Why the Energy Industry Needs to Build its Own Carbon Offset Exchange to get to Net Zero

Framework for a Carbon Offset Market for the Energy Industry

Amid the negative news of 2020, one bright spot was the rise in ESG statements and strategies among industrial companies, and in particular, the oil industry. While it was once a rarity to see an E&P company commit to reduce its carbon impact, now it is far more widespread. This trend has only just begun. More companies are measuring their carbon emissions, managing their operations more sustainably and reporting on these metrics.

Despite these positive developments, there are two main impediments to the oil and gas industry's momentum:

- First, there is no uniformity in E&P companies' goals and plans. Different companies are measuring different emissions using different technologies – while each company may be making progress, it is very hard to make comparisons across the industry.
- Second, currently there is no explicit economic incentive for E&P companies to reduce their greenhouse gas (GHG) emissions. There are clearly benefits to being a good actor – gas that is not flared can be sold, for example, and investors may reward responsible companies with premium valuations – but without more explicit incentives, progress will stall. As we will explain in more detail, and somewhat bizarrely, as one of the main industries at the epicenter of the environmental debate, E&Ps (and for that matter most industrial emitters) have no way to generate offsets from reducing emissions, or even from keeping hydrocarbons permanently in the ground.

Little has happened in the past year to quell the world's thirst for oil. With global lockdowns and limited vapor trails overhead, in 2020 oil demand declined just 9% versus 2019. Not for the first time, reports of the industry's death have been greatly exaggerated and it is likely that the oil and gas industry will be around for many years to come. Given this, it is imperative that the industry greatly reduces its emissions, and Kimmeridge believes that delivering net zero scope 1 and 2 oil and gas production should be achievable.

The current rules governing offset projects are too cumbersome, bureaucratic and academic, as they fail to grasp the potential for meaningful emission reductions from the industry. With an increasing number of oil and gas companies declaring net zero emissions policies, it makes sense to do this through internal emissions reductions rather than purchasing offsets from outside the industry.

2020 also appears to have been a turning point for carbon offsets. Each offset represents the reduction or removal of one metric ton of carbon dioxide equivalent from the atmosphere, spanning projects across the globe, from forestry to renewable energy to energy efficiency. The clamor for offsets has grown so loud that demand is very likely to outstrip supply in the next five years, especially for offsets generated in the US.

In this white paper we will argue that there is a solution to these problems: **E&Ps need to commit to an independently verified reduction in the carbon intensity of their production of 50% by 2030 (bringing**

them in line with the "Biden Plan") and create an industry-wide offset exchange to facilitate carbon trading.

Both elements are needed. By committing to reducing the industry's carbon emissions by 50% by 2030, there is an explicit goal to hold companies to. And by having the industry participate in an exchange, the necessary incentive program can be created to achieve that goal.

In the following pages we will discuss how the industry can improve. Then we will dive into the exciting but strange world of voluntary carbon offsets. Voluntary offsets have facilitated certain programs of carbon reduction but have been somewhat arbitrary in their focus areas. For them to succeed more broadly, they will need to be applied in industries that have historically been excluded from generating offsets. We will then turn to what an industry committed to **The Pledge** could look like. Finally, we argue that given the current narrow focus of existing carbon registries and exchanges, the industry will need to begin by setting up its own system.

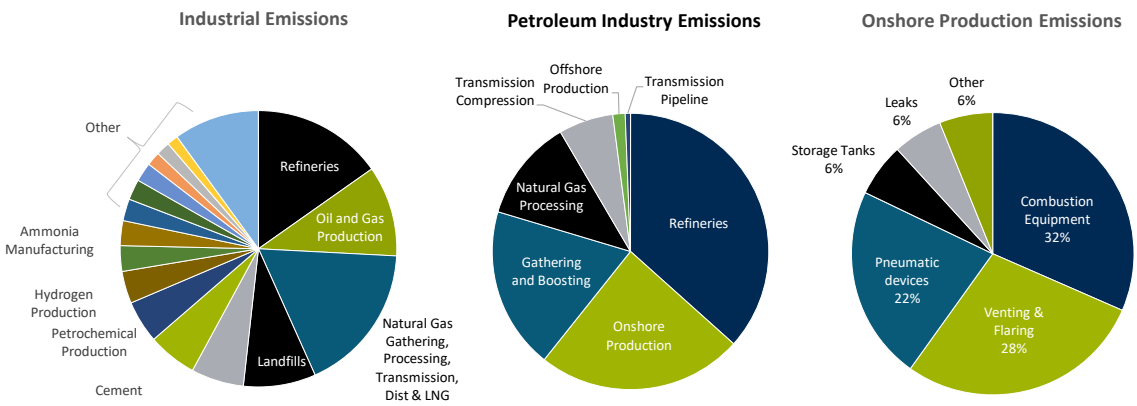
The Pledge: The US E&P Industry Will Reduce GHG Intensity by 50% by 2030

