologies that the industry could explore generate biofuels, solar, hydro, and wind power.⁶⁷ The cost of renewable energy has dropped over the past few years, reaching the point where almost every source of renewable energy can now compete on cost with oil, coal and gas-fired power plants. Hydroelectric power is the cheapest source of renewable energy, at an average of \$0.05 per kilowatt hour(kWh), followed closely by the average cost of developing new power plants based on onshore wind, solar, biomass and geothermal energy - which is usually below \$0.10/kWh. Next in price range is offshore wind power, which costs roughly \$0.13/kWh. All of these fuel types are in competition with the cost of developing new power plants based on fossil fuels such as oil and gas - which range from \$0.05/kWh to over \$0.15/kWh.⁶⁸

Degree of Rivalry

The Energy sector is highly competitive and dominated by a few large and integrated oil and gas companies, such as Exxon Mobil, Chevron, Suncor Energy, etc.⁶⁹ Integrated oil companies have a competitive advantage over independent exploration and production and refining companies. These oil companies are involved in every aspect of the oil and gas business, having their upstream and downstream operations integrated. This offers protection for the company during price changes; a protection that independent exploration and production companies do not possess. These downstream units do compete with independent refiners, which does fuel a highly competitive rivalry.

Industry Attractiveness

The oil and gas industry is structured as a tight oligopoly with low concentration based on the high amount of competition present among a select amount of dominating companies. It is currently a mature industry because of its well-established products and participants, in addition to a mature growth rate. This industry is attractive to incumbents due to economies of scale and very steep capital requirements. BP would favor this environment, since it is an incumbent in the industry and is still achieving gross margins in excess of 10% over the past three years.

⁶⁷ “Oil Drilling & Gas Extraction.” *IBIS World*

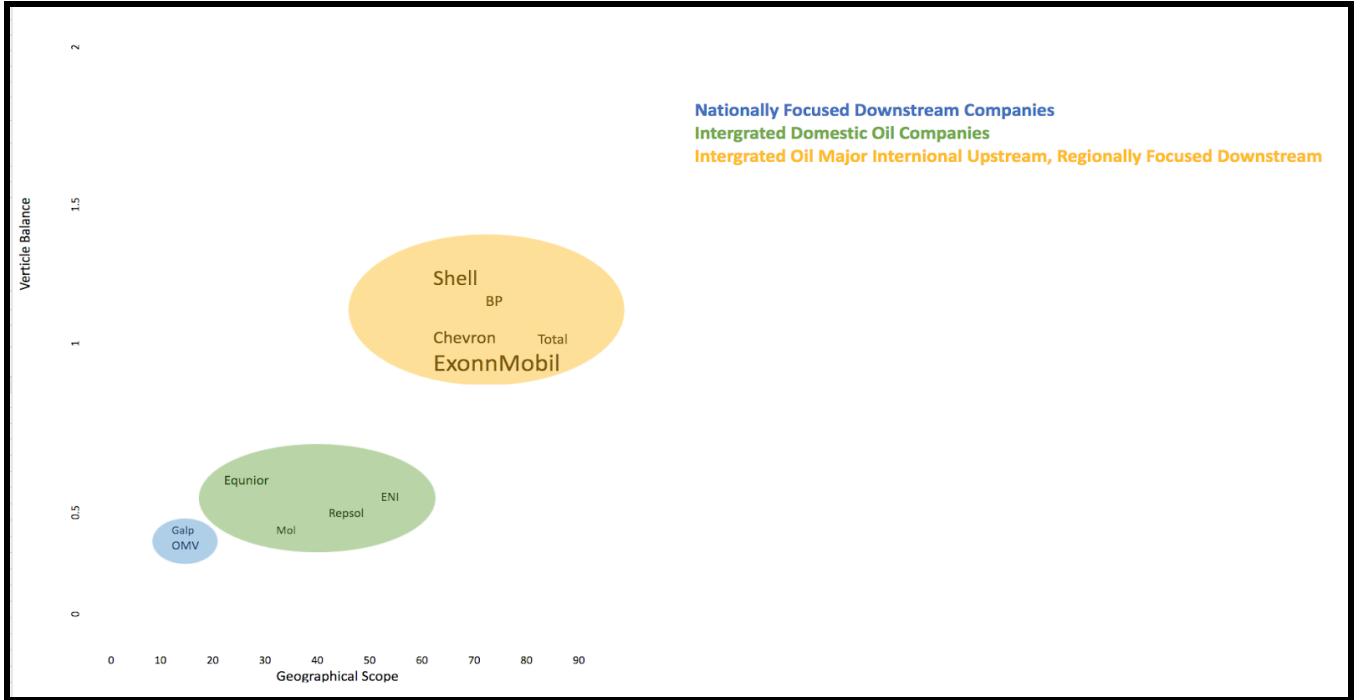
⁶⁸ Dudley, Dominic. “Renewable Energy Costs Take Another Tumble, Making Fossil Fuels Look More Expensive Than Ever.” *Forbes*

⁶⁹ “Oil Drilling & Gas Extraction.” *IBIS World*

Competitor Environment

Strategic Group Analysis

International Oil and Gas Industry



Peer Group:⁷⁰

British Petroleum's peer group members within the international oil and gas industry is as followed, in market cap relative order (*market cap represented by font size in SGA map*):

1. Exxon Mobil [294.21B]
2. Royal Dutch Shell [235.86B]
3. Chevron [223.42B]
4. BP [132.72B]
5. Total [140.35B]
6. ENI [56.87B]
7. Repsol [26.27B]
8. OMV [18.90B]
9. Galp Energia [12.79B]
10. Mol Hungarian Oil and Gas [8.09B]

⁷⁰ “Bloomberg RV Function.” *Bloomberg LP*

Dimensions:

*Horizontal Axis: Geographic Scope:*⁷¹

- Geographical scope places each company on the strategic group map given how many countries they operate in.
- This is an important metric to include in the map because it shows which companies are more developed and are less impacted by the economy of fewer countries. Oil and gas are finite resources, therefore by operating on a diverse global scale the company has an advantage for both upstream and downstream segments, in terms of extraction and customers.

*Vertical Axis: Vertical Balance:*⁷²

- Vertical balance refers to how vertically integrated each company is.
- This is an important metric to use as a dimension because upstream and downstream companies operate very differently, yet are both dependent on each other. The two behave differently in terms of oil and gas prices; downstream focused companies perform better when prices are low, whereas upstream companies perform better when prices are high. Thus, this dimension provides us with a good idea of what companies control most of the oil and gas industry.
- Downstream is responsible for refining and marketing of crude oil and gas (*represented starting at 0 on the map*). Upstream is responsible for the exploration and production of oil and natural gas.
- Downstream companies that operate in upstream activities will be closer to 2 on the map, given how much of their revenue comes from each segment.
- The peer group average of total revenue breakdown (*displayed in table below*) was calculated by taking the sum of each peer group member's revenue of downstream and upstream operations separately. Upstream total revenue was \$343.89 billion and downstream was \$1,031.22 billion.
- In order to get each company's upstream/downstream percent of industry revenue, their own upstream and downstream revenue was divided by the relative group total revenue.
- As shown in the tables below:

Revenue Breakdown for Each Peer

<i>in Billions</i>	BP	Repsol	Shell	Equinor	Galp	Mol	OMV	Total	ENI	Chevron	ExxonMobil	Total Revenue
Upstream	\$27.83	\$9.08	\$53.66	\$3.77	\$1.99	\$6.69	\$2.56	\$42.16	\$11.73	\$158.90	\$25.52	\$343.89
% Rev	9.34%	14.07%	13.82%	28.90%	9.72%	35.25%	9.47%	16.63%	13.14%	100%	9.14%	
Downstream	\$270.12	\$55.49	\$334.68	\$9.27	\$15.08	\$11.95	\$17.35	\$69.29	\$26.66		\$221.33	\$1,031.22
% Rev	90.66%	85.93%	86.18%	71.10%	73.65%	62.98%	64.15%	27.32%	29.87%		79.24%	

⁷¹ "Bloomberg DES Function," Bloomberg LP

⁷² "Bloomberg CCB Function," Bloomberg LP

Peer Average of Total Revenue

	BP	Repsol	Shell	Equinor	Galp	Mol	OMV	Total	ENI	Chevron	ExxonMobil
% Upstream	8.09%	2.64%	15.60%	1.10%	0.58%	1.95%	0.74%	12.26%	3.41%	46.21%	7.42%
% Downstream	26.19%	5.38%	32.45%	0.90%	1.46%	1.16%	1.68%	6.72%	2.59%	0.00%	21.46%

Strategic Grouping:

Given the placement of each company, the SGA map was broken down into three strategic groups, listed as the following:

- *Nationally Focused Downstream Companies*: Galp and OMV are the least integrated as they have the smallest percent of revenue contributed in the peer group total revenue. Both of which have a higher revenue income from their downstream segment and operate in roughly 10 countries.
- *Integrated Regional Oil Companies*: Equinor, Mol, Repsol, and ENI are grouped into this category. They are more integrated than the first group given their revenue contributions to the peer average breakdown. These companies operate in roughly 30-50 countries.
- *Integrated Oil Major International Upstream, Regionally Focused Downstream Companies*: This strategic group includes the big name players: Shell, BP, Total, ExxonMobil, and Chevron. Since BP falls within this strategic group, the remaining four companies are their greatest competitors. This group controls most of the oil and gas industry. They are significantly more integrated companies, however, the majority of their revenue is generated by their downstream operations. Thus, these are primarily downstream companies. In addition, these five players are also diverse geographically as they operate in 65+ countries. Given their dimensions, these companies have a major upperhand in competition over the other two strategic groups.

Key Success Factor Analysis

Integrated Major International Downstream Companies

Weight	0.2		0.3		0.2		0.3		
Competitors/Factors	Barrels of Oil Refined per Day (millions)		Environmental Disclosure Score (5Yr Avg)		Global Distribution (# of countries)		Combined Oil & Gas Reserves (MMBOE) (5Yr Avg)		
BP	1.7	3	64.296	5	78	3	18179.60	3	3.6
Shell	2.8	3.5	56.2	4	70	2.5	18714.80	3	3.3
Total	1.85	3	56.82	4	130	4	11629.20	1	2.9
Chevron	1.6	2.5	46.944	2	84	3.5	12729.60	1.5	2.25
ExxonMobil	4.72	5	52.065	3.5	200	5	23103.00	5	4.55

Key Success Factor Impact Statement

Only falling behind ExxonMobil in the Key Success Factor Analysis, BP appears to be one of the stronger players in the Integrated Major International Downstream Companies strategic group. With a total rank of 3.6/5, BP excels in Environmental Disclosure Score and could improve among other factors of Barrels of oil refined per day, global distribution, and combined oil and gas reserves.

