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Green Gilded Oil: How Faux Sustainability by US Oil Companies is Undermining Neo-Sustainability

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Abstract: Greenwashing has been a common practice among companies since the 1980s. There are some companies that take that practice to an extraordinary level. These companies create a sustainability report, dedicate pages on their website touting their environmental stewardship, spend money on projects that make them appear “green” and at the same time spend millions of dollars lobbying the government to decrease environmental regulations and stop any plan to curtail carbon emissions. We will call these companies green gilded as they are coated in a thin layer of environmentalism as a means to deceive the public. This paper analyzes some of the largest US oil producers with an in-depth analysis of ExxonMobil and Chevron Corp. It examines the money they spend on lobbying efforts to undermine actual sustainable policy. It looks into their sustainability reports, money spent to limit their carbon footprint, and money spent on environmental stewardship. It also compares the carbon footprint of each company. It analyzes the dangers of green gilding and bilking the public. It defines and describes what a neo-sustainable approach in the oil business would look like.

Keywords: Neo-sustainability; faux sustainability; greenwashing; green gilded; climate change

1. Introduction

Sustainability has been a buzzword for at least the last decade; almost every major corporation, complete with sustainability officers and sustainability reports, has embraced it. Companies big and small have defined sustainability however they see fit [1]. The embrace of the term has only led to the perpetuation of the status quo. It appeared that humanity was slowly decreasing its production of climate warming CO₂ from 2014–2016, while supporting a growing economy. However, in 2017 and in 2018 the world has reversed that trend and increased CO₂ emissions by 1.4% and 1.7%, respectively [2]. It is more important than ever that people know which companies are sustainable and which are not. Consumers who want to make sustainable choices with their purchases are left confused. Differentiating between the sustainable and the green gilded can be a difficult task for the average consumer.

There has not been enough analysis of the actual harm that the oil majors are doing towards international and national political efforts to slow climate change and mitigate the effects. This study looks into the actual money spent by the US oil majors on hindering climate action using political funding and faux science. It analyzes faux sustainability and looks for a path forward using a neo-sustainable approach.

This study compares some of the largest companies in the petroleum industry in the US according to size and impact as well as their political donations. It also compares their claimed sustainability, actual money spent on sustainable projects, and analyzes the long-term sustainability of their business models. For the purpose of this paper, the word sustainable is defined simply as something that can be done indefinitely using the resources on the planet without increasing the CO₂ concentrations in the

atmosphere. Faux sustainability is defined as creating the appearance of sustainability practice while not actually engaging in sustainable activities. Neo-sustainability is defined by Farley and Smith as “the ability of an activity to sustain a system by improving its quality and operating with its limits [1].” Green gilding is defined as the process of creating a veneer of sustainability while actively fighting against sustainability through actions, funding, and lobbying.

The companies described and compared here are the three largest in the oil/oil services industry in the United States in both income and political donations. They control over half a trillion in annual revenues and are worth trillions of dollars combined. They have an outsized influence on the American political system due to spending extraordinary amounts of money annually on politicians, political organizations, and political action committees. Combined, these politically active US petroleum and petroleum services companies spent \$94 million in the 2018 election cycle alone [3].

Their green gilding practices undermine sustainable actions and progress by creating a public image that misleads the public into believing that without major structural changes to their businesses and their holdings the company can be sustainable. By co-opting the term and using it to greenwash their clearly unsustainable businesses, they make it difficult for companies that are actually engaging in sustainable practices to set themselves apart. This can disincentivize other companies in the field from actually implementing structural changes because they, as leaders in their fields, demonstrate how to cash in on sustainability without actually doing anything that can be deemed sustainable.

Not only do these companies spend millions on politicians and lobbying, they also fund the American Petroleum Institute (API). The API funds climate change denying scientists—many of them are not environmental scientists, like physicist Willie Soon of the Harvard-Smithsonian Institute, who received \$1.25 million from API, ExxonMobil, and the Charles Koch foundation, among others [4]. Having prominent scientists deny or at least question the consensus on climate change, even if that is not their area of expertise, has provided political and “scientific” cover for politicians that work to promote fossil fuel interests.