Kimmeridge pledges to reduce the GHG intensity (metric tons of CO_2e per 1,000 boe produced) of our gross operated production by at least 50% by 2030 from a 2019 base level (peak US oil and gas production). We encourage others to do the same and join several E&P companies who have outlined similar goals. Indeed, recent industry M&A has also been a catalyst for improved ESG strategies (e.g., the net zero pledge announced alongside the merger between Bonanaza Creek Energy and Extraction Oil & Gas)[1]. These reductions can be achieved through better operational practices as well as proactive emissions reduction. To name just a few examples, E&Ps can plug and abandon (P&A) orphan or marginal wells on their leases; they can invest in emissions technologies such as carbon capture and storage (CCS); they can do better soil/land management where they own the surface; they can change their power generation mix by utilizing land for solar and wind power. These activities, when measured against an independently verified baseline, can generate offsets that will be the foundations of a new offset exchange, which will focus on real, measurable emission reductions from the industry.

According to the EPA, 23% of the US GHG emissions come from industrial processes, totaling 1,316 $MtCO_2e$ in 2019. Of this, under half (486 $MtCO_2e$) was associated with the petroleum and refining industries and 10% was emitted by US onshore oil and gas production. This 117 $MtCO_2e$ from the onshore segment is around 2% of US GHG emissions and it represents the oil industry's scope 1 emissions - this is something the industry can directly control (Figure 1).

[1] Kimmeridge is the beneficial owner of approximately 38% of the outstanding shares of Extraction and Ben Dell, one of the founders of Kimmeridge, currently serves as Chairman of the Board of Directors of Extraction and is expected to continue in this role for the combined company to be named Civitas Resources, Inc.

Figure 1: Industrial GHG Emissions in 2019; Petroleum and Onshore Production Segments



Reducing emissions is good business practice: from better operational management, to obtaining higher prices when selling assets to others, to approaching lenders and investors for new financing arrangements. Furthermore, it should have the incentive of generating carbon offsets. However, until recently the industry has been skeptical of the need for offsets, and the offset industry and registries have struggled with how the oil industry can fit into their protocols. Offsets can incentivize the industry to accelerate emissions reductions beyond state or federal requirements. This should be in everyone's interest, but it likely requires a dedicated industry offset program.

How Carbon Offsetting Works

The principle behind offsets is meant to be simple: if you are emitting a ton of carbon today, and you stop emitting that ton of carbon next year, you should be able to generate a credit for one ton of carbon. You can then sell this to someone who wishes to offset their own ton of emitted carbon, so they buy the credit from you. But behind a simple concept, the reality of how offsets actually work is messy and complex, and limits which emitters or projects can generate offsets.

The California Air Resources Board (CARB) has a compliance-based cap-and-trade program which regulates the major sources of GHG emissions in California and issues ARB Offset Credits to qualifying projects that reduce or sequester greenhouse gases. CARB defines offsets as "real, quantifiable, enforceable, permanent, additional and verified reductions of GHGs generated from projects in economic sectors – like forestry or agriculture. These projects include activities such as managing forests so they store more carbon, eliminating harmful and powerful GHG refrigerants that also destroy the ozone layer, changing the way rice fields are managed to limit the generation of the super-pollutant methane and capturing and destroying methane from livestock operations".

Offsets are created by projects in broad categories that have had protocols developed for how the cardon reduction will occur and how it will be verified. There are several categories of projects as defined by the European Union, UN, CARB and various voluntary registries, covering the following activities: Forestry, Land Use and Agriculture, Energy Efficiency/Fuel Switching, Chemical Processes, Waste Disposal, Transportation, Renewable Energy and Household Devices (Table 1). Protocols for generating offsets from these projects have been established over the last 20 years, but strangely,

lowering oil industry emissions, such as stopping methane and CO_2 leaking out of old shut-in wells, has not been considered. This is primarily because the abandonment of these wells should have been the responsibility of the company that drilled them in the first place. This is indeed true, but if the company has since gone bankrupt, these fugitive emissions can be easily and immediately stopped by other industry participants. It seems clear to us that we should embrace mechanisms and processes that incentivize companies and industries to stop or limit emissions now.

