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Monthly Sustainability Newsletter

INVESTMENTS IN RENEWABLES BY MAJOR OIL AND GAS COMPANIES

Chairman's Message

Dear members, partners and friends,

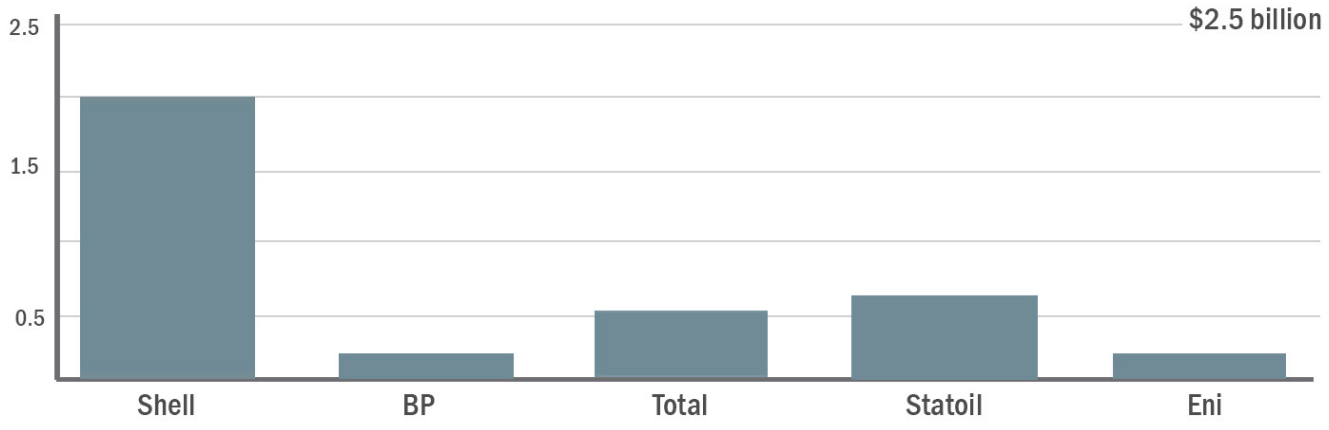
The current energy transition is typically described as a move towards a cleaner, low-carbon system. This has implications well beyond power markets, and touches on liquids, heating and cooling, industrial demands, and transportation. The role of the oil majors in this transition, is crucial for the current energy system globally, and likely to its future. As governments pursue increasingly ambitious initiatives to reduce greenhouse gas emissions and decrease their reliance on fossil fuels, international oil and gas companies (IOCs) are confronted with the challenge of repositioning their business strategies. There is no doubt that actions to mitigate climate change have implications for an IOC's bottom line. Implications that include the potential to lower long-term demand for carbon-intensive energy sources, influence public perceptions, raise costs of operation and increase expenditures on emissions-reducing technologies. In this month's issue, we look at how the major oil and gas companies are unleashing their expertise and innovative business approaches into the emerging terrain of renewables.

IOC's Investment in Renewables

IOCs are already receiving pressure from shareholders who are demanding they disclose the financial risk associated with climate change. The World Bank also decided to stop funding upstream oil and gas projects after 2019. The energy industry is now increasingly measured by their ability to reduce their environmental footprint and diversify into new energy resources. In other words, IOCs will have to progressively demonstrate how they are meeting their targets as sustainably as possible whilst also promoting sustainability.