These companies have economies that are larger than many countries. Their annual gross incomes are: ExxonMobil \$279.2 billion, Chevron \$158.7 billion, Koch Industries \$115 billion, and Marathon Petroleum \$96.1 billion [5]. A very small percentage of this income is spent on green gilding the company, while at the same time similar or larger monies were spent undermining green policy initiatives and calling into question climate science. ExxonMobil for example spends over \$200 million on community investments and \$42 million of that goes to higher education with another \$6 million spent on public policy research. The question that remains about these self-reported numbers is: How much of that money is spent funding research that furthers the self-interests of ExxonMobil by thwarting programs such as “cap and trade” and carbon taxes and how much is actually funding research that benefits science and humanity in general?

Neo-sustainability as defined by Farley and Smith as “the ability of an activity to sustain a system by improving its quality and operating within its limits,” [1] cannot be achieved without major changes to the structure of these companies. A classic oil company cannot move towards neo-sustainability without transitioning its major activity to something else. It can remain an energy company, but it cannot produce fossil fuels for the majority of its income. Outside of the examples analyzed in this paper, there are a few energy companies that are moving towards neo-sustainability that we will discuss in the conclusion.

2. ExxonMobil

2.1. Green Gilding

ExxonMobil states that they have spent \$9 billion since 2000 on reducing emissions and it does appear that their 2017 emissions are down approximately 3% from 2008 but less than 1% from 2009 numbers. There is natural variability in the oil business that may be causing some of the variation year to year depending on the number of new wells opened, the availability of infrastructure to

capture methane, flaring regulations, etc. Overall, the company's emissions are trending slightly lower. According to their own data, they are currently avoiding over 15% of what they would be emitting if they were not taking steps to mitigate emissions. They are mitigating emissions by flaring and cogeneration. They are flaring or burning natural gas that is sometimes a by-product of oil extraction. This is done because natural gas or methane can be up to 25 times as effective at trapping heat in the atmosphere as CO₂. By burning methane, ExxonMobil releases less methane and more CO₂. Cogeneration is the process of using excess heat from facilities or factories and reusing that heat energy to produce electricity or to heat a building. ExxonMobil claims that they have interests in 5400 MW of cogeneration capacity. ExxonMobil plans to implement a strategy to limit venting of fugitive gases, which are GHGs, usually methane, that escape from pressurized equipment in the extraction and treatment processes.

As mentioned as an earlier example, ExxonMobil donated \$204 million in 2017 and \$161 of the sum is accounted for as cash, goods, and services. It is unclear what form the other \$43 million is in, but they also cite \$43 million from employees, so it appears that they included individual employee giving as part of their total. While this is a tiny fraction of ExxonMobil's \$19.7 billion in profit, it does total to 1.03% of ExxonMobil profits. These monies are distributed to a number of organizations with some directly controlled by ExxonMobil and others that are completely independent.

ExxonMobil claims: "We are committed to providing affordable energy to support human progress while advancing effective solutions to address climate change [6]." They also boast 40 years of climate science done in house and in conjunction with academic scientists. Recent investigative research has demonstrated that they did indeed produce copious amounts of research on climate change and that "83% of peer-reviewed papers and 80% of internal documents acknowledge that climate change is real and human-caused, yet only 12% of advertorials do so, with 81% instead expressing doubt." ExxonMobil conducted research on climate change that supported the scientific consensus, but instead communicated to the public through advertisements that there is doubt about climate change [7]. In this way, they were encouraging the public to believe that due to uncertainty, the best policy was a "wait and see approach" or inaction. ExxonMobil's disinformation campaigns were part of a combined effort by oil majors and other players in the fossil fuel industry to continue to muddy the waters.

This disingenuous lip service is spread across the sustainability and environmental sections of the ExxonMobil sustainability report. "ExxonMobil believes the risks of climate change warrant action . . . providing customer solutions that reduce their greenhouse gas emissions and engaging on climate change policy [6]." ExxonMobil, in 2018, is funding groups that are fighting government action on climate change. "ExxonMobil gave \$1.5 million last year to 11 think tanks and lobby groups that reject established climate science and openly oppose the oil and gas giant's professed climate policy preferences [8]." It did, however, sever ties with American Legislative Exchange Council (ALEC), a group that fights against any acknowledgement of the risks caused by climate change, in July of 2018. Organizations, which ExxonMobil funds, are lobbying the Trump administration to rollback efficiency standards on motor vehicles. ExxonMobil along with other oil majors have funded, through their paid lobbyist, a Facebook page that encourages citizens to call and write to their representatives. It uses a picture of former President Barack Obama and the quote "Would you buy a used car from this man?" The site has been successful at generating 25% of the comments on the proposed rollbacks, according to a Times investigation [9]. To be clear, even the auto industry balked at some of these rollbacks, preferring a progressive move forward in efficiency, so as to not encounter a huge change in policy with the next administration. This is the current manifestation of a decades long pattern.