Table 1: Broad Offset Categories as Defined by Forest Trends' Ecosystem Marketplace

Project Category	Project Type
Agriculture	Fertilizer - N20 Grassland/rangeland management Livestock methane No-till/low-till agriculture Rice cultivation/management Sustainable agricultural land management Other - Agriculture
Chemical Processes/Industrial Manufacturing	Nitric Acid Ozone-depleting substances (Article 5) Ozone-depleting substances (US based) Carbon capture and storage Coal mine methane Other - Chemical Processes/Industrial Manufacturing
Energy Efficiency/Fuel Switching	Energy efficiency - community-focused (targeting individuals,communities, etc.) Energy efficiency - industrial-focused (targeting corporations) Fuel switching Waste heat recovery Other - Energy Efficiency/Fuel Switching
Forestry and Land Use	Afforestation/reforestation Agro-forestry Avoided conversion Improved forest management REDD - Avoided planned deforestation REDD - Avoided unplanned deforestation Soil carbon Urban forestry Wetland restoration/management Other - Forestry and land use
Household Devices	Clean cookstove distribution Water purification device distribution Other - Household Devices
Renewable Energy	Biogas Biomass/biochar Geothermal Large hydro Run-of-river hydro Solar Wind Other - Renewable Energy
Transportation	Transportation - private (cars/trucks) Transportation - public (bikes/public transit)

	Other - Transportation
Waste Disposal	Landfill methane Waste water methane Other - Waste Disposal

Source: Forest Trends' Ecosystem Marketplace; https://www.forest-trends.org/

The current project categories used by the registries to generate offsets will have specific protocols that have been defined by the different bodies and agencies. Then there are four classes of participants that are usually required to generate the offset. First are the **project developers** who will define and implement the emission reduction work for a particular project if it meets current criteria or could fulfill a new category. Developers will then interact with offset **registries** who will endorse and list their project and register the carbon credits sold. The registries will also validate and audit the project through an approved list of **verifiers** so anyone who purchases the offset can guarantee their authenticity. Lastly, **resellers** are required to sell the credit to customers by purchasing and brokering the credits to the developers with the sales recorded in the registry.

Examples of current offset projects are varied, eye-opening and arguably niche, with many focused on forestry, as well as methane destruction, typically from coal mines (Figure 2).

Figure 2: Examples of Current US Offset Projects in Coal Mine Methane Destruction and Forestry

Elk Creek CO, Abandoned Mine Project

- 3MW power plant in conjunction with an enclosed flaring system recovering approximately 50,000 m3/d of methane
- Methane is extracted from the underground mine workings and supplied to methane destruction technologies
- The Project uses three 1 MW (1500 hp) Guascor lean-burn gas engines to generate electricity and an Abutec flaring system
- An electric substation on site supplies the power to the electric utility and ski area
- Gas flow meters and a methane analyzer are used to continuously meter the amount of methane destroyed by the Project activities

Hawk Mountain PA, Forest Management

- Hawk Mountain's mature oak and hickory forest has substantial timber value
- However, in 2018, the land was placed into a perpetual conservation easement and generates income through the sale of carbon offsets
- The improved forest management sequesters 45,000 metric tons of carbon dioxide each year above the regional baseline
- The project is classified as "additional" under the carbon accounting standards as the carbon savings would not have happened without the offset project (ie the trees were not harvested) and the project would not have happened without the ability to sell carbon offsets

Source: Climate Action Reserve; American Carbon Registry

Current Offset Registries – Compliance versus Voluntary

Two types of programs have historically existed for generating and trading offset credits. The most valuable offsets are those associated with some form of government regulatory process – these are called compliance programs and include government-certified cap-and-trade systems. The second kind is voluntary programs run by NGOs, some of which are in the US, that have similar protocols and project

categories as the compliance programs. In some cases, voluntary programs also work with compliance programs like CARB in California, to qualify new projects for the compliance market.

Table 2: Examples of Current Compliance and Voluntary Programs

"Compliance" Carbon Offset Programs (Run by Governmental Bodies)	Geographic Coverage	Label Used for Offset Credits
Clean Development Mechanism (CDM) [2]	Developing Countries	Certified Emission Reduction (CER)
California Compliance Offset Program	United States	Air Resources Board Offset Credit (ARBOC)
Joint Implementation (JI) [3]	Developing Countries	Emission Reduction Unit (ERU)
Regional Greenhouse Gas Initiative (RGGI)	Northeast United States	RGGI CO_2 Offset Allowance (ROA)
Alberta Emission Offset Program (AEOP)	Alberta, Canada	Alberta Emissios Offset Credit (AEOC)