Daily Refinery Capability⁷³

Daily refinery capability is the number of barrels of oil a company is able to refine in a single day. As demonstrated by the data above, ExxonMobil is the clear leader of this factor - with 4.72 million barrels per day. This is followed distantly by Shell with 2.8 million barrels of oil refined per day. This is a significant difference - demonstrating ExxonMobil's clear lead in this area. Proceeding Shell is Total, with the capacity to refine 1.85 million barrels of oil per day. Total is followed closely by BP with 1.7 million barrels of oil per day. Lastly is Chevron, which only has the capacity to refine 1.6 million barrels of oil per day. With these five competitors being Integrated Major International Downstream Companies, refining oil is a very critical part of their operations. Downstream operations in the oil and gas industry are largely composed of refining and reflect the company's performance in that area.

Environmental Disclosure Score⁷⁴

The environmental disclosure score is inclusive of a company's sustainability and impact on the environment. This score consists of several different calculations regarding company performance - including emission of greenhouse gases, water and air pollutants, waste, and use of natural resources. The significance of the environmental disclosure score to an integrated oil company is the ability to demonstrate to consumers that the company is environmentally conscious in their actions. In the twenty first century, where the threats of climate change are at the forefront of political discussion, sustainability has become a critical value in the consumer's choice of provider.

Of the integrated major international downstream companies, British Petroleum has the highest environmental disclosure score with 64.296. The second highest score belongs to Total with 56.82 - roughly eight points behind BP. The lowest score in the group belongs to Chevron with 46.944.

Over the course of five years, consistent improvement in environmental disclosure score is seen by BP and Total. Shell has had the same score over the course of five years. Chevron's score dropped and then steadily increased, while ExxonMobil's score dropped slightly and stayed at that level. BP and Total had the highest five years averages and continue to show consistent growth - making them the true environmental leaders of the integrated major international downstream companies.

Environmental Disclosure Score	2018FY	2017FY	2016FY	2015FY	2014FY	5Yr Avg
BP	65.29	65.29	64.46	64.46	61.98	64.296
Shell	-	56.2	56.2	56.2	56.2	56.2
Total	-	61.98	54.55	54.55	56.2	56.82
Chevron	48.76	47.11	44.63	44.63	49.59	46.944
ExxonMobil	-	51.24	51.24	52.89	52.89	52.065

⁷³ "BP 2018 Annual Report." *BP Corporate Website*

⁷⁴ "BP 2018 Annual Report." *BP Corporate Website*

Global Distribution⁷⁵

The global distribution of an oil and gas company is consistent of the number of countries that the company operates in. Global expansion is beneficial to an oil and gas company, as market expansion can increase profitability.

Total and ExxonMobil both hold a significant lead in this category. ExxonMobil leads with an operations in 200 countries, followed by Total with operations in 130 countries of operation. Next is Chevron, which operates in 84 countries worldwide. Chevron is followed by BP and Shell, which operate in 78 and 70 countries, respectively.

Reserves⁷⁶

Combined Oil & Gas Reserves are measured in millions of barrels of oil equivalent (MMBOE). These reserves could be considered the single most important asset that International Oil Companies have. This can be attributed to the fact that reserves are a direct representation of the company's future revenues. Oil and gas reserves consist of the estimated amount of crude oil located in a particular area, which have the potential to be extracted under current technological constraints.⁷⁷ As companies then use their reserves, replacements can be generated from the organic search and exploration for new reserves, or by simply purchasing existing reserves from other agents.⁷⁸ Reserves are important for the downstream operations of BP and the other International Oil Companies because the ability to refine, market, and sell finished products is dependent on how much crude oil can be readily extracted. It is important to note that over the past four years, BP has been the only company to have an increasing number of reserves compared to its competitors. This means that as fast as BP is using their reserves, they are able to recover the resources they used and even add to their previous total.

ExxonMobil leads in their Oil Reserves with 23,103 MMBOE. This is followed by Shell and BP with 18714.80 MMBOE and 18179.60 MMBOE, respectively. This is followed by Chevron with 12729.60 MMBOE. Lastly, is Total with 11629.20 MMBOE.

Combined Oil & Gas Reserves (MMBOE)	2018FY	2017FY	2016FY	2015FY	2014FY	5Yr Avg
BP	19,945	18,441	17,810	17,180	17,522	18,180
Shell	11,372	12,200	19,974	24,759	25,269	18,715
Total	12,050	11,475	11,518	11,580	11,523	11,629
Chevron	12,052	11,664	17,663	11,168	11,101	12,730
ExxonMobil	24,293	21,220	19,974	24,759	25,269	23,103

⁷⁵ 2018 Annual Reports

⁷⁶ “Bloomberg BI Function.” *Bloomberg LP*

⁷⁷ “Oil Reserves.” *Investopedia*

⁷⁸ “Exploration vs. acquisitions of oil and gas reserves: Effect on stock returns.” *Taylor & Francis Online*

Overall rank

Looking at the key success factors, Environmental Disclosure Score and combined oil & gas reserves were the most important with a weight of 0.3 each.

A company's Environmental Disclosure Score, is vastly important as demonstrates their ability to be socially responsible. Over the past five years, British Petroleum has dominated this category, earning an average score of 64.296 and a ranking of 5. Following BP is Shell and Total, who both earned a ranking of 4. Next is ExxonMobil with a 3.5, and then last is Chevron with a rating of 2.

Combined Oil & Gas Reserves is equally important as Environmental Disclosure Score, receiving a weight of 0.3 as well. Having efficient oil and gas reserves will save a company crude oil, natural gas, and most importantly, money. Over the past five years, British Petroleum earned an average score of 18,179.60, which is measured in MMBOE (million barrels of oil equivalent). In the integrated major international downstream strategic group, BP is tied with Shell for second, and behind ExxonMobil. Total and Chevron ranked low comparatively, with rankings of 1 and 1.5, respectively.

Behind Environmental Disclosure Score and Combined Oil & Gas Reserves is Barrels of Oil Refined per Day, in millions. This is indicative of the downstream strength of an integrated oil company - as refining is a key component in downstream operations. This was weighted at 0.2 and ExxonMobil dominated the other competitors in this area with a ranking of 5. The second highest was Shell, but only with a ranking of 3.5. BP and Total were tied with rankings of 3, and Chevron scored the lowest with a 2.5 ranking.

Lastly, Global Distribution rounded out the key success factors with a weight of 0.2 out of 1 as well. Global Distribution indicates the company's expansion into worldwide markets. ExxonMobil leads in this category with a rank of 5, followed by Total with a rank of 4. Chevron is ranked at 3.5 and BP is ranked at 3. Scoring last is Shell at 2.5.

After ranking each company on where they stand in the key success factors, the calculation of the overall ranking was able to take place. British Petroleum's overall ranking of 3.6, as well as the other companies overall ranking, was calculated by taking the weight of each key success factor, and multiplying it by the rank given to each company for where they stand in the key success factor. British Petroleum's overall ranking of 3.6 ranked second in the integrated major international downstream strategic group, followed somewhat closely by Shell's ranking of 3.3, and BP being a good distance behind ExxonMobil's ranking of 4.55. British Petroleum has a good advantage on Chevron and Total, with them earning an overall ranking of 2.25 and 2.9.

Competitor Dynamics (Porter)

	Shell	ExxonMobil
Goals	<ul style="list-style-type: none"> • Meet the world's growing need for more and cleaner energy solutions. • Be economically, environmentally, and socially responsible. 	<ul style="list-style-type: none"> • Continue to be the world's premier petroleum and chemical manufacturing company. • Continue to achieve superior financial and operating results while adhering to high ethical standards.
Assumptions	<p style="text-align: center;">Self</p> <ul style="list-style-type: none"> • A heritage rich with exploration, innovation, and a pioneering spirit. • Committed to sustainable development. • A global group of energy and petrochemical companies. <p style="text-align: center;">Industry</p> <ul style="list-style-type: none"> • The world and industry energy systems are transforming. • The Paris Agreement has sparked a climate change initiative for governments to adhere to. • It will move at different paces in different places over the next few decades. 	<p style="text-align: center;">Self</p> <ul style="list-style-type: none"> • The world's premier petroleum and chemical manufacturing company. • A good corporate citizen in every area of operation. • Constantly developing and applying next-generation technologies. • Industry leader in almost every aspect of the energy and chemical manufacturing business. <p style="text-align: center;">Industry</p> <ul style="list-style-type: none"> • There is a growing need for energy and high-quality chemical products. • Energy impacts nearly every aspect of modern life.
Capabilities	<p style="text-align: center;">Strengths</p> <ul style="list-style-type: none"> • Shell Techworks is their collaboration with technology entrepreneurs and start-ups outside the industry that can help solve energy challenges. • Shell Ventures invests, either as a venture capitalist or development partner, to co-develop technologies relevant to their business. • Large focus on government parameters. 	<p style="text-align: center;">Strengths</p> <ul style="list-style-type: none"> • Operations Integrity Management System (OIMS) provides a systematic, structured, and disciplined approach to manage risk and drive accountability for safety, security, health, and environmental performance across business lines, facilities, and projects. • Global manufacturing network involves leaders and technical

	<ul style="list-style-type: none"> Major player in contributions to society. <p>Weaknesses</p> <ul style="list-style-type: none"> Mainly still a gas and oil company. Focusing on customer demands is different than what is necessary to achieve sustainable goals. 	<p>experts across their businesses and covers dimensions such as safe operations, operational excellence, operator training, and environmental performance.</p> <p>Weaknesses</p> <ul style="list-style-type: none"> ExxonMobil is still not seen as environmentally conscious as they should be and their overuse of resources are much higher than they should be to be able to meet any climate change targets.
Strategy	<ul style="list-style-type: none"> Strengthen position as a leading energy company by providing oil, gas, and low-carbon energy as the world's energy system transforms. Provide a world-class investment case by growing free cash flow and increasing returns based on a resilient portfolio. Become a more customer-centric, simple and streamlined company Respond to society's desire for more and cleaner, convenient and competitive energy. Sustain a strong societal license to operate and make a positive contribution to society through their activities. 	<ul style="list-style-type: none"> Meet growing demand for energy while also reducing their environmental impacts. Produce the energy and products the world needs in a responsible manner. Investing in technology and communities to bring the world better energy. Pioneering new research and pursuing new technologies to reduce emissions while creating more efficient fuels.