Big Oil's Clean Energy Budget

Oil majors have allocated the following funds per year for renewable energy



Note: Statoil figure is through to 2020 and will be raised to $1 billion after

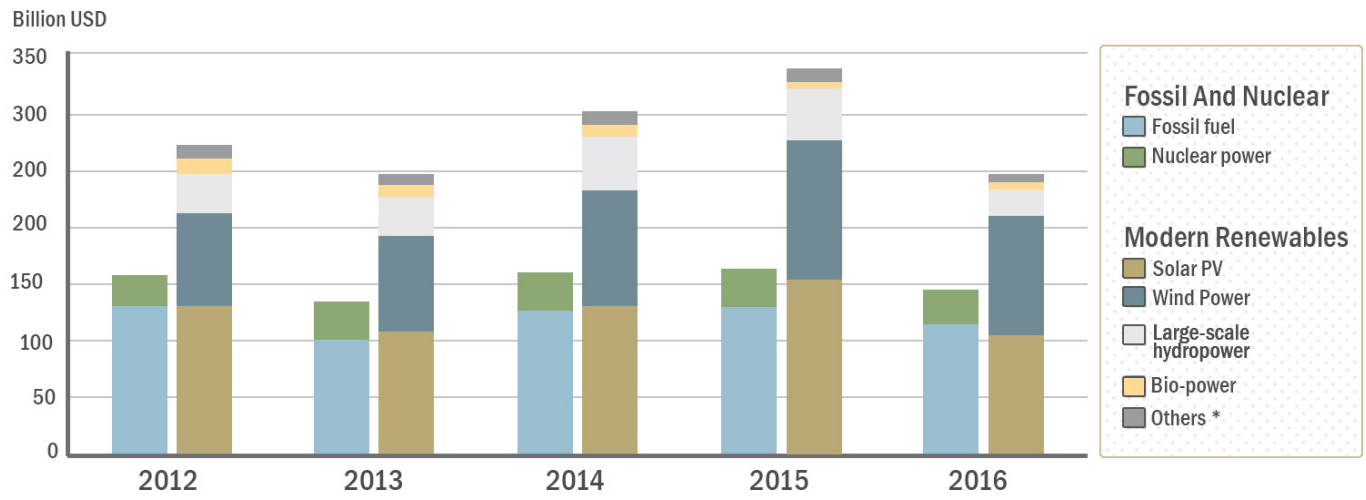
In response, IOCs are gradually becoming substantive players in the renewables market, lending their scale and business expertise to the deployment of clean energy. In the last two years, several IOCs have pledged to invest hundreds of millions of dollars in renewables. For example, Statoil announced in 2016 that the company would spend $200 million to establish an in-house venture capital arm that will expand its renewables portfolio beyond wind power. Total have shared an impressive annual pledge of $500 million to renewable energy investments. Total, however, may be overshadowed by Shell's pledge to double its original annual investments of $1 billion on clean energies through its New Energy Division, of which a substantial share will be dedicated to renewables. Even BP, after leaving the solar market in 2011, announced last December, a $200 million investment in Europe's largest solar power developer, Lightsource.

While IOCs' published projections show global demand for fossil fuel products increasing for the next two decades, many have taken initial steps to manage the risks associated with climate change. These include reducing carbon emissions for existing operations and expanding focus on cleaner energy sources, such as natural gas and renewables.

Trends of Investment

Yet even with these promises to invest in renewable energies, the IOCs appear to have dedicated only a small percentage of capital expenditures to expanding their renewable portfolio. Shell's investment of $200 million on renewables is minuscule when compared to its total CAPEX of $80 billion. Some IOCs have actually divested their holdings in renewables due to low returns on investment or to supplement upfront capital in light of low oil prices. ExxonMobil investments in renewables, are relatively small, the company has chosen to focus on algae biofuels and fuel cells by funding small research projects rather than substantial business ventures. Chevron is one of the few IOCs that has not shared, within the public domain, any plans for expanding its renewable portfolio. Neither has Chevron provided any targets for future investments in clean energy. These publicly traded companies have a fiduciary responsibility to maximize shareholder value. Currently, companies developing renewable materials, processes, or chemicals to date have generated only one-sixth of their invested capital. IOCs with a stake in clean energy have described investing in renewables as a medium-to long-term strategy.

Global Investment in Power Capacity by Type (Renewable, Fossil Fuel and Nuclear Power),



*CSP, geothermal, small-scale hydropower and ocean energy

Investment by Type

IOCs' biggest challenge is to find synergies between their existing business models and expertise and innovative new energy frontiers.

Biofuel

Due to IOC's experience in refining oil and gas products, many companies have pursued a number of endeavours in the biofuel industry. While in biofuels, IOCs still spend significant upfront capital developing unfamiliar and complex raw materials, they can leverage existing capabilities from refining through converting oil refineries or applying techniques used for processing petroleum. Conveniently, some biofuels can be mixed with petroleum products meaning they can be sold and used within existing operations. In 2015, Total announced it would halt the processing of crude oil at the La Mède Refinery and instead manufacture hydrotreated vegetable oil, or renewable diesel, making it the first biorefinery in France.