"Voluntary" Carbon Offset Programs (Run by NGOs)	Geographic Coverage	Label Used for Offset Credits
American Carbon Registry	United States, Some International	Emission Reduction Tonne (ERT)
Climate Action Reserve (CAR)	United States, Mexico	Climate Reserve Tonne (CRT)
The Gold Standard	International	Verified Emission Reduction (VER)
Plan Vivo	International	Plan Vivo Certificate (PVC)
The Verified Carbon Standard	International	Verified Carbon Unit (VCU)

Source: Carbon Offset Research and Education (CORE) 2: CDM has functioned primarily as a regulatory program under the Kyoto Protocol, it now also caters to voluntary purchasers 3: JI is also an offset program established under the Kyoto Protocol used in developed countries

Historically, carbon offset credits are generated when projects meet the standards using protocols that have been approved by the UN, carbon cap-and-trade entities such as the European Union Emissions Trading System (EU ETS), CARB, and programs in Canada and other areas, in addition to voluntary registries typically run by NGOs. Many of the voluntary registries are also approved as project registries that feed into the cap-and-trade entities like CARB, so offsets can be converted to credits that can work within the cap-and-trade program. This regulated market sets the demand for offsets based on predefined emissions reduction targets.

Outside the regulated market, voluntary registries are used by various bodies to offset their emissions based on internal targets. Recently this practice has been growing both as an ethical approach to business and in response to the pull from consumers and investors. Voluntary registries develop offset project protocols through their carbon accounting standards, monitor and verify emission reductions and register the offsets generated.

A company wishing to buy carbon credits can approach the appropriate registry associated with a particular project type (or a broker who can put together a portfolio of credits). Once sold, the credits are then banked to be used against future emissions or retired if they are offset against emissions immediately. The compliance cap-and-trade programs are deemed to be the most "senior" of the carbon credits as they can be exchanged and traded. Whereas the voluntary registries in the US and in Europe, such as the Gold Standard registry (which partners with the UN), will issue credits that have been developed from a wider range of projects using the registries' own standards, which may lie outside the narrower project list that the larger cap-and-trade entities use.

Pricing of credits differs widely due to project type and whether they are part of a compliance program or voluntary. The voluntary credits are generally cheaper than credits used in the regulatory market, but there appears little logic to why some voluntary credits are more expensive than others, as they are all denominated in reducing or removing one ton of carbon equivalent from the atmosphere. There is also no official global marketplace for voluntary credits, with each registry controlling the issuance and retirement of the credits created by their protocols. Voluntary markets use an OTC mechanism to transact, with the transfer of ownership recorded by the registries. Additionally, registries typically make the project registration and verification documents public to ensure transparency and protect against double counting or selling. All of this sort of works in the embryonic and emerging system for voluntary offsets, but it is clearly not an optimal structure. As demand to become carbon neutral grows, further standardization will be needed.

Voluntary Offset Market Supply, Demand and Trading

According to Ecosystem Marketplace's (EM) survey, 2020 offset volume was surprisingly strong despite the pandemic and the loss of volume from the carbon footprint offsets associated with aviation and tourism. Although the 2020 numbers have not been released, in 2019 offset issuances were up significantly versus 2018 (Figure 3), outpacing the volume of retirements. However, as there is no clear marketplace or platform, the trading volume is not very transparent. It appears from the Ecosystem Marketplace data that the offsets traded have gone up dramatically from 43.2 $MtCO_2e$ in 2017 to 90.7 $MtCO_2e$ in 2018 to 100.4 $MtCO_2e$ in 2019[2]. The increase in trading over the last few years seems to be driven by a rise in renewable energy credits which have more than doubled. These credits are cheaper than other offsets and have pushed down offset pricing. In fact, several of the voluntary registries stopped accepting renewables energy projects at the end of 2019.

[2] Forest Trends' Ecosystem Marketplace, *Voluntary Carbon and the Post-Pandemic Recovery. State of Voluntary Carbon Markets Report, Special Climate Week NYC 2020 Installment.* Washington, DC: Forest Trends Association, 21 September 2020.

Figure 3: Annual Voluntary Carbon Offset Issuances and Retirements, 2007–2019

Source: Forest Trends' Ecosystem Marketplace

One of the changing dynamics for the voluntary credit market has been the shift from being supply-driven by companies that want financing for carbon reducing projects, to a market that today has more of a demand-pull effect, as more companies want to offset emissions and move to a net zero position. However, tracking the voluntary offset market is difficult as there is no central marketplace, which exists within the compliance markets, and no standard for what counts as a "real" offset.

This raises some fundamental questions: Are the few established registries the only entities that can issue credits? Do we accept that other entities will be required to meet future demand, which will likely massively outweigh supply? Existing carbon accounting principles are woefully inadequate to incentivize widescale emission reduction strategies, so undoubtedly, other voluntary offset marketplaces will emerge. Ultimately, large financial institutions will try to develop one single market for voluntary offsets and derivatives will likely follow. Elements of this are already underway with the CME GEO futures contract and we believe more are in the works.