	Shell	ExxonMobil
Satisfaction	<ul style="list-style-type: none"> Shell is somewhat satisfied as a financial leader of the energy industry. They have significant market share and brought in the third highest revenues for 2018. 	<ul style="list-style-type: none"> ExxonMobil is satisfied as one of the leaders in market share for the oil and gas industry.

Next Move	<ul style="list-style-type: none"> • Adhere to the energy system transformation by focusing on low-carbon solutions. 	<ul style="list-style-type: none"> • Focus on new developments worldwide that will help improve their overall efficiency and environmental standing.
Vulnerability	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Retaliation	<ul style="list-style-type: none"> • Competitors will attempt to expand into similar markets as Shell. • It is a race to newer, more sustainable, low-carbon solutions. 	<ul style="list-style-type: none"> • Competitors are more than likely expanding into the same markets that ExxonMobil are expanding into such as alternative forms of energy.

Competitor Response

BP ranks second, behind ExxonMobil, in the Integrated Major International Downstream Companies Strategic Group. They underperformed in Barrels of Oil Refined per Day, Global Distribution, and Combined Oil & Gas Reserves.

Internal Analysis

Nature of the Firm: Culture & Leadership

Bob Dudley - Group Chief Executive

Bob Dudley was named Group Chief Executive on October 1, 2010 after holding a variety of management and executive positions for Amoco Corporation, the corporation that later merged with BP. Mr. Dudley then worked as executive assistant to the group chief officer for two years prior to being named chief executive officer of TNK-BP from 2003 to 2008. Additionally, he has been appointed to numerous boards of the industry and is even the chair of the Oil and Gas Climate Initiative(OGCI). He has spent his entire career in the oil and gas industry and has demonstrated a consistent set of values and behaviors that transformed the company. He has made sure BP is adapting to the challenges presented by the energy transition to a lower carbon economy.⁷⁹



Brian Gilvary - Chief Financial Officer

Brian Gilvary was appointed as Chief Financial Officer of BP on January 1, 2012. “The role includes responsibility for finance, tax, treasury, mergers and acquisitions, investor relations, audit, global business services, information technology and procurement.” Mr. Gilvary has spent his entire career with BP, which began in 1986 after acquiring a PhD in mathematics from the University of Manchester. He has accumulated experience across all facets of the company’s operations throughout his tenure, which expands his capabilities to BP far beyond finance. Brian Gilvary’s deep understanding has been vital in adjusting capital structure and operating costs accordingly for BP.⁸⁰



⁷⁹ “Bob Dudley- Group Chief Executive.” *BP Corporate Website*

⁸⁰ “Brian Gilvary- Chief Financial Officer.” *BP Corporate Website*

Tufan Erginbilgic - Chief Executive: Downstream

Tufan Erginbilgic began his tenure as chief executive, Downstream on October 1, 2014. Before assuming his current role, Mr. Erginbilgic was the chief operating officer of the fuels business. He joined BP in 1997 after spending seven years with Mobil. His career encompassed various roles in refining and marketing for countries throughout Europe, the United Kingdom, and Turkey. He has also held positions such as head of the European fuels business in 2004, group chief executive for BP's lubricant business, and chief operating officer for the entire eastern hemisphere fuels value chain and lubricants business.⁸¹



Susan Dio - Chairman and President of BP America

Susan Dio has only recently been appointed to her current position of chairman and president of BP America, which began on September 1, 2018. However, she has been with BP since 1984 and has held key operational and executive positions in the US, UK, and Australia. Prior to assuming her current role, Susan Dio served as chief executive officer of BP shipping. She was in control of managing the BP fleet that moved more than 200 million tonnes of products globally each year. Her expertise is now being implemented through leadership and oversight of BP's US businesses.⁸²



⁸¹ “Tufan Erginbilgic- Chief Executive: Downstream.” *BP Corporate Website*

⁸² “Susan Dio- Chairman and President of BP America.” *BP Corporate Website*

Bernard Looney - Chief Executive: Upstream

Bernard Looney assumed the role of chief executive, Upstream on November 1, 2010 and is expected to succeed Bob Dudley as group chief executive and join the BP Board on February 5, 2020. He is responsible for the oil and gas exploration, development and production activities worldwide. Mr. Looney has made drastic improvements in process and personal safety performance, which increased by 35% and 20% respectively. Production also grew 20% as a result of 23 major project start-ups that all were completed under budget and ahead of schedule.⁸³



Dev Sanyal - Chief Executive: Alternative Energy / Executive Vice President: Regions

Dev Sanyal has been a member of BP's executive team since January 1, 2012 and has been with the company since 1989. Mr. Sanyal "is responsible for the alternative energy business globally and for the group's interests in Europe and Asia regions." The majority of his roles since joining BP have been for international purposes in London, Athens, Istanbul, Vienna, and Dubai. Dev Sanyal ascended to the head of the group chief executive's office in June of 2006. The following year, Mr. Sanyal assumed the role of group treasurer, while also being chairman of BP Investment Management. From 2007 to 2013, he as a Trustee of the Career Academy Foundation and from 2012 to 2019 was a member of the Accenture Global Energy Board. He is also a Fellow of the Energy Institute.⁸⁴



⁸³ "Bernard Looney- Chief Executive: Upstream." *BP Corporate Website*

⁸⁴ "Dev Sanyal- Chief Executive: Alternative Energy/ Executive Vice President: Regions." *BP Corporate Website*

Organization Structure

British Petroleum (BP) organizational structure is comprised of the corporate level, business segments, and geographical breakdown. The corporate level includes the CEO, Robert Dudley, and all other executives and board of directors. As for business segments, BP operates in three: BP Exploration & Production, BP Refining and Marketing, and BP Chemicals. Each of which operate in various countries such as Asia, Europe, and the US.

Value Chain Analysis

Key: Identified Strength Identified Weakness

Operating Margin= 4.97

Infrastructure	Technologically Advanced, Geographically Expanded, and Socially Aware Strategy: Diversification of Portfolio ROE= 9.48 ROA= 3.36 Operating in 78 countries CEO: Robert Dudley				
HR		Work with external organizations Operating Management System			
Tech	Use of big-data analytics, augmented reality, drones and advanced drilling techniques Continuous monitoring of methane emissions	AI technology BP & subsidiaries hold >3,600 patents and pending patent applications worldwide \$429MM invested in R&D	In-vehicle monitoring systems and cameras to improve transportation safety	<i>BPme</i> for smartphones	
Procurement	Purchase alternative crude from third parties Renewable Fuel Agreement with RES Polyflow Joint Venture with Bunge	Investments in StoreDot and FreeWire Partnership with Rosneft			
PRIMARY ACTIVITIES	\$67.81 per barrel High cost, Low Revenue E&P	Acquisition of ChargeMaster 2018 1,890 crude oil refining capacity	Transport oil & gas through pipelines and by ship, truck, and rail	18,700 Convenience Partnership Sites	
	Inbound Logistics	Operations	Outbound Logistics	Marketing & Sales	Service

Upstream ← → Downstream

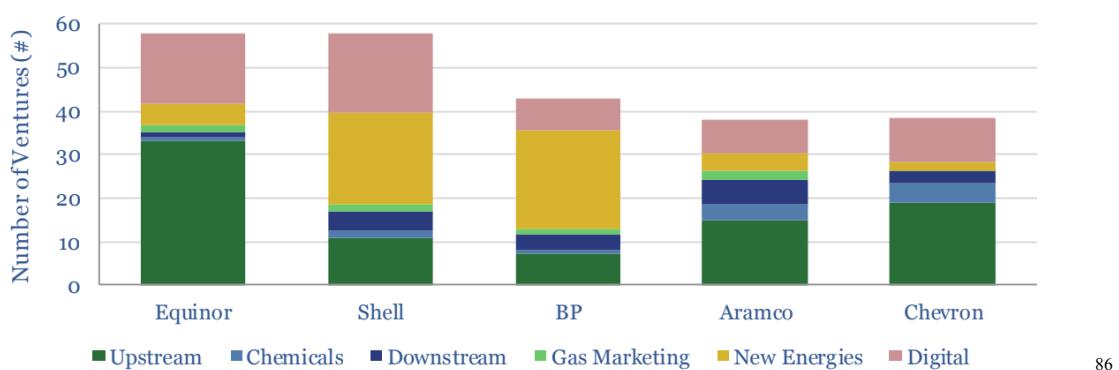
Infrastructure

British Petroleum (BP) is built upon an infrastructure of geographical scope, social awareness, technological advancement, and a strategy consistent of diversifying their portfolio. BP owns or has a stake in eleven refineries on four different continents of the world; North America, Europe, Australia, and Africa. BP owns seven of these eleven refineries - two in the United States, two in Germany, one in the Netherlands, one in Spain, and one in Australia. The other four refineries BP has stake in are located in the United States, Germany, New Zealand, and South Africa. BP has a great capacity for social awareness - specifically in the area of sustainability and climate crisis awareness. This is highlighted as a skill below. BP is integrated and operates within a diverse field - investing in technologies such as artificial intelligence, electric powered vehicles, and holding many patents for technology advances, as well as investing in alternative forms of energy such as biofuels, wind, and solar energy.

Strengths

BP is deeply committed to sustainability in their operations. The company has determined an emissions target reduction of 3.5 million tonnes to the year 2025 - which will be achieved by improved efficiency, less methane emissions, innovation with cleaner energy technology, and calling for a price on carbon. BP has ventured into copious new energy solutions - a majority of their new ventures.⁸⁵ When investing in technology, BP looks for the achievement of advanced mobility, carbon management, low carbon power and storage, bio and low carbon products, and digital energy. A major emphasis in BP's technology investments is in the exploration of electric-powered vehicles and companies that create the necessary technologies to achieve this. Through collaborating with external organizations, such as their peers, non-governmental organizations, academic institutions, and their own stakeholders - BP is striving to address the global climate threat. One critical example of this collaboration is the Oil and Gas Climate Initiative (OGCI). The OGCI brings together ten oil and gas companies who are working to reduce greenhouse gas emissions in the industry and with the use of their individual products. By coming together, these companies explore ways to improve sustainability within their operations, and could provide support and funding to global research and innovation.