ExxonMobil, which has been relatively conservative with its investments in renewables, has a sizable research team dedicated to advanced algae biofuels and has extended this research for 2017. IOCs are struggling to keep low, the production costs for both first and second-generation biofuels, due to high feedstock prices. Shell, for example, had to cancel funding for research in biofuels made from algae and woodchips due to the poor economics of converting hydrocarbons. Total however, has been the most active of IOCs in developing second-generation biofuels. In the past two years, they have embarked on three investments ranging from a few million dollars, to hundreds of millions to produce and market biofuels composed of plant waste.

Offshore Wind

Statoil has leveraged its expertise in offshore structures to deploy four large-scale offshore wind farms in Europe. As one of the world's largest offshore operators with a long history of working in the turbulent North Sea, the company has an unmatched understanding of floating structures, well-developed port facilities, shipbuilding for installation vessels, and cable designs. Statoil was thus well positioned to build the Hywind Turbine, the world's first floating wind turbine in Scotland, UK. While the company has limited its exploration in other areas of renewables, it remains the primary stakeholder in this unprecedented project. Statoil originally owned 100% of the project until it sold 25% of its stake to Masdar, a renewable energy company in Abu Dhabi.

Other IOCs, such as Shell, have begun to express interest in wind farms. Shell recently won a bid to build a 680 MW wind farm in Netherlands and Eni's subsidiary Saipem, signed a contract in April 2016 to execute the lift and mating operations for Statoil's Hywind Turbine. Statoil's pledge to dedicate 25% of its CAPEX to new energy solutions and its recent bids in the U.S. offshore market signals that the Norwegian company will continue expanding its operations in offshore wind.

Solar

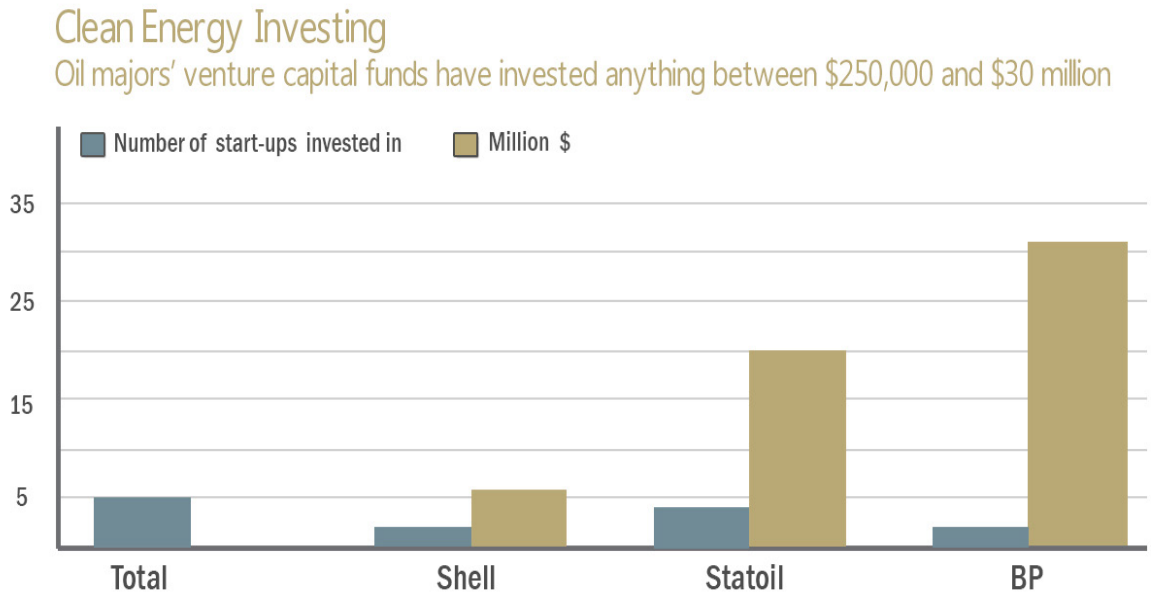
Total, Shell, and Eni are pursuing efforts in large-scale solar energy production. Eni is planning to deploy solar power plants within and outside of Italy. In 2016, the company announced the Progetto Italia initiative to build 15 large-scale solar power plants next to oil and gas brownfields (existing facility). Outside of Italy, Eni is similarly looking to repurpose brownfields and Greenfields in Pakistan, Egypt, and Algeria.