An example of one of these campaigns would be from their weekly New York Times op-ed ad entitled: *Unsettled Science*. In it, they use a graphic of historical temperatures of the Saragossa Sea that has been modified by non-scientists and climate skeptics to make it appear that the earth is actually a little cooler than historical averages. This is done by cutting off the most recent data and by shifting the years marked on the graph by 50 years, so that 1950 temperatures appear to be 2000 temperatures. Then they suggest that global warming may indeed be good for the planet and increased CO₂ levels

may increase forest and crop growth. ExxonMobil uses a kernel of truth: increased CO₂ can increase planet growth. However, studies have demonstrated that the benefit cannot continue indefinitely because of nitrogen limitation and because plants grown with higher CO₂ levels become less nutritious due to a loss of iron, zinc, and protein content [10]. They surround that kernel of truth with distortions and pseudoscience, all while having a team of in-house scientists and partner scientist that are well aware of the facts.

2.2. Greenhouse Gases Released

ExxonMobil is responsible for the release of 3.22% of all of the CO₂ and CH₄ (methane) emitted by human activity from 1750–2010 [11]. Exxon and Mobil, before they became ExxonMobil, were both descendants of Standard Oil, which was founded in 1870. ExxonMobil is responsible for the release of 46,672 MtCO₂ (million ton equivalent of CO₂) emissions. Both the percent of global warming gases or greenhouse gasses (GHGs) and the actual amount of CO₂ released are second only to Chevron who we will discuss next. Annually, ExxonMobil releases an average of 125 MtCO₂ annually since 2008. Their 2017 emissions were down slightly at 122 million tons.

2.3. Political Contributions

ExxonMobil spent \$1,825,138 on direct contributions to people running for office in the US as well as leadership PACs and parties. A total of 93% of their money is spent on Republican politicians. However, Beto O'Rourke (D) received the most of any particular candidate, but all of the money came from individuals who worked for ExxonMobil, not the company itself. These numbers are dwarfed by the amount of money that ExxonMobil spends on lobbying: \$11,150,000 in 2018 and \$11,390,000 in 2017. ExxonMobil lobbying has traditionally been spent on efforts to deny climate science, but they also focus on fighting regulations and delaying climate solutions. They publicly have stated that a carbon tax would be the least burdensome government intervention, but former ExxonMobil CEO said they have a preference for an "absence of policy." ExxonMobil has financially supported climate change deniers since the 1980s; they stated in a 2007 corporate sustainability report that they would cease funding in 2008 after a bipartisan letter sent by two US Senators: Olympia Snowe (R-Maine) and Jay Rockefeller (D-W.Va.) sent in 2006. Direct funding has ceased but indirect funding has continued. As mentioned before, ExxonMobil gave \$1.5 million to 11 lobby groups and think tanks that reject established climate science [8] In the US alone, ExxonMobil spends over \$14.5 million hampering the government of the United States from solving the problem of climate change. They are ranked by Influence Map as the 3rd most powerful organization at lobbying against climate change legislation. While publicly backing methane regulations, they lobbied against the detection requirements. ExxonMobil is perhaps the most duplicitous of the fossil fuel majors.

The slim veneer of environmentalism that ExxonMobil puts over its efforts to continue adding to climate change is so much more insidious than classic green washing. ExxonMobil is not just another company that is prompting inaction on climate change and GHGs and instead encouraging government to promote voluntary environmentalism; it is actively undermining any possible solutions through who and what ExxonMobil funds. In this way, ExxonMobil puts a veneer of environmental concern over concerted efforts to continue to maximize profits while actively participating, knowingly, in increasing global warming.