Looking at the work of Ecosystem Marketplace and others, it appears that in 2019, the volume of renewable energy generated "offsets" exceeded those from forestry and land use. However, the prices of forestry and land use offsets averaged more than three times those of renewable energy (Figure 4). This is just one example of the perverse outcomes of voluntary markets, where one ton of carbon is clearly not fungible with another ton of carbon, despite any clear rationale for the discrepancy.

Figure 4: Transacted Voluntary Carbon Offset Volume, Value and Weighted Average Price, 2017-2019

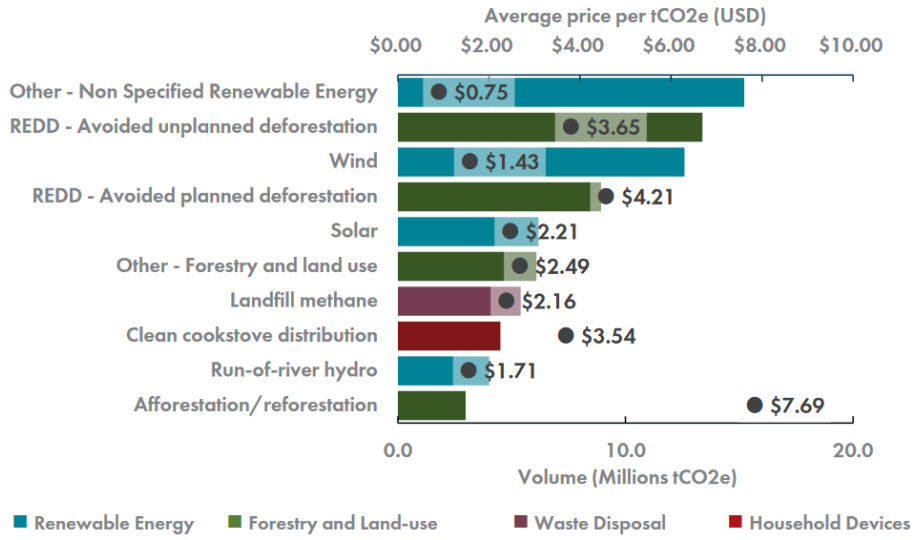
	2017			2018			2019		
	VOLUME MtCO2e	AVERAGE PRICE	VALUE	VOLUME MtCO2e	AVERAGE PRICE	VALUE	VOLUME MtCO2e	AVERAGE PRICE	VALUE
FORESTRY AND LAND USE	16.6	$3.4	$63.4M	50.7	$3.2	$171.9M	36.7	$4.3	$159.1M
RENEWABLE ENERGY	16.8	$1.9	$31.5M	23.8	$1.7	$40.9M	42.4	$1.4	$60.1M
WASTE DISPOSAL	3.7	$2.0	$7.4M	4.5	$2.2	$10.0M	7.3	$2.5	$18.0M
HOUSEHOLD DEVICES	2.3	$5.0	$11.8M	6.1	$4.8	$29.5M	6.4	$3.8	$24.8M
CHEMICAL PROCESSES/ INDUSTRIAL MANUFACTURING	2.6	$1.9	$4.9M	2.5	$3.1	$7.9M	4.1	$1.9	$7.7M
ENERGY EFFICIENCY/FUEL SWITCHING	1.1	$2.1	$3.3M	2.8	$2.8	$7.8M	3.1	$3.9	$11.9M
TRANSPORTATION	0.1	$2.9	$0.2M	0.3	$1.7	$0.5M	0.4	$1.7	$0.7M

Notes: This figure does not include responses that didn't provide price data.

Breaking down the voluntary market from the EM data shows that most offset projects are highly skewed towards forestry, both the planting of additional trees and the deferral of cutting down trees, or "Forest Harvesting" in commercial operations, along with renewable projects (Figure 5).