Eni estimates these projects will save up to 0.3 M/tons of CO2 per year for the next 20 years. Other companies have shown interest in Eni's integrative solutions. In 2016 and 2017, General Electric and Statoil respectively signed a non-binding framework agreement with Eni to jointly assess renewable energy projects located near existing oil and gas operations. Shell is also planning to integrate construction of a solar power plant with existing property by building one on an unused parcel of land next to its Moerdjik chemicals site in the Netherlands.

Total's interest in solar caught the oil and gas industry by surprise when it became part of one of the three largest solar energy providers after purchasing a 66% stake in SunPower a premier manufacturer of solar panels, in 2011. Although Shell was previously involved with manufacturing PV panels, Total SA is one of the only IOCs to have experience deploying utility-scale solar power plants. In 2013, Total also won a 20% stake in Shams 1, a concentrated solar power plant (CSP) in Abu Dhabi that was the largest CSP plant at the time. These two projects align with Total's aim to leverage resources from acquired companies and become an electricity trading company. Other IOCs have followed suit with significant acquisitions in solar power developers, such as Shell's acquisition of a 44.83% interest in Silicon Ranch Corporation as well as retail energy provider MP2.

Investment in Start-up Ventures

IOCs have provided corporate venture capital (CVC) funding to start-ups whose services and products are not necessarily integrated into IOCs' business strategy or operations, but nonetheless allow them to have a small stake in renewable energy. CVC funding is provided to start-ups exploring emerging technologies. Examples include Shell's £5 million venture funding to Kite Power Solutions, which generates wind power from kites, and Statoil's equity stake in United Wind, a company that leases wind turbines to homes. The degree to which IOCs are involved in the funded start up's operations ranges from owning a minority equity stake and sitting on the board of directors as an observer to restructuring the start-ups' business strategies.



Complementarity of Renewables with Natural Gas

Several IOCs have acknowledged the importance of natural gas in complementing the production of intermittent renewable resources. Natural gas's ability to partner with renewable energy sources encourages a broader approach to the end-to-end electricity value chain in terms of availability and cost. Total created a new Gas, Renewables, and Power Segment in 2017, however not all IOCs have shown interest in providing both gas and electricity production.

both gas and electricity production. While certain IOCs have openly acknowledged the importance of gas in supplementing renewables, most do not appear interested in complementing their investments in renewables with their holdings in gas.

Shell's speculative investigation in creating a solar plant that can switch to gas when the solar power is not available demonstrates their interest in integrative gas and renewable energy solutions. Shell confirmed last year that the company is looking to build such solar plants in Australia and Oman. Oman is a reasonable choice given Shell's experience with hybrid solar and fossil fuel solutions through its solar Enhanced Oil Recovery (EOR) plant, but Australia provides an interesting case study. Shell is Australia's biggest LNG exporter and may be searching for markets for future gas production from its 25% stake in Gorgon joint venture, which is developing Australia's largest known undeveloped gas resource.

Future Contributions of IOC's

The investments in renewable energy technologies and systems by IOC's is a rapidly changing landscape. Companies demonstrate a diverse mix of strategies in their attempt to embrace entrepreneurship in renewables markets, leverage their expertise in oil and gas production, and create an integrated value chain. Companies have seen mixed success in their efforts thus far, and the models IOCs choose to follow as they become interested in deploying renewables are still emerging. Existing challenges to integrate renewables into IOCs' business strategy perhaps indicate the potential chaotic forces that may arise during the transition to a clean energy economy. With recent news of General Electric's job cut of 12,000 employees due to decreased demand for natural gas, IOCs are under increasing pressure to adjust to an increasingly uncertain energy landscape. Nonetheless, these shifts in energy economies provide IOCs with an exciting opportunity to explore innovative options for leveraging their competitive advantages in the energy transition.

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