3. Chevron

3.1. Green Gilding

Chevron focuses on corporate responsibility instead of using the term sustainable. Its corporate sustainability report (CSR) includes sections on both climate change and the environment. Its section on climate change begins with this: "we believe that managing climate change risks is an important element of our strategic focus" as it relates to shareholder value. They state four principles that guide their

policy views and actions on climate change. These are: (1) GHG emissions reductions require global action, (2) balanced policies (economic, environmental, and energy security), (3) continued research and application of technology for cost-effective mitigation, and (4) transparent costs, uncertainties, risks, and trade-offs of GHG reduction and climate change adaptation efforts [12]. Chevron is more honest with its approach to climate change; it is apparent in the wording that GHGs are everyone's problem. Only cost-effective solutions are viable and there may be trade-offs to reducing GHGs. They boast that the company's methane emissions have gone from 0.15% in 2013 compared to total production to 0.08% in 2017. They are reducing methane flaring and evaluating biofuels as an option. Its climate change section ignores any mention of reducing the use of fossil fuels.

Chevron's section on the environment claims a number of mandated government programs as Chevron's own environmental stewardship. They cite a Richmond, CA refinery that they have installed 24-hour-a-day air quality monitoring sites. However, further research reveals that every time the local air district has put out new regulations, they have been sued by Chevron [13]. Chevron has a particularly cynical take on promoting their environmental work. They only touted environmental mandates that they were forced to partake in and many that they fought, legally, to not be involved in. This faux sustainability is not only disingenuous is also dangerous as it can create an image of company dedicated to creating a more sustainable planet, when the reality is the exact opposite. That goes to the heart of what green gilding is.

Chevron does not get high marks in sustainability from published academic sources except for one curious exception. A 2014 case study published in the *Journal of Sustainable Management* was fairly flattering; it was written by four people from Robert Morris University. Chevron, coincidentally, has invested millions of dollars funding science education at and around Robert Morris University over the years.

Chevron states: "Reduce our environmental footprint: We use our business processes to identify and manage risks to the environment and reduce potential environmental impacts throughout the life of our assets. [12]" This statement directly contradicts with Chevron's annual growth in production of petroleum. If Chevron did not actively work to undermine government efforts to "reduce . . . environmental impacts" of automobiles by raising fuel efficiency standards, it could actually embrace a plan that reduces the impact of Chevron's biggest asset oil reserves.

3.2. Greenhouse Gases Released

Chevron has released more CO₂ than any company in the history of humanity at 51,096 MtCO_{2e}, which was a total of 3.52% of the global total from 1751–2010. [11]. Chevron reports its annual MtCO_{2e} at 64 for 2017 down from 66 in 2016 but the 3rd party use of its product is 376 MtCO_{2e} up from 364 in 2016. Combined, Chevron increased its CO₂ emissions by 10 million tons year to year. Despite a continued pledge to reduce emissions, Chevron continues to add to its total as the biggest producer of GHGs in the history of the planet.

Chevron has a number of planned reductions in GHG emissions their latest goal is reducing methane flaring by 30% by 2023, based on 2016 numbers. However, Chevron has a history of promising more than it can or will deliver. As an example of this, Chevron's Gorgon facility in Australia was approved with the promise that Chevron will be sequestering the millions of pounds of CO₂ equivalent released from the drilling and compression process underground. The facility has been operational since 2016 but the company has once again pushed back its CO₂ sequestration project to December 2019. Chevron claims that they will be able to sequester between 7.9 and 11.1 million tons of CO₂ annually [14].

3.3. Political Contributions

Chevron contributed a total of \$24,034,697 to the 2018 election cycle, of which \$5,144,697 was directly contributed to candidates. \$9,600,000 was spent on lobbying in 2018 and \$9,290,000 was spent on lobbying in 2017. Chevron was rated as the fourth most influential company by Influence Map at

stopping climate change legislation. Chevron has lobbied against a carbon tax by donating \$500,000 to defeat a carbon tax measure in Washington state, lobbied for a rollback of methane emissions, and for opening up land and offshore drilling sites in all states. They are members of ALEC a longtime distributor of climate change misinformation. Their CEO sits on the board of the American Petroleum Institute, which lobbies for the rollback of methane emissions, against CO₂ regulations, and is a longtime funder of climate deniers and climate denier pseudoscience. Chevron is less duplicitous than ExxonMobil as it does not explicitly, publicly support the issues that it lobbies against but it does muddy the waters by promoting its environmental work regardless if it is voluntary or enforced due to past violations.