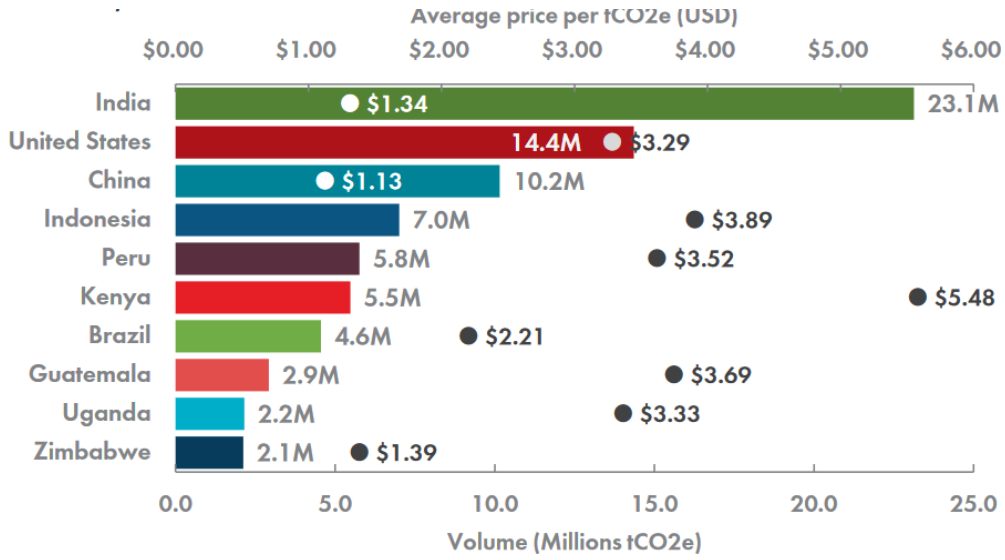
However, in many cases, renewable projects in the US will not generate offsets going forward. Instead, they will be awarded renewable energy credits (RECs), tradeable market-based instruments based on a MWh of electricity generated and delivered to the grid from a renewable source. RECs are not interchangeable with offsets and are mostly used by utilities and large power consumers to meet their regulated emissions targets, so this dynamic may lead to even fewer usable "offsets" for corporations and individuals seeking to reduce their carbon footprint.

Figure 5: Transacted Voluntary Carbon Offset Volume and Average Price by Project Type (Top 10), 2019



Another form of "offset discrimination" that has emerged within the voluntary offset marketplace is geographic. Figure 6 shows the price of the same offset unit (i.e., one ton of CO_2e) from different countries in the world. The lower price per ton for offsets in India and China indicates the lack of fungibility in the offset market. Clearly there is some underlying suspicion that an offset from India or China is not worth as much as an American offset, even though in some cases the offsets were issued by the same voluntary market registry for the same project class. As more US consumers will likely want US offsets (EM estimates that 80% of credits purchased in North America come from US projects), the price will rise accordingly, which may incentivize more offset issuance, especially if they were more costly to generate in the first place. But the bureaucratic process and resultant timeline for issuing new US offsets using the voluntary offset registries make it likely that corporations and individuals will turn to new marketplaces in search of offsets if the same validation, verification and monitoring can be proven.

Figure 6: Top 10 Countries by Volume of Voluntary Carbon Credits Project Locations, 2019



Source: For Figures 4, 5 and 6 - Forest Trends' Ecosystem Marketplace

If readers are scratching their heads because there is no mechanism to reward companies in the oil and gas industry (or processing/refining) who dramatically seek to reduce their emissions by using new technology, improved operational practices and sound financial metrics, then spare a thought for the renewable sector. Wind and solar, the poster children for the renewables sector were dealt a bit of a blow in 2019. Several voluntary registries, including Verra in the US, removed larger grid-connected projects from their offset list, but retained projects that were developed in "Least Developed Countries" and projects that were off-grid. It could be viewed that receiving tax credits for renewable power along with offsets is double counting, or that the recent proliferation of large-scale wind and solar plants are not replacing enough coal-fired power in many locations in the US and are simply being added to the generating capacity. Logical and consistent? We will let you be the judge, but there is clearly scope for a new platform that seeks to lower emissions on a unit of hydrocarbon basis, or even the acceleration of hydrocarbon project abandonment all together.

Our proposal for a new offset registry for industrials would hardly be the first new registry or marketplace that does not rely on the very specific, and we would argue flawed, carbon accounting

standards of the existing registries. There are several different entities that have been set up to generate offsets associated with reducing and removing CO_2 from the atmosphere. The offsets generated by NORI (focused on agriculture) and SilviaTerra (forestry) and their markets are described in Figure 7 and again are verified by third parties, but do not conform to the specific and narrow protocols of projects within the traditional voluntary registries. These examples of specifically tailored startup offset marketplaces are useful in contemplating a new offset registry for industrials.