Figure 6. Venturing activities from five of the leading Oil Majors



⁸⁵ "The Energy Transition and Oil Companies' Hard Choices." *Oxford Energy*

⁸⁶ "The Energy Transition and Oil Companies' Hard Choices." *Oxford Energy*

Weaknesses

ROA and ROE are both positive, however, they fall below their peers. These ratios have also fallen further since their last year end, at an ROA of 1.68 (compared to a peer average of 4.10), and a current ROE of 4.79 (compared to peer average of 8.40). This is a severe sign of weakness as ROE is used to indicate competitive advantage, which BP has not achieved given their below average ROE. The two ratios demonstrate weakness in the company's profitability.

Inbound Logistics

British Petroleum excels in many areas of their inbound logistics - whether it be in use of advanced technologies or partnering with other companies to produce biofuels. Within their Exploration and Production, BP uses big-data analytics, augmented reality, drones and advanced drilling techniques to increase efficiency. Within this realm, they have implemented a continuous monitoring system for methane emissions - for use of trying to limit and moderate their releases of methane gas.⁸⁷ BP often procures crude oil from third parties, which helps limit their direct environmental impact and drilling costs while still allowing them to distribute the same amount of product. BP is able to produce oil at \$67.81 per barrel, which is high compared to some other prices seen within the industry, such as Brent and WTI's prices. (\$63.65 and \$57.94, respectively)⁸⁸ BP has a high cost, low revenue exploration and production sector - making their drilling operations not cost effective.

In addition, BP has entered into two different agreements involving biofuels - demonstrating their commitment to sustainability. They have an agreement with RES Polyflow over the purchase of crude product developed from recycled plastics, and they have a joint venture with Bunge to create a bioenergy company in Brazil.

Strengths

BP has entered into two biofuel related agreements with renewables companies. The first agreement is between BP and RES Polyflow and involves the process of pyrolysis, which is converting plastics back into crude oil. RES Polyflow is a new company with Plastics-To-Fuel energy recovery systems that has entered into an offtake agreement with BP for the purchase of their fuels produced by its first commercial production facility. The RES Polyflow plant will convert 100,000 tons of plastic waste into 16 million gallons of ultra-low sulfur diesel fuel and naphtha blend stocks per year. Under the terms of the agreement, BP will purchase all of the diesel fuel and naphtha blend stocks produced by the RES Polyflow facility for distribution in the regional petroleum market.⁸⁹ BP noted in 1Q19 that "we see chemical recycling as a gamechanger for plastics circularity...we are looking to commercialise these technologies by 2025"⁹⁰ This process of pyrolysis can assist in solving the global crisis of plastic pollution, while also finding a viable alternative to fracking and oil exploration and production. Especially for BP, who has a high cost and low revenue for exploration and production.

In addition to the agreement with RES Polyflow, BP has also entered into a 50/50 joint venture with a leader in agriculture, food and ingredients - Bunge - that will create BP Bunge Bioenergia, a bioenergy company in one of the world's fastest growing markets for biofuels. BP will combine its biofuels and biopower businesses located in Brazil with the business of Bunge to create an international, high efficiency, producer of sugarcane ethanol. BP's interest in the new venture will grow its existing

⁸⁷ "BP deploys continuous methane measurement for new major oil and gas projects." *BP Corporate Website*

⁸⁸ "Energy." *Bloomberg*

⁸⁹ "RES Polyflow Announces Renewable Fuel Agreement with BP." *RES Polyflow*

⁹⁰ "4Q and full year 2018 results and strategy update: Webcast Q&A transcript." *BP Corporate Website*

biofuels business by more than 50%.⁹¹ Ethanol produced by sugarcane is one of the most efficient and low emission fuels. With this joint venture, BP will be expanding into a high demand market and exercising their commitment to sustainability.

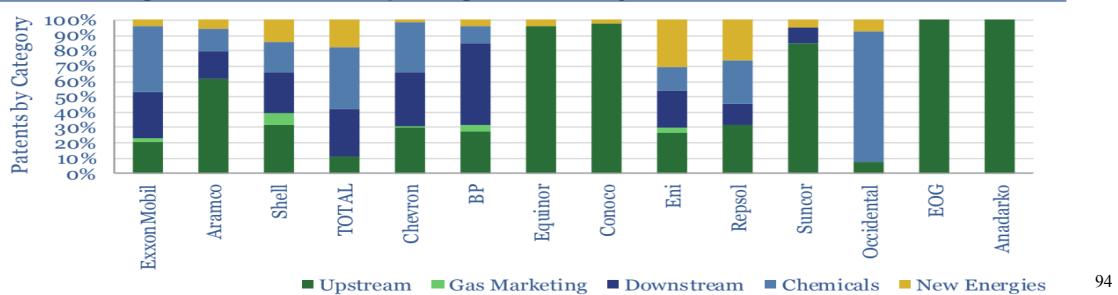
Weaknesses

BP has high cost, yet low revenue in their upstream divisions. BP has the highest exploration and production spending of \$29.32 billion of their peer group, with the lowest being \$17.17 billion of spending.⁹² In addition to their high expenditures, they have the lowest exploration and production revenues per BOE. That being \$17.59 million their last filing, compared to the peer average of \$42.56 million. Although BP carries a smaller market cap and they are primarily a downstream energy company, their upstream division has a weakness in their upstream operations in terms of spending too much and not generating enough profitability.

Operations

British Petroleum procures new resources through their investment efforts. Certain investments, including ones in companies that have begun to produce new fast-charging battery technology, have helped to strengthen BP by moving into the future and bringing in a new focus of adding charging stations for electric vehicles to their retail sites. This will help BP greatly in their efforts to become more sustainable. BP's use of AI technology has helped them to become more efficient in their operations by accelerating project lifecycles with a ninety percent time reduction in data collection, interpretation, and simulation.⁹³ Additionally, their 3,600 pending patents act as a way for them to surpass their competitors seeing as approximately fifty percent of BP's patents are based on downstream technologies. This is relevant because this is the area of their operations which is the most profitable. These patents help BP improve their operations so that they can make fossil fuels more efficient. BP's operating management system (OMS) has also helped them to become more efficient in their operations by driving performance improvements and assuring that they manage risks in all sectors of requirements. Also, their partnership with Rosneft (an integrated oil company in Russia) helps them differentiate themselves from their peers, to increase total shareholder return with a 19.75% shareholding.

Figure 4: 8% of the leading oil companies' patents are driving advances in renewable energy; the remaining 92% are aimed at improving the efficiency of fossil fuels



⁹¹ "BP announces major expansion in renewable energy, combining biofuels and biopower with Bunge in Brazil to create a world-class bioenergy company." *BP Corporate Website*

⁹² "Bloomberg RV Function," *Bloomberg LP*

⁹³ "BP Invests in New Artificial Intelligence Technology." *BP Corporate Website*

⁹⁴ "The Energy Transition and Oil Companies' Hard Choices." *Oxford Energy*

Strengths

BP is invested in StoreDot, a leading developer of ultra-fast charging battery technology, and FreeWire, a manufacturer of mobile rapid charging systems for electric vehicles. These investments, in addition to their 2018 acquisition of ChargeMaster, will further diversify their portfolio and achieve their goal of being low carbon by potentially adding charging stations to their fueling stations for electric vehicles worldwide at some point in the future.

Weaknesses

There are no weaknesses for this primary activity

Outbound Logistics

BP moves oil & gas through pipelines and by ship, truck, and rail. They have integrated technology in their trucks to improve efficiency and safety, and therefore reducing risk.

Strengths

There are no strengths for this primary activity

Weaknesses

There are no weaknesses for this primary activity

Marketing & Sales

BPme is a mobile application created by British Petroleum, currently available in six countries, that allows customers the option to pay for fuel from their phone. Downloaded over a million times since its launch, BPme has shown promising signs of becoming a revolutionary asset to consumers in the oil and gas industry. BPme has the ability to locate BP sites as well as provide information on the opening times of the facilities. Marketed towards consumers that would rather stay in the car with their children, pets, or valuables, the app allows them to pay without leaving the car. British Petroleum plans to penetrate new markets over the coming months and implement new amenities to the app. In addition to BPme, British Petroleum orchestrated more convenience partnerships, increasing the total amount of company stores by 25%, between 2017 and 2018, around 1,400 BP stores worldwide.

Strengths

There are no strengths for this primary activity

Weaknesses

There are no weaknesses for this primary activity

Service

Strengths

There are no strengths for this primary activity.

Weaknesses

There are no weaknesses for this primary activity.

Core Competence

British Petroleum's core competence lies in the diversity of their portfolio and investments, along with a strong commitment to sustainability in all of their endeavors.

Financial Ratio Analysis⁹⁵

Liquidity Ratios:

<i>Quick Ratio</i>	2018	2017	2016	2015	2014
BP	0.62	0.69	0.64	0.74	0.79
Royal Dutch Shell	0.70	0.64	0.74	0.74	0.58
Total	0.78	1.03	0.93	0.93	0.92
Chevron	0.90	0.73	0.95	0.95	0.94
Exxon Mobil	0.49	0.50	0.44	0.44	0.50

The quick ratio is used to measure a company's ability to use highly liquid assets to pay off short term liabilities, the closer to one, the more liquid strength. BP holds the second lowest quick ratio of 0.62, behind Exxon Mobil. Indicating BP and Exxon Mobil may not be able to pay off their short term obligations nearly as well as Chevron could. Thus, BP has a decent amount of liquidity risk.

⁹⁵ "Bloomberg RV Function," *Bloomberg LP*

<i>Current Ratio</i>	2018	2017	2016	2015	2014
BP	1.05	1.16	1.16	1.29	1.37
Royal Dutch Shell	1.25	1.20	1.17	1.32	1.16
Total	1.28	1.50	1.33	1.38	1.45
Chevron	1.25	1.03	0.93	1.35	1.32
Exxon Mobil	0.84	0.82	0.87	0.79	0.82

The current ratio is another way to measure a company's ability to cover their short-term liabilities with enough liquid assets, using current assets and current liabilities. A strong range for the current ratio is between 1.5 and 3 percent. That being said, BP falls below average again at 1.05, again above Exxon Mobil. The company does not have strong liquidity to meet its current obligations compared to the majority of their peers.