Chevron does engage in the process of green gilding. Chevron promises carbon sequestration and deep cuts to methane emissions. It spends millions of dollars every year to keep laws and regulations from requiring that sequester carbon or reduce methane emissions. Chevron's leaders want to be able to speak of future plans for more sustainable practices without actually being legally required to do anything. Without legal and financial ramifications, they have the ability to dupe the public into believing there are changes coming. They can spend a tiny fraction of their profits on things like carbon capture technology. (They have recently invested an undisclosed amount of money into a Canadian-based Carbon Engineering.) These relatively small investments produce press that makes them appear to be a group of concerned global citizens while they continue to increase the amount of GHGs they admit. This form of green gilding is dangerous as it masks the true dangers that a company such as Chevron poses to the planet.

4. Koch Industries

4.1. Green Gilding

Koch Industries is a special case in a number of respects. Most importantly Koch Industries is a privately held company and is not beholden to shareholders or public pressure that can be put on investors of the company. Only Cargill Inc. is a larger private company by gross income. Koch Industries does not sell many direct-to-consumer products and that further insulates them from public pressure to adhere to any moral standard in regard to the environment. This has allowed Koch Industries to be blatantly political and to publicly fund groups and scientist who question the consensus on climate change.

Charles and David Koch forced their brothers Bill and Frederick R. Koch out of the business after the death of their father Fred Koch in 1967 and now each own 42% of the company. The descendants of a close friend of Fred Koch own the remaining 16%. This allows the Koch Brothers complete control of the company and its political and environmental work. Fred Koch senior was a member of the John Birch Society, a far-right, anti-communist organization that was founded in the 1950s. Fred and Charles Koch have similar leanings and have spent a lifetime building up and funding far-right organizations that promote market solutions to societal problems [15]. These organizations also fund climate denial through lobbying and funding of scientists who either deny climate change or, like Koch-funded scientist Bjorn Jorgensen, play down the consequences.

Despite the freedom granted by private ownership, Koch Industries does tout its advances in reducing CO₂ emissions, reducing waste, and reducing toxin releases, by 10%, 14%, and 13% respectively, from 2013–2017 [16]. It does present itself as a company that is much maligned by the press and public opinion. It encourages readers to sign up for emails to find out what Koch Industries are "really" doing. Their director of Environmental, Health and Safety, Sheryl Corrigan states, "At Koch, I have never been told 'no' to any proposal that was good for people and the environment." They engage in faux sustainability.

4.2. Greenhouse Gases Released

Koch Industries generates \$115 billion a year in revenue through oil and gas, oil and gas infrastructure and pipelines, oil tar sands, cattle, mining, chemical manufacturing, logging, and paper products. They are still responsible for 300 MtCO₂e annually. This is equivalent to 0.7% of the planetary total. Koch Industries is also responsible for 1000s of spills, land and water contamination, and deaths caused by their relentless focus on the bottom line above all else. They have one of the worst environmental and safety records of any large company. They have been fined over \$836 million for 466 violations. A total of 313 of those violations were environmental. An additional 680 environmental violations were found on a self-audit of the acquired Invista Company. They do claim to have slightly decreased their amount of GHGs they release annually.

4.3. Political Contributions

Koch Industries donated \$12,060,720 to individuals and organizations. They also spent \$9,500,000 in 2017 and \$9,990,000 in 2018 on lobbying [17]. This is dwarfed by the Koch Brothers private donations, which stretch into the billions. The exact numbers are difficult to track due to the opaque nature of many of the organizations they support, like Americans for Prosperity that do not disclose donation amounts. In the 2016 elections cycle, they set a donation goal of \$889 million from their extended Koch network [18]. This massive amount of money came from a group of donors dedicated to limiting government regulation and stymying any effort to regulate GHG emissions. If Koch Industries decreased its CO₂ from 300 to 270 MtCO₂e annually, as it claims, while at the same time successfully stopping the US from regulating the other over 5000 MtCO₂e annually, their individual successes are dwarfed by the damage they have facilitated. The Koch donor network has more political control than any other group in US history. \$889 million is almost equal to the \$896 million that Clinton and Trump raised from their two candidate committees combined. The Koch brothers have created a force to stop climate action in its tracks in the United States. This has reverberated across the planet and provided cover for other countries to drag their feet on achieving the agreements of the Paris Climate Accords [19].