Figure 7: Alternative Voluntary Offset Marketplaces Outside the Traditional Registries

NORI	SilviaTerra
• By using sustainable, regenerative farming practices, farmers remove carbon from the atmosphere and store it in their soil • Storing carbon in soil is low cost, high impact carbon removal • Farmers can register their carbon removals on the Nori marketplace, where they can sell directly to individuals and organizations • You pay the farmer for their carbon removals, and receive digital certificate of ownership and they are retired immediately • All records are registered permanently on a blockchain database, so you will always have proof of your purchase • Nori collects a 15% transaction fee to help keep the marketplace running	• Forest landowners harvest less volume than they otherwise would have, increasing the amount of carbon stored in the forest landscape • Advances in remote sensing technology drive targeted, short-term timber harvest deferrals on an annual basis • America's landowners, make offers to sell the carbon in their forests and consumers can choose the location and landowner type • Consumers pay for and take possession of the carbon credits generated from the deferrals, which can then be retired • SilviaTerra's Natural Capital Exchange (NCAPX) pays landowners to reduce annual harvests and can increase the average forest carbon per acre

With the potential supply problems associated with removing most renewables as an offset category and the additional supply issues associated with consumers preferring US generated offsets, there need to be other incentivizing mechanisms for large industries to reduce emissions. A new exchange seems to be the most sensible remedy.

The Industry Can't Heal Itself Without a New Marketplace

So, if you are a progressive company in the US oil and gas industry with a goal of getting to net zero, who continues to profitably supply consumers with the oil and gas they demand, what can you do to get offset credits?

First, the company could buy credits from a US voluntary registry or a broker. The offsets purchased would most likely be supplied from forestry or other land use programs based on the size of the issuances described earlier, and frankly the volume of offsets required. Additionally, a company could utilize some of the other "off-registry" marketplaces such as NORI or SilviaTerra.

Second, an oil and gas company could develop protocols that can generate credits under CARB or with one of the US voluntary registries, but this would take time and would have to comply with the existing carbon accounting standards. These standards have mostly excluded the generation of credits from the emissions reduction and removal actions of the oil and gas industry to date. Only Canada (for methane venting) and Verra and the American Carbon Registry (for plugging and abandoning orphan wells) are

developing project protocols for the industry. Even then, these protocols would require the same academic peer review process that exists today, and the small number of protocols currently available to the industry would suggest that there may be limited traction in getting them approved.

One of the more academic issues faced by the oil and gas industry when it comes to offset generation revolves around the concepts of "real" and "additionality" in terms of carbon accounting standards. Both concepts focus on an after-the-fact atmospheric benefit of an action to reduce or remove GHG emissions and whether these reductions would have occurred without carbon market incentives. The argument that many offset registries have against granting offsets and developing protocols to the oil and gas industry relates to the idea of a global market. At its extreme, if you stopped producing in the US by accelerating the abandonment of wells, someone somewhere else in the world could produce those extra barrels if the demand was still there, resulting in no "atmospheric benefit". This sort of thinking stifles any incentive for the industry to reduce emissions and its one of the reasons that we believe the industry should develop its own internal marketplace based on emissions reductions versus offsets for sale outside the industry.

There is always a third way. We propose the creation of a voluntary registry following the style of the existing protocols that other registries use, adapted for the oil and gas industry. This registry would use realistic carbon accounting standards focused on reducing GHG emissions from current activities and emphasizing removing CO_2 from the atmosphere. The goal would be to reduce or remove emissions from a world which still consumes oil and gas, until the demand for the products transitions to something else. Monitoring and verification of these projects would be carried out by third parties, and these credits would be traded initially amongst industry participants: "insets" versus "offsets", if you will.

There are also a number of potential avenues that exist for the certification of methane emissions and reducing levels below a benchmark (e.g., RMI MiQ and Xpansiv), and these will likely become marketplaces within themselves in the coming years. These platforms have been primarily aimed at lowering the carbon intensity of natural gas and LNG and are a welcome addition as oil and gas companies will receive the acknowledgement due for reducing methane emissions. However, it is not clear how fungible these certificates will ever be with offsets, as they are based on different units.