Efficiency Ratios:

<i>Asset Turnover</i>	2018	2017	2016	2015	2014
BP	1.07	0.89	0.70	0.82	1.20
Royal Dutch Shell	0.96	0.75	0.62	0.76	1.19
Total	0.74	0.63	0.56	0.63	0.90
Chevron	0.63	0.50	0.39	0.46	0.74
Exxon Mobil	0.80	0.70	0.60	0.69	1.05

Asset turnover ratio measures how efficiently a company can convert their assets to profit. BP has the highest ratio of 1.07, meaning every one dollar of assets can be generated to roughly \$1.07 worth of revenue. Their assets have been increasing in value with their investments, such as Bridas Corporation and Pan American Energy, both at the end of 2017, boosting 2018.

Inventory Turnover	2018	2017	2016	2015	2014
BP	13.67	11.12	10.15	12.41	12.99
Royal Dutch Shell	13.87	10.64	10.16	12.54	14.38
Total					
Chevron	24.70	21.75	17.60	18.46	25.78
Exxon Mobil	13.59	13.15	11.97	12.81	19.29

Inventory turnover is a measurement of how often a company uses or sells their inventory a year, in other words, how quickly inventory comes in and out. These ratios are high for the oil and gas industry in general because of the high supply and demand. BP falls in the lower tier with a ratio of 13.67, just above Exxon Mobil. Management states that they expect their turnover to remain relatively similar for the next five years or so.

Debt Management Ratios:

Debt/Equity	2018	2017	2016	2015	2014
BP	64.80%	62.98%	60.20%	54.04%	46.92%
Royal Dutch Shell	37.93%	43.31%	49.06%	35.57%	26.36%
Total	43.65%	45.03%	52.51%	56.66%	59.32%
Chevron	22.14%	25.96%	31.44%	25.05%	17.81%
Exxon Mobil	19.04%	21.77%	24.60%	21.88%	16.08%

The debt to equity ratio is used to analyze a company's financial leverage. BP has the highest debt to ratio amongst their peers since 2016. A good amount of their debt is still being paid off from the Gulf of Mexico oil spill of 2010. Since, BP continues to incur costs and recognized liabilities for certain future costs. Other debt comes from their heavy investments, such as Bridas Corporation which was a cash-free transaction.

Profitability Ratios:

Gross Margin	2018	2017	2016	2015	2014
BP	15.10%	11.86%	11.86%	9.45%	12.53%
Royal Dutch Shell	17.25%	18.05%	18.23%	15.93%	15.15%
Total					
Chevron	12.27%	6.11%	-0.13%	3.32%	13.63%
Exxon Mobil	12.58%	11.07%	6.58%	10.94%	13.25%

The gross margin ratio is a measure of how much revenue exceeds the cost of goods sold in a company. BP has one of the top gross margins of 15.10%, right below Shell, Indicating the company does an efficient job of generating revenue from their costs involved with products and services. The majority of 2018 improvements had to do with the 2017 Tax Cut and Jobs Act.

ROE	2018	2017	2016	2015	2014
BP	9.48%	3.50%	0.12%	-6.22%	3.14%
Royal Dutch Shell	11.88%	6.81%	2.62%	1.16%	8.45%
Total	11.08%	8.84%	6.85%	5.74%	4.46
Chevron	9.80%	6.26%	-0.33%	2.98%	12.65%
Exxon Mobil	10.98%	11.10%	4.64%	9.36%	18.67%

Return on equity measures of profitable a company is terms of their equity, or how well a company uses their investments in order to generate profits. BP has the lowest ROE of 9.48, compared to an average of 10.98%. Their low ROE and high price-to-earnings of 27.30, compared to its peer average of 17.69, BP shows signs of being overvalued. Most improvements to 2018 were due to the 2017 Tax Cut and Jobs Act. A decent portion of their equity comes from their partnership with Rosneft.

ROA	2018	2017	2016	2015	2014
BP	3.36%	1.26%	0.04%	-2.37%	1.28%
Royal Dutch Shell	5.79%	3.17%	1.22%	0.56%	4.19%
Total	4.58%	3.64%	2.72%	2.24%	1.81%
Chevron	5.84%	3.58%	-0.19%	1.73%	7.30%
Exxon Mobil	6.00%	5.81%	2.35%	4.71%	9.34%

Return on assets indicates how profitable management has made a company is relative to its total assets, in terms of how they use their assets to generate earnings. BP has the lowest ROA of 3.36%, compared to the peer average of 5.79%. 2018 was a boost of all the companies because of the 2017 Tax Cut and Jobs Act, boosting each ratio overall.

Competitive Advantage

BP excels with their asset turnover ratio, however, they have the lowest return on equity; which shows competitive advantage and therefore BP has no competitive advantage relative to their peers in terms of recent profitability.

SWOT Analysis

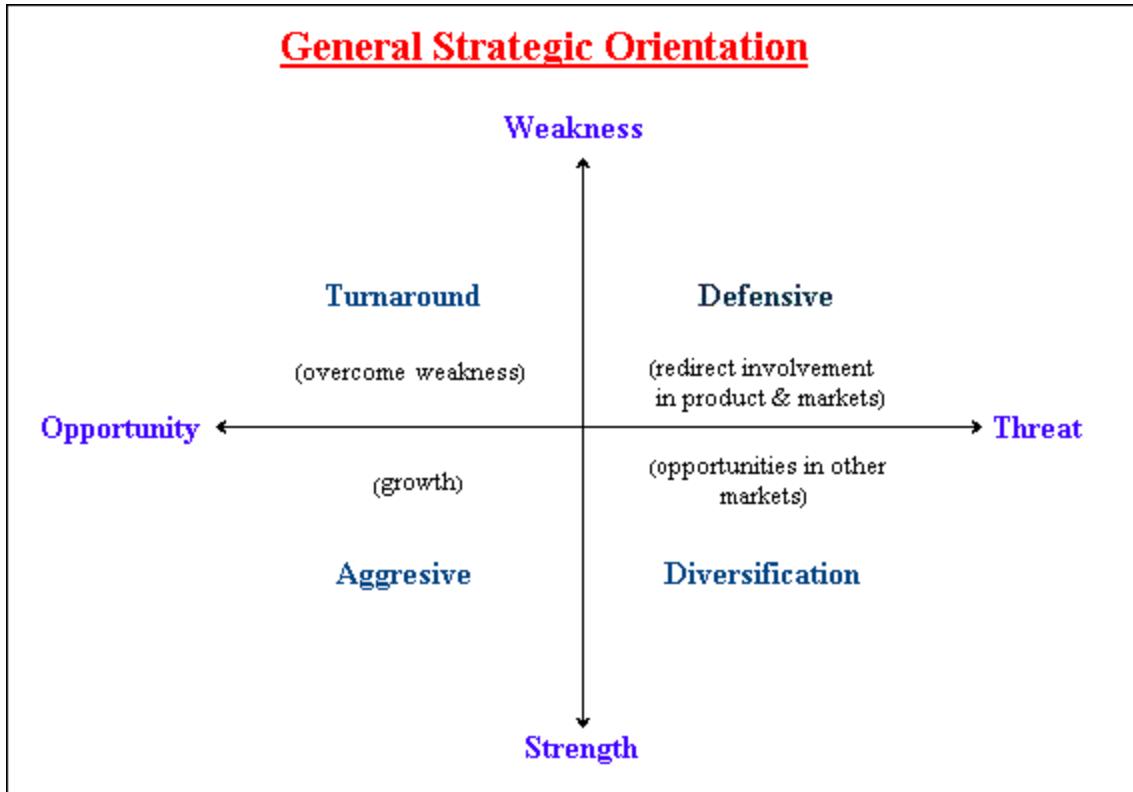
Overview:

<p>S</p> <p>S1: Commitment to Sustainability</p> <p>S2: Geographical Distribution</p> <p>S3: Investments in high-tech companies</p> <p>S4: Joint Venture with Bunge</p> <p>S5: Renewable Fuel Agreement with RES Polyflow</p> <p>S6: Commercialization to Plastic Waste Circularity by 2025</p>	<p>O</p> <p>O1: Industrialization of developing countries</p> <p>O2: Expected increase of total vehicle miles in 2019</p> <p>O3: Clean Energy Research</p> <p>O4: Pyrolysis Technology</p>
<p>W</p> <p>W1: ROE= 9.48</p> <p>W2: ROA= 3.36</p> <p>W3: High cost, Low Revenue E&P</p>	<p>T</p> <p>T1: Increased Natural Disasters</p> <p>T2: Crude Oil and Natural Gas Price Fluctuations</p> <p>T3: Greenhouse Gas Emissions</p> <p>T4: Oil spills</p> <p>T5: Government Regulations</p> <p>T6: Fuel efficiency (& electric cars)</p>

SWOT Overview Impact Statement

Although there are threats to BP relating to regulations, effects of global warming, and fluctuations of oil and natural gas prices, BP's commitment to sustainability, geographical distribution, and pursuit of new technology to improve efficiency and limit environmental impact puts them in a position to thrive within their industry. Even though BP has the lowest ROE and ROA of their competitors, there are present opportunities to overcome these weaknesses through research and development of clean energy technology and with the industrialization of developing countries.