5. Damage

The damage these companies do by creating false scientific uncertainty cannot be overstated. They give politicians cover for ignoring scientific consensus by hoodwinking the public into believing that the science is uncertain and that the outcome of continuing to burn fossil fuels is unknown. Their disingenuous work creates a ripple effect across the industry. The ripple effect encourages other players to engage in the same behavior: support ideas with words and try to tear down those ideas with funding. Their duplicitous campaigns, to publicly accept climate change and work to stem the worst effects coupled with their private and sometimes secret funding of individuals and groups that work to undermine the scientific consensus on the climate change, seriously hamstring the international work of millions of scientists, politicians, and activists that are attempting to address what may be the biggest challenge ever faced by humanity [20].

6. Neo-Sustainable Approach

Neo-sustainability requires businesses to have complete responsibility for the life cycle of their product. This is not a new idea but a return to an older idea. A prime example of this would be soda manufacturers until the 1970s. Soda was sold in a reusable bottle that required a deposit and was returned; it was then cleaned and refilled by the manufacturer. Patagonia is an outdoor clothes and gear company that recycles and accepts back all of its products regardless of wear and tear taking full responsibility for the full life cycle of their products. This is all well good for soda and clothing, but how does this translate to an oil company? As a soda company was at one time responsible for the life of their bottles, so an oil company must be responsible for the GHGs produced through the

life of its product. Using Farley and Smith's definition, the neo-sustainable approach for a company would be one not only operates within its limits but also sustains a system by improving its quality. In order to do this, an energy company would have to define the system that they work in as the world biosphere. In that biosphere CO₂ produced and CO₂ removed would have to be equal. There are myriad ways of doing this: reforestation, creation of tall grass prairies, and actual CO₂ removal and storage are just a few of the most well-known methods. Larger projects such as replacing coal power plants with renewable energy could be another way for large oil companies to reduce their total CO₂ output. It is a limited one, as all energy systems will have to begin transitioning to renewable if the worst effects of climate change are to be avoided. A fair accounting in a project like this would be to count the amount of years left in the coal plant's life cycle. This amount of expected CO₂ that the plant would have released if it fulfilled its intended years of production can then be used as a carbon offset by the oil major. This approach will need to be mandated on an international level, as the oil majors are international players that could simply move extraction operations out of countries that are increasing operation costs by adding regulations.

7. Beginning the Transition

The process has begun, albeit too slow and too little to provide the change needed to avoid the worst effects of climate change. That being said, oil majors are hedging their bets. While most of them work to derail regulations and stop governments from creating a system of accountability for their actions, most companies are also investing in a variety of renewable energy and CO₂ capture and sequestration companies. They are also reducing the direct CO₂ they create. It is important to note that this is the CO₂ from drilling, production, refinement, and shipping, but it is not the indirect CO₂ from the burning of their products. They indeed work hard to increase those CO₂ emissions by petitioning the government and supporting politicians who are working to rollback Corporate Average Fuel Economy standards (CAFE). The most recent standards, put in place under the Obama Administration in 2012, will require automakers to have an average fuel economy equivalent of 54.5 mpg by 2025; this is achieved through a combination of electric vehicle sales, actual fuel economy improvements, and improvements to the efficiency of in car A/C units. They are currently lobbying the Trump Administration to roll these back or at least freeze them at 2020 standards. The Trump Administration has announced in 2018 plans to freeze standards at 2020 levels, but no new regulations have been released as of March 2019. Because of this uncertainty in "what will be expected of them" nationally and internationally the big oil majors have only been dipping their toes into actually dealing with the effects of the GHG and CO₂ in particular that their products release. However, there are some oil and oil industry companies that are doing better than the three discussed in detail here.

8. Better Actors

British Petroleum (BP) has been hot and cold with their reactions to embracing responsibility for their part in causing climate change. In July 2000, BP started their Beyond Petroleum PR campaign. They touted the \$45 million purchase of solar energy company Solarex, but did not focus on the \$26.5 billion spent on acquiring ARAMCO [21]. BP spent \$200 million rebranding, switching out their shield for a bright sun [22]. However, by 2013 they had moved back to their focus on petroleum and sold off all their solar investments. In some cases, actually tearing down half built projects. In 2019, they are once again invested in solar with a 43% ownership share of Lightsource BP and a plan to invest \$200 million in solar over the next 3 years [23]. No doubt this turn back to solar has more to do with the political winds in Britain and the EU. It is yet to be seen if there is follow through on these commitments or if it is another attempt to green wash an oil company with some faux sustainability.

