

How should the oil sector respond to the Paris Agreement?

The world will never exist in a zero-oil paradigm. Oil's characteristic energy density, relative abundance, and transportability has made it indispensable to all economic, technological, and political landscapes; and the recent ratification of the Paris Agreement will not impose an immediate threat to the oil sector. But, overtime stricter emission standards and environmental incentives will overtake the energy landscape. And gradually oil will start to face immensely uneven changes in demand across its different sectors (transportation, industry, power...etc.); manifesting differently in developing, developed and oil-producing nations. So, big oil's efforts to remain relevant must obviously treat each instance separately, and wholly.

Within the power generation sector, oil stands to lose a large share of its competitive advantage in developed countries. As it is, the Paris Agreement has provided developed countries with the incentive, and arguably the necessity, to transition into a purely renewable and natural gas energy mix. Additionally supported by their access to the required capital and expertise. And to maintain its share of the power sector, oil will need to rebrand itself as the cheaper producer with zero emissions. For large oil companies, this looks like investing in efficiency enhancements and equipping operating generation facilities with Carbon Capture and Storage (CCS) or similar technologies. Both the Intergovernmental Panel on Climate Change (IPCC) and International Energy Agency (IEA) have already come out heralding CCS as critical to preventing the worst effects of climate change. A positive message to associate with oil.

More pressing than power is transportation. A recent study at the IEA identified a sharp decline in the demand for oil in developed countries by 2040. The decline was surprisingly driven by reductions in travel demand and efficiency gains. Which will likely be a response to new alternative bio-fuels and a growing prevalence of autonomous and fleet-pooled vehicles. As such, it would be in the obvious interest of oil companies to diversify their technology and supply hybrid bio-fuels downstream and midstream. Of course, as an advocate of solving a problem and not simply displacing it, the recommendation stands only under the assumption that tail-pipe emission savings do not outweigh life-cycle energy costs associated with harvesting and hauling the bio-fuel.

While CCS and bio-fuels are great opportunities for oil to outlive the Paris Agreement, if this world is championing a 1.5-degree benchmark, electric vehicles (EV) are the long-term solution. But, until clean energy becomes globally ubiquitous, petroleum is the better alternative for some countries to achieve their Nationally Determined Contributions (NDCs). This is because EVs are only as *green* as the associated smoke stack and in some countries, like China or regions in the U.S., power generation is predominantly coal-driven. Thus, a larger number of EVs entails the release of four times the greenhouse gas (GHG) emissions per vehicle. So oil companies should conduct regional life cycle analyses to identify the markets that should be using petroleum. After which, advertise to the public, in those precise regions, the drawbacks of EVs and successfully dampen the impact of a slowing demand for oil. Then once developed nations attain clean power, it will fall on the oil industry to morally decide to stop campaigning *for* petroleum.

But the demand for oil looks very different in developing countries. Over the next 30 years, the Energy Information Agency (EIA) estimates energy use per capita in the developing world will increase by 46% as their populations begin to live and emit like us. During which, industry and government will understandably rely on cheap, accessible fossil fuels to support national economic development. And more oil-guzzling cars will be purchased and driven per household. In response, oil industries will observe unprecedented growth across all sectors.

But, signing the Paris Agreement does institute an ethical environmental responsibility for governments to uphold. And eventually the developing world must confront their paradoxical priorities in power generation and decide to either meet demand at a low cost, or incur significant economic burden and invest in renewables. Ironically the best solution is a collaboration between the oil companies and the commitments made in the Paris Agreement. Specifically, the commitment by developed nations to annually raise one-hundred-billion dollars (until 2020) to assist developing countries fight climate change. Then considering the lack of outdated, inefficient built infrastructure in developing countries, this gap is best filled (and fund best spent) with predominantly oil and natural gas power generation plants, all equipped with seemingly expensive and advanced emission sequestration technologies like CCS. Of course, only relevant for regions where renewables are largely infeasible due to prolonged wet seasons and limited space. Also if oil companies emphasize (and to some degree monopolize) their product in these specific regions, they can prevent developing countries from ever relying on coal.

The Paris Agreement similarly pursues Global Sustainable Development. Vague and open to interpretation, sustainable development will be taken to imply: globally maintaining a healthy and universal standard of living. Recent international development initiatives have sought to effectuate this through transitioning rural communities to ‘greener’ biomass fuels for cooking and heating. Compromising the associated risk of local biomass resource depletion and the potential health side-effects (due to indoor air pollution). Liquefied Petroleum Gas (LPGs), while not a zero-carbon resource, would substantially reduce risks and provide a considerable market for the diversifying oil sector. Studies show this shift to add approximately less than 2% to global GHG emissions. A small price to pay.

The fight to protect our future does not filter down to fossil fuel vs. no fossil fuel. Oil producing nations alone would experience instantaneous economic collapses. And it would also take vast innovation in technology to make renewable energy globally feasible. But, preventing permanent climate change is fighting to maintain a quality of life for *everyone*. So as the oil sector lobbies to stay relevant, it is obliged to remain vigilant of both industry *and* the environment. That said, when the time comes where clean energy is holistically the greener alternative it is up to regional policy to incentivize the final transition. In the end, our united commitment should protect everyone’s right to live, and not just to survive.