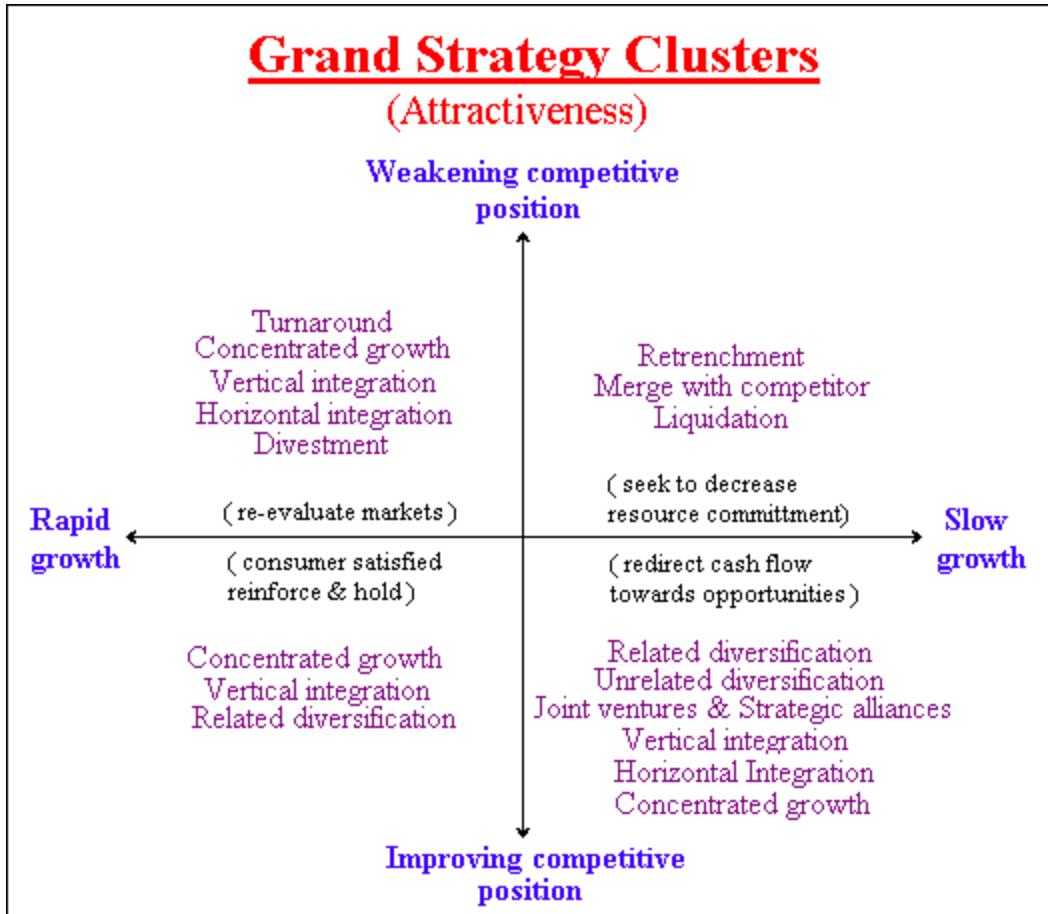
Orientation:



Conclusion: Diversification

BP is a major oil and gas player, however, they have various weaknesses in a slowing industry. Thus, for them to improve themselves and become more profitable in the future, they have to enter into other markets to seek opportunities. Placing them in the diversification quadrant. Opportunities have been present in the alternative fuels/renewables division of energy, to which BP has already begun to branch out to, in terms of their technology and partnerships or acquisitions, such as ChargeMaster. A more aggressive entry to this market could set BP up to be more profitable.

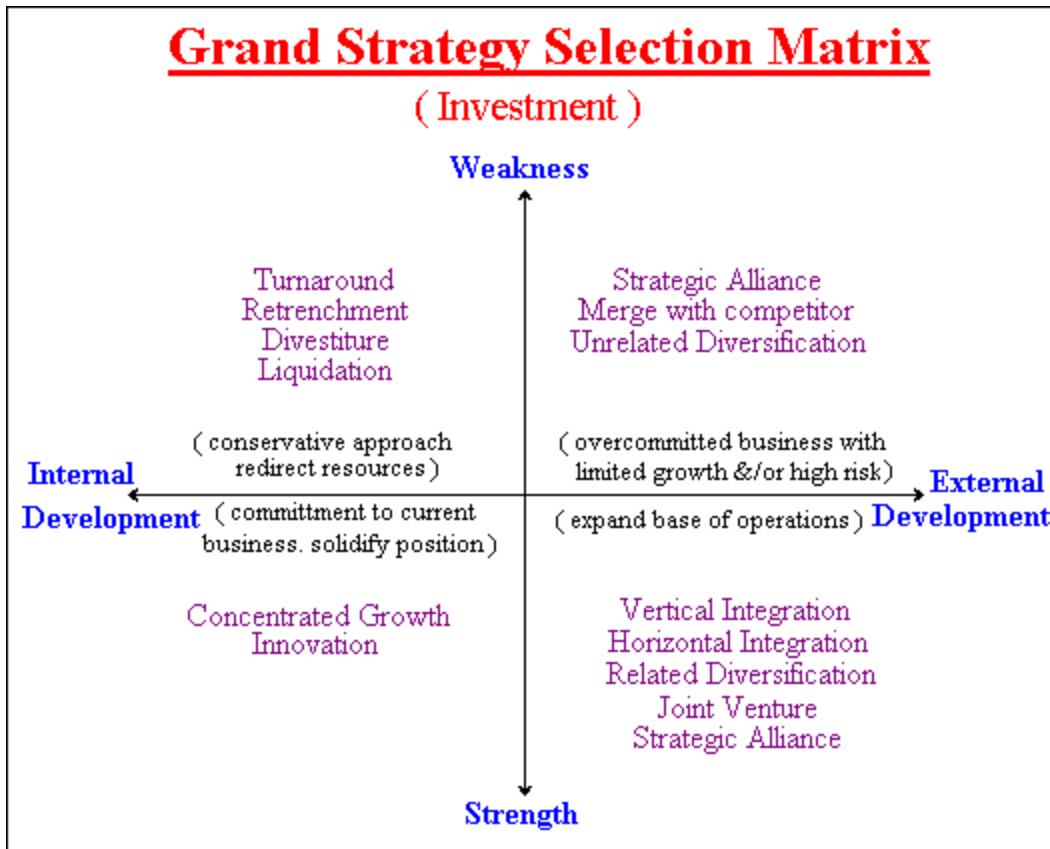
Attractiveness:



Conclusion: **Redirect cash flow towards opportunities**

BP is improving their competitive position in a mature industry, which indicates slow growth. In redirecting cash flow towards opportunities, the company will be fulfilling their strategic orientation determination of diversification.

Investments:



Conclusion: **Expand base of operations**

BP is a strong competitor in the oil and gas industry, with the focus of their investments in external development. Due to the position of expanding their base of operations, as well as redirecting cash flow towards opportunities, BP has several options to proceed from this point forward. Vertically or Horizontally integrating, participating in related diversification, or pursuing joint ventures or strategic alliances are all viable options for BP moving forward.

Strategic Choice

Generic Strategy



Conclusion: Differentiation

A differentiation strategy consists of a firm seeking to be unique in its industry along specific parameters that are valued by its buyers. It focuses on one or more attributes that a majority of buyers in the industry perceive as important, and positions itself to meet those needs. BP generally focuses on sustainability in its operations, investing in research and development of new technologies, exploring energy alternatives, and diversifying their portfolio across the supply chain and different energy markets.

Strategic Question

How Can British Petroleum succeed in the energy transition?

Recommendation

Upstream Strategy

As a leader in sustainability within the oil and gas industry, British Petroleum must remain competitive in a growing market for renewable energy. With this in mind, the recommendation presented is to aggressively pursue pyrolysis technologies, patents, and investments in companies of this nature. With competitors such as Shell and ExxonMobil investing in pyrolysis related technology, BP must pursue this path aggressively in order to remain competitive. Currently, 85% of the world's plastic is incinerated, dumped into landfills, or ends up in the oceans. With the use of pyrolysis, plastics can be converted back into oil and distributed in the petroleum market. The recommendation is that BP enters into a 70/30 joint venture with RES Polyflow, in order to create a new company with a bigger facility and a higher capacity for Plastic-to-Oil production, located in India. This would provide an opportunity for RES Polyflow to globally expand, while moving into an area with increasingly high demand for oil and excessive plastic pollution. In accordance with the Paris Climate Agreement and India's established goal to reduce their emissions by 20-25% in 2020, implementing a pyrolysis-based fuel strategy would decrease waste and emissions in the country. India is the third largest carbon emitter in the world with a rapidly increasing demand for fossil fuels. A substitute to fossil fuels would benefit the country, as rising global temperatures are resulting in an increase in heat-related deaths in India each year.

With the world currently in the midst of a plastic pollution crisis, positioning themselves as the oil company with the greatest capacity for environmental consciousness could be beneficial to BP's image in the years following the Deepwater Horizon Oil Spill. In addition to positive PR, expanding pyrolysis facilities into India will be a major benefit to BP, as India's increasing demand for fuel will have a positive effect on revenues. With the increase in pyrolysis-created fuel that this would bring to BP, the company would be able to scale back on exploration and production spending and activity - which is the area of their operations that costs the most, while returning the least revenue. It is believed that a strong pursuit of recycling opportunities in BP's strategic plan will position the company as a leader in environmental advocacy, while still finding a way to remain profitable amidst an energy transition.

Downstream Strategy

BP acquired ChargeMaster in 2018, which is based out of the United Kingdom and builds, sells, and maintains home, work, and public charging units for electric cars. This company is currently only in operation in the United Kingdom, but a market for this technology could be expanded to countries where electric vehicles are growing in sales, such as China and the United States. With 50% of BP's acquired patents being in the downstream sector, the company has been seeking methods to increase the efficiency of fossil fuels in refining, transport, and sales. The recommendation is that BP keeps exploring ways to increase efficiency in their downstream operations and explores the possibility of expanding ChargeMaster into countries where demand for electric vehicles is rising.

Net Present Value

Using an initial investment of \$1 billion, and a year one cost of goods sold of \$250 million; the NPV becomes positive by year three. The initial investment is typical and expected of BP as a large oil player, as well as their first year cost of goods sold. Some factors used to calculate include: discount rate of 5 percent, sales growth of 12 percent, and tax rate of 40 percent. No additional investments were made after year three.

Managerial Implications

Value Chain

Infrastructure					
HR					
Tech		Explore ways to increase efficiency in downstream operations			
Procurement	70/30 Joint Venture with RES Polyflow in India				
PRIMARY ACTIVITIES	India generates 26,000 tonnes of plastic per day Decrease spending in exploration and production	Expansion of Chargemaster into countries with increasing demand for electric powered cars		Positive Company Image due to Sustainability Value	
	Inbound Logistics	Operations	Outbound Logistics	Marketing & Sales	Service

Additional Implications

Stakeholder Considerations

Shareholders

Current shareholders will be positively impacted by the decision to pursue pyrolysis because BP will be disengaging with less profitable activities and penetrating newer markets. Entering India is also beneficial because the oil demand in India is rising, while helping reduce their plastic pollution problem will increase public appeal. In turn, BP's stock should increase and shareholders will gain value.

Employees

Employees will be positively impacted because there will be jobs created at the new facility, as well as for the ChargeMaster initiative. BP employees will be able to identify with a cleaner oil producing alternative. Also, if they are native to India, they will be instilled with pride about what the new facility has to offer.

Community

The community will be impacted immensely as plastic pollution degrades the quality of life of the Indian citizens. Being able to progressively clean waterways and begin properly disposing of plastic will make the community more sanitary and efficient.