Shell or Royal Dutch Shell has a reputation as one of the most progressive oil companies with major investments in solar and wind. They also expect oil use to increase until 2030. They are aiming to half the amount of net CO₂ emissions by 2050. This is not just direct CO₂ emissions that most oil companies look to decrease but also indirect emissions from their products. The focus on total

emissions both indirect and direct is a huge step for Shell but the target of 2050 is too late to forestall the worst effects of climate change. Climate models demonstrate that decreasing CO₂ emissions that late will slow climate change, but it will not reverse effects such as glacier melt in Greenland and Antarctica. Shell does map out a plan for a transition away from all fossil fuels by 2060. In the hypothetical world transition, an area the size of Brazil would be reforested by 2070. In this scenario, they hope to limit global warming to 1.5 degrees C. This is an important plan and it sets Shell apart from companies like ExxonMobil or Chevron. It is also important to see what Shell has actually achieved.

Shell is investing up to \$2 billion a year in cleaner energy solutions including: wind, solar, and hydrogen. They pledged, in 2018, to double that number to \$4 billion in 2019. If Shell follows through with their pledge, they will indeed become a serious player in green energy. Shell has faced pressure from activist investors that are forcing Shell in a greener direction. With a 2018 net income of over \$23 billion they could be poised to do even more. They have the potential to be more involved than any other oil company in renewable energies.

Total is the 4th largest producer of oil and gas and they are also committing to a more sustainable future. Total intends to invest \$500 million a year in renewable energy. In 2011, they bought a majority share of SunPower Corp., a US manufacturer of solar panels, for \$1.4 billion. Total has the potential to be an even bigger player in low-carbon technology field as they invested \$900 million in low-carbon technology R&D projects in 2017. The long-term effect of any of these technologies is unknown as it also unclear exactly which technologies they are investigating. They emphasis carbon capture research in their 2017 climate report [24].

It is impossible in this work to include an exhaustive list of all of the actors in world energy markets, but there are two worth mentioning here. Applied Energy Service (AES) has transformed itself from a US producer of electricity from coal into a leader in renewable energy. With revenue of \$33 billion it is no longer a small player and will be able to take advantages of changes in the energy transition. Marathon Petroleum is an especially bad actor with outsized negative political effects on US energy policy through the support of pseudoscience and climate denying politicians. A company with a net income of \$3.4 billion, they spend similar amounts as ExxonMobil and Chevron on lobbying and politicians. They are able to do more of the dirty work than either ExxonMobil or Chevron is able to do, because of their lower international profile. They are less susceptible to a public backlash. They are heavily invested in the oil refinery business and more vulnerable to changes in pollution regulations, so they keep up the pressure to not regulate GHGs or particulates.

9. Conclusions

The oil industry in general is only engaged in faux sustainability. However, there is a large difference between Chevron and Shell. It is important to note the damage created by those that engage in green gilding. Companies that support pseudoscience and the writings of academically accredited climate deniers create false scientific uncertainty and give politicians cover for ignoring the scientific consensus [25]. These players are a serious threat to the planet. They create a ripple effect; other companies use the same strategies to either deny climate science or use the purported doubt to postpone any meaningful change [26].

For neo-sustainability to have the opportunity to actually take hold, there must be legal changes that stop bad actors from weakening governmental will and warping public opinion. It is important that their destructive works are continually exposed. It is equally important to look at companies that are moving in a direction that can create positive change and have the potential to become neo-sustainable. Current international agreements like the Paris Climate Agreement do not do enough to push companies into neo-sustainability. These agreements allow companies to choose how much they want to be involved or to completely ignore them. This leaves the individual countries with an impossible task of enforcing change without corporate responsibility for their actions and the effects on the biosphere.

The current ability of companies to green wash, green gild, and offer faux sustainability has the potential to doom the world to a set of negative outcomes that will create humanitarian and migration crises that the world has never seen. It will also doom a large percentage of our fellow species to extinction. Neo-sustainability offers a counter vision. This vision will not become a reality without national and international regulations and agreements that demand all companies, especially oil companies, take full responsibility for their products and their effects on the planet.

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