Ethical Imperative

The ethical imperative taken in this recommendation is the utilitarian approach. The utilitarian framework is the ideology of taking actions that would do the most good overall, even if it hurts a small population, it is doing an overall good. The philosopher behind this was Ancient Greek philosopher Epicurus of Samos (341-270 BCE). Environmental ethical actions is a perfect example of a utilitarian framework as it provides the most good to those affected and least amount of harm. Thus, our recommendation for BP to pursue their environmental actions further will go the greatest good for the community and stakeholders, government, corporations, and of course the environment.

References

1. "Where We Operate | Home." *BP Corporate Website*. Accessed November 15 2019.
https://www.bp.com/en_us/united-states/home/where-we-operate.html
2. "BP PLC - British Corporation." *Britannica*. Accessed November 14 2019.
<https://www.britannica.com/topic/BP-PLC>
3. "Holding Company." *Britannica*. Accessed November 14 2019.
<https://www.britannica.com/topic/holding-company>
4. "Post-War - 1946-1970." *BP Corporate Website*. Accessed November 14 2019.
<https://www.bp.com/en/global/corporate/who-we-are/our-history/post-war.html>
5. "BP PLC - British Corporation." *Britannica*. Accessed November 14 2019.
<https://www.britannica.com/topic/BP-PLC>
6. "Amoco - Meeting the fuel needs of US motorists since 1912." *BP Corporate Website*. Accessed November 14 2019.
<https://www.bp.com/en/global/corporate/who-we-are/our-brands/amoco.html>
7. "BP PLC - British Corporation." *Britannica*. Accessed November 14 2019.
<https://www.britannica.com/topic/BP-PLC>
8. "Gulf Oil Spill." *Ocean.si*. Accessed November 14 2019.
<https://ocean.si.edu/conservation/pollution/gulf-oil-spill>
9. "The new millennium - 2000-2012." *BP Corporate Website*. Accessed November 14 2019.
<https://www.bp.com/en/global/corporate/who-we-are/our-history/the-new-millennium.html>
10. "BP Mission, Vision & Values." *Comparably*. Accessed November 14 2019.
<https://www.comparably.com/companies/bp/mission>
11. "Our Code, Our Responsibility." *BP Corporate Website*. Accessed November 14 2019.
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/who-we-are/our-values-and-code-of-conduct/bp-code-of-conduct-english.pdf>
12. "BP Statistical Review of World Energy." *BP Corporate Website*. Accessed November 25, 2019.
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf>
13. "BP Statistical Review of World Energy." *BP Corporate Website*. Accessed November 25, 2019.
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf>
14. "FAQ page." *EIA*. Accessed November 25, 2019.
<https://www.eia.gov/tools/faqs/faq.php?id=709&t=6>

15. "Transportation sector energy consumption." *EIA*. Accessed November 25, 2019.
<https://www.eia.gov/outlooks/ieo/pdf/transportation.pdf>
16. "Electric Vehicle Sales: Facts & Figures." *EEI*. Accessed September 13 2019.
https://www.eei.org/issuesandpolicy/electrictransportation/Documents/FINAL_EV_Sales_Update_April2019.pdf
17. "Electric Vehicle Sales: Facts & Figures." *EEI*. Accessed September 13 2019.
https://www.eei.org/issuesandpolicy/electrictransportation/Documents/FINAL_EV_Sales_Update_April2019.pdf
18. "BP Energy Outlook 2019 edition." *BP Corporate Website*. Accessed September 14 2019.
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2019.pdf>
19. "BP Energy Outlook 2019 edition." *BP Corporate Website*. Accessed September 14 2019.
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2019.pdf>
20. "BP Energy Outlook 2019 edition." *BP Corporate Website*. Accessed September 14 2019.
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2019.pdf>
21. "Oil & Gas Industry 2019 Trends." *KPMG*. Accessed September 14 2019.
<https://assets.kpmg/content/dam/kpmg/ar/pdf/pg-industria-del-pg-tendencias-para-2019-english.pdf>
22. "Top 6 Things You Didn't Know About Solar Energy." *Department of Energy*. Accessed September 14 2019.
<https://www.energy.gov/articles/top-6-things-you-didnt-know-about-solar-energy>
23. "Top 6 Things You Didn't Know About Solar Energy." *Department of Energy*. Accessed September 14 2019.
<https://www.energy.gov/articles/top-6-things-you-didnt-know-about-solar-energy>
24. "Solar." *Department of Energy*. Accessed September 14 2019
<https://www.energy.gov/science-innovation/energy-sources/renewable-energy/solar>
25. "Bioenergy." *Department of Energy*. Accessed September 14 2019
<https://www.energy.gov/science-innovation/energy-sources/renewable-energy/bioenergy>
26. "Global Oil & Gas Exploration & Production Industry Performance." *IBIS World*. Accessed September 15 2019.
<http://clients1.ibisworld.com.online.library.marist.edu/reports/gl/industry/currentperformance.aspx?entid=190>

27. "Which countries achieved economic growth? And why does it matter?" *Our World in Data*. Accessed September 15 2019.
<https://ourworldindata.org/economic-growth-since-1950>
28. "Global Oil & Gas Explorations & Production Competitive Landscape." *IBIS World*. Accessed September 15 2019.
<http://clients1.ibisworld.com.online.library.marist.edu/reports/gl/industry/competitivelandscape.aspx?entid=190>
29. "BP Energy Outlook 2019 edition." *BP Corporate Website*. Accessed September 15 2019
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2019.pdf>
30. "BP Energy Outlook 2019 edition." *BP Corporate Website*. Accessed September 15 2019
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2019.pdf>
31. "Global Oil & Gas Exploration & Production Industry at a Glance." *IBIS World*. Accessed September 15 2019.
<http://clients1.ibisworld.com.online.library.marist.edu/reports/gl/industry/ataglance.aspx?entid=190>
32. Mwamba, Seneo. "10 Facts About Plastic Pollution You Absolutely Need to Know." *Global Citizen*. Published June 14, 2018. Accessed September 14 2019.
<https://www.globalcitizen.org/en/content/plastic-pollution-facts/>
33. Turrentine, Jeff. "The Natural Gas Industry Has a Methane Problem." *NRDC*. Published June 7, 2019. Accessed September 14 2019.
<https://www.nrdc.org/onearth/natural-gas-industry-has-methane-problem>
34. "Greenhouse Gases Effect on Global Warming." *NASA*. Accessed September 14 2019.
<https://svs.gsfc.nasa.gov/20114>
35. "How Can Climate Change Affect Natural Disasters?" *USGS*. Accessed September 14, 2019.
https://www.usgs.gov/faqs/how-can-climate-change-affect-natural-disasters-1?qt-news_science_products=0#qt-news_science_products
36. "API: Hurricanes And The Pipeline Industry's Preparation." *American Petroleum Institute*. Accessed September 14 2019.
<https://www.colpipe.com/news/in-the-news/api-hurricanes-and-the-pipeline-industrys-preparation>
37. "What is an Oil Spill?" *Climate Interpreter*. Accessed September 14 2019.
<https://climateinterpreter.org/content/what-oil-spill>.
38. "Energy Policy Act of 2005." *United States Government, 109th Congress*. Published August 8 2005. Accessed September 14 2019.
https://www.fedcenter.gov/_kd/Items/actions.cfm?action>Show&item_id=2969&destination=ShowItem Accessed September 15, 2019.

39. "The Safe Drinking Water Act." *United States Government, 106th Congress*. Published August 6 2019. Accessed September 14 2019.
<https://www.govinfo.gov/content/pkg/CPRT-106SPRT67528/pdf/CPRT-106SPRT67528.pdf>
40. Kim, Joon. "Students Corner: Regulating Energy - Oil." *FERC*. Accessed September 15 2019. <https://www.ferc.gov/students/regulation/oil.asp>.
41. "The Paris Climate Agreement." *United Nations, Framework Convention on Climate Change*. Accessed September 15 2019.
https://unfccc.int/sites/default/files/english_paris_agreement.pdf
42. "Petroleum Refining: Industry Performance." *IBIS World*. Accessed September 15, 2019.
<http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/currentperformance.aspx?entid=449>
43. "Petroleum Refining: Industry Outlook." *IBIS World*. Accessed September 15, 2019.
<http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/industryoutlook.aspx?entid=449>
44. "Petrochemical." *Britannica*. Accessed September 15 2019.
<https://www.britannica.com/science/petrochemical>
45. "The Energy Transition and Oil Companies' Hard Choices." *Oxford Energy*. Published July 2019. Accessed November 25, 2019.
<https://www.oxfordenergy.org/wpcms/wp-content/uploads/2019/07/The-Energy-Transition-and-Oil-Companies-Hard-Choices-Energy-Insight-51.pdf?v=7516fd43adaa>
46. "Oil and Gas Field Machinery and Equipment Manufacturing." *Business Insights: Essentials*. Accessed September 15 2019.
https://bi-gale-com.online.library.marist.edu/essentials/article/GALE%7CNQRKTV242446586/71b67bd56244922f38a722ddcab990be?u=nysl_se_marist
47. "Support Activities for Oil and Gas Operations." *Business Insights: Essentials*. Accessed September 15 2019.
https://bi-gale-com.online.library.marist.edu/essentials/article/GALE%7CAKQTWZ927602825/8fcbb17ef9f9be5ac0af5a067ba0e154?u=nysl_se_marist
48. Blackmon, David. "Technology Is A Huge Driver Of The U.S. Oil And Gas Boom." *Forbes*. Published March 25 2019. Accessed September 15 2019.
<https://www.forbes.com/sites/davidblackmon/2019/03/25/technology-is-a-huge-driver-of-the-u-s-oil-and-gas-boom/#8d07b7a5ac5d>
49. Sampon, Anthony. "The Seven Sisters: The Great Oil Companies and the World They Shaped." *Energy Today*. Accessed October 2 2019.
<https://www.energystoday.net/conventional-energy/the-seven-sisters-the-great-oil-companies-and-the-world-they-shaped/>
50. Hoyos, Carola. "The New Seven Sisters: Oil and Gas Giants Dwarfs Western Rivals." *Financial Times*. Published March 2007. Accessed October 2, 2019.
<https://www.ft.com/content/471ae1b8-d001-11db-94cb-000b5df10621>

51. "Bloomberg ICS Function." *Bloomberg LP*. Accessed October 2, 2019.
52. "Bloomberg ICS Function." *Bloomberg LP*. Accessed October 2, 2019.
53. Glickman, Stewart, Yang Chuah, Shang. "Industry Report: Oil, Gas & Consumable Fuels Industry." *CFRA*. October 2, 2019.
<https://www-capitaliq-com.online.library.marist.edu/CIQDotNet/Research/DocumentViewer.aspx?documentViewerDocumentId=42299585>
54. "Bloomberg ICS Function." *Bloomberg LP*. Accessed October 2, 2019.
55. Glickman, Stewart, Yang Chuah, Shang. "Industry Report: Oil, Gas & Consumable Fuels Industry." *CFRA*. Accessed October 2, 2019.
<https://www-capitaliq-com.online.library.marist.edu/CIQDotNet/Research/DocumentViewer.aspx?documentViewerDocumentId=42299585>
56. "Bloomberg ICS Function." *Bloomberg LP*. Accessed October 2, 2019.
57. "Global Product and Services." *BP Corporate Website*. Accessed October 2, 2019.
<https://www.bp.com/en/global/corporate/products-and-services.html>
58. Glickman, Stewart, Yang Chuah, Shang. "Industry Report: Oil, Gas & Consumable Fuels Industry." *CFRA*. Accessed October 2, 2019.
<https://www-capitaliq-com.online.library.marist.edu/CIQDotNet/Research/DocumentViewer.aspx?documentViewerDocumentId=42299585>
59. "Bloomberg ICS Function." *Bloomberg LP*. Accessed October 2, 2019.
60. "Global Oil & Gas Exploration & Production." *IBIS World*. Accessed October 4, 2019.
[http://clients1.ibisworld.com.online.library.marist.edu/reports/gl/industry/default.aspx?en\(tid\)=190](http://clients1.ibisworld.com.online.library.marist.edu/reports/gl/industry/default.aspx?en(tid)=190)
61. "Oil Drilling & Gas Extraction." *IBIS World*. Accessed October 4, 2019.
[http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/default.aspx?en\(tid\)=103](http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/default.aspx?en(tid)=103)
62. Krauss, Clifford. "U.S. Oil Companies Find Energy Independence Isn't So Profitable." *The New York Times*. Published June 30, 2019. Accessed October 4 2019.
<https://www.nytimes.com/2019/06/30/business/energy-environment/oil-companies-profit.html>.
63. "Oil Drilling & Gas Extraction." *IBIS World*. Accessed October 4, 2019.
[http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/default.aspx?en\(tid\)=103](http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/default.aspx?en(tid)=103)
64. Pitatzis, Athanasios. "Porter's Five Forces Model for Oil and Gas Industry." *Energy Routes*. Published May 23, 2016. Accessed October 5, 2019.
<https://energyroutes.eu/2016/05/23/porters-five-forces-model-for-oil-and-gas-industry/>
65. "Oil Drilling & Gas Extraction." *IBIS World*. Accessed October 4, 2019.
[http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/default.aspx?en\(tid\)=103](http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/default.aspx?en(tid)=103)
66. Pitatzis, Athanasios. "Porter's Five Forces Model for Oil and Gas Industry." *Energy Routes*. Published May 23, 2016. Accessed October 5, 2019.
<https://energyroutes.eu/2016/05/23/porters-five-forces-model-for-oil-and-gas-industry/>
67. "Oil Drilling & Gas Extraction." *IBIS World*. Accessed October 4, 2019.
[http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/default.aspx?en\(tid\)=103](http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/default.aspx?en(tid)=103)

68. Dudley, Dominic. "Renewable Energy Costs Take Another Tumble, Making Fossil Fuels Look More Expensive Than Ever." *Forbes*. Published May 30, 2019. Accessed October 4, 2019.
<https://www.forbes.com/sites/dominicdudley/2019/05/29/renewable-energy-costs-tumble/#bc910c8e8cea>.
69. "Oil Drilling & Gas Extraction." *IBIS World*. Accessed October 4, 2019.
http://clients1.ibisworld.com.online.library.marist.edu/reports/us/industry/default.aspx?en_id=103
70. "Bloomberg RV Function." *Bloomberg LP*. Accessed October 25, 2019.
71. "Bloomberg DES Function." *Bloomberg LP*. Accessed October 25, 2019.
72. "Bloomberg CCB Function." *Bloomberg LP*. Accessed October 25, 2019.
73. "BP 2018 Annual Report." *BP Corporate Website*. Accessed October 25, 2019.
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/investors/bp-annual-report-and-form-20f-2018.pdf>
74. "BP 2018 Annual Report." *BP Corporate Website*. Accessed October 25, 2019.
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/investors/bp-annual-report-and-form-20f-2018.pdf>
75. 2018 Annual Reports:
- "BP 2018 Annual Report." *BP Corporate Website*. Accessed October 25, 2019.
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/investors/bp-annual-report-and-form-20f-2018.pdf>
 - "Royal Dutch Shell 2018 Annual Report." *Royal Dutch Shell Corporate Website*. Accessed October 25, 2019.
<https://reports.shell.com/annual-report/2018/?accept=1>
 - "Total S.A. 2018 Annual Report." *Total S.A. Corporate Website*. Accessed October 25, 2019.
<https://www.total.com/sites/default/files/atoms/files/2018-form-20-f-web.pdf>
 - "Chevron Corp. 2018 Annual Report." *Chevron Corp. Corporate Website*. Accessed October 25, 2019.
<https://www.chevron.com/-/media/shared-media/documents/annual-report-supplement-2018.pdf>
 - "ExxonMobil 2018 Annual Report." *ExxonMobil Corporate Website*. Accessed October 25, 2019.
<https://corporate.exxonmobil.com/-/media/Global/Files/investor-relations/annual-meeting-materials/annual-report-summaries/2018-Summary-Annual-Report.pdf>
76. "Bloomberg BI Function." *Bloomberg LP*. Accessed October 25, 2019.
77. "Oil Reserves." *Investopedia*. Accessed October 25, 2019.
<https://www.investopedia.com/terms/o/oil-reserves.asp>
78. Denning, Liam. "Big Oil's Issue With Embracing 'Big Energy.'" *Bloomberg*. Published February 12, 2019. Accessed November 25, 2019.
79. "Bob Dudley- Group Chief Executive." *BP Corporate Website*. Accessed November 25, 2019.
<https://www.bp.com/en/global/corporate/who-we-are/board-and-executive-management/the-board/bob-dudley.html>

80. "Brian Gilvary- Chief Financial Officer." *BP Corporate Website*. Accessed November 25, 2019.
<https://www.bp.com/en/global/corporate/who-we-are/board-and-executive-management/the-board/brian-gilvary.html>
81. "Tufan Erginbilgic- Chief Executive: Downstream." *BP Corporate Website*. Accessed November 25, 2019.
<https://www.bp.com/en/global/corporate/who-we-are/board-and-executive-management/executive-team/tufan-erginbilgic.html>
82. "Susan Dio- Chairman and President of BP America." *BP Corporate Website*. Accessed November 25, 2019.
<https://www.bp.com/en/global/corporate/who-we-are/board-and-executive-management/executive-team/susan-dio.html>
83. "Bernard Looney- Chief Executive: Upstream." *BP Corporate Website*. Accessed November 25, 2019.
<https://www.bp.com/en/global/corporate/who-we-are/board-and-executive-management/executive-team/bernard-looney.html>
84. "Dev Sanyal - Chief Executive: Alternative Energy/ Executive Vice President: Regions." *BP Corporate Website*. Accessed November 25, 2019.
<https://www.bp.com/en/global/corporate/who-we-are/board-and-executive-management/executive-team/dev-sanyal.html>
85. "The Energy Transition and Oil Companies' Hard Choices." *Oxford Energy*. Published July 2019. Accessed November 25, 2019.
<https://www.oxfordenergy.org/wpcms/wp-content/uploads/2019/07/The-Energy-Transition-and-Oil-Companies-Hard-Choices-Energy-Insight-51.pdf?v=7516fd43adaa>
86. "The Energy Transition and Oil Companies' Hard Choices." *Oxford Energy*. Published July 2019. Accessed November 25, 2019.
<https://www.oxfordenergy.org/wpcms/wp-content/uploads/2019/07/The-Energy-Transition-and-Oil-Companies-Hard-Choices-Energy-Insight-51.pdf?v=7516fd43adaa>
87. "BP deploys continuous methane measurement for new major oil and gas projects." *BP Corporate Website*. Accessed November 25, 2019.
<https://www.bp.com/en/global/corporate/news-and-insights/press-releases/bp-deploys-continuous-methane-measurement-for-new-major-oil-and-gas-projects.html>
88. "Energy." *Bloomberg*. Accessed November 25, 2019. <https://www.bloomberg.com/energy>
89. "RES Polyflow Announces Renewable Fuel Agreement with BP." *RES Polyflow*. Published March 20, 2018. Accessed November 25, 2019.
<http://www.respolyflow.com/2018/03/res-polyflow-announces-renewable-fuel-agreement-with-bp/>
90. "4Q and full year 2018 results and strategy update: Webcast Q&A transcript." *BP Corporate Website*. Published February 5, 2019. Accessed November 25, 2019.
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/investors/bp-fourth-quarter-2018-results-qa-transcript.pdf>

91. "BP announces major expansion in renewable energy, combining biofuels and biopower with Bunge in Brazil to create a world-class bioenergy company." *BP Corporate Website*. Published July 22, 2019. Accessed November 25, 2019.
<https://www.bp.com/en/global/corporate/news-and-insights/press-releases/bp-announces-major-expansion-in-renewable-energy-with-bunge-in-brazil.html>
92. "Bloomberg RV Function." *Bloomberg LP*. Accessed November 20, 2019
93. "BP Invests in New Artificial Intelligence Technology." *BP Corporate Website*. Published January 28, 2019. Accessed November 2019.
<https://www.bp.com/en/global/corporate/news-and-insights/press-releases/bp-invests-in-new-artificial-intelligence-technology.html>
94. "The Energy Transition and Oil Companies' Hard Choices." *Oxford Energy*. Published July 2019. Accessed November 25, 2019.
<https://www.oxfordenergy.org/wpcms/wp-content/uploads/2019/07/The-Energy-Transition-and-Oil-Companies-Hard-Choices-Energy-Insight-51.pdf?v=7516fd43adaa>
95. "Bloomberg RV Function." *Bloomberg LP*. Accessed November 20, 2019