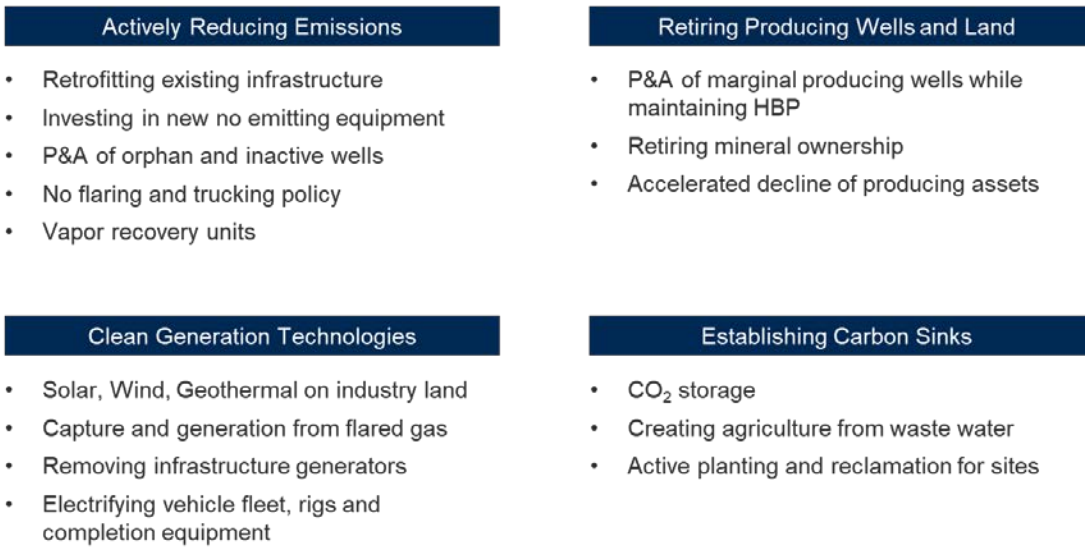
What the Oil and Gas Industry Can Do

The oil and gas industry obviously produces oil and gas which are ultimately turned into energy by the consumers who demand them. It also uses industrial mechanisms to extract and refine the hydrocarbons in the process. There are many ways the industry can lower the carbon intensity of the product, which should be commended and promoted, as should its skillset in promoting CO_2 atmospheric reversal through CCS.

We define emissions reduction in the energy industry across four main categories:

- Actively reducing emissions from current and historic operations and equipment
- Accelerating retirement of active producers and prospective land
- Investing in clean generation technologies that displace high-emitting activities
- Establishing carbon sinks that will remove carbon from the atmosphere

Figure 8: Examples of Emissions Reduction by Category



While some of these strategies are included under the current offset registries, there is no specific platform that encourages the oil and gas industry to actively reduce emissions, or even more radically, accelerate its own decline. We believe that an industry incentivized to get to net zero, through its own actions, and not just through paying others to plant trees, is the right path forward, and as such, an industry carbon inset exchange is the necessary solution.

Mechanism for a New Registry

There are different mechanisms for establishing an "inset" emissions scheme for the energy sector. To be consistent with other programs, an inset would represent the verifiable reduction or removal of GHG emissions into the atmosphere, equivalent to one metric ton of carbon dioxide, from designated projects.

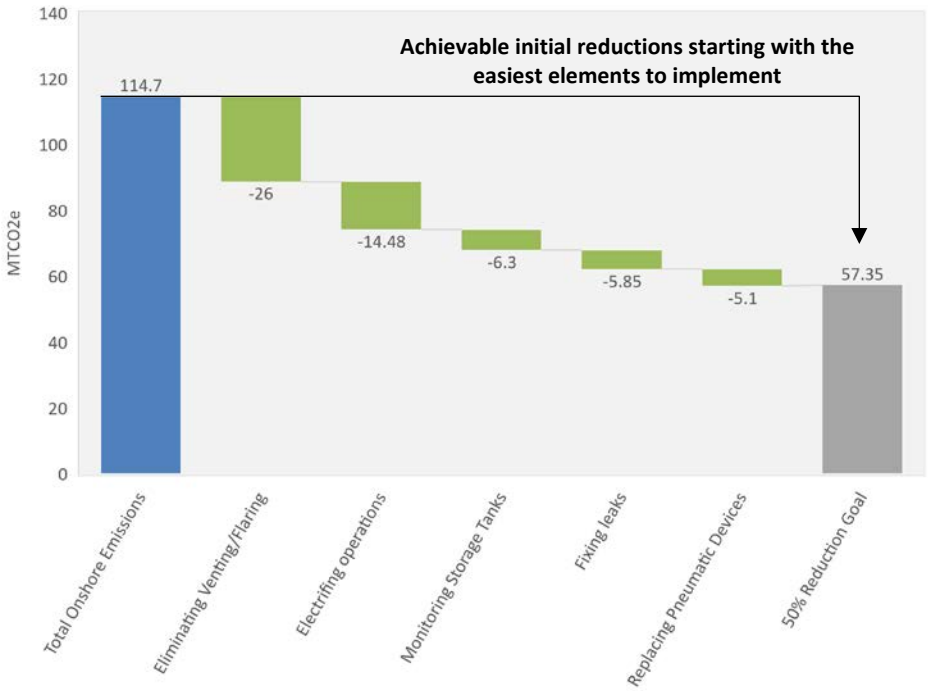
Pricing could either presume that there is a fixed amount of insets available and follow the bitcoin model of reducing the amount of insets available over a period of time, which would suggest that all insets being generated at a particular time cost the same to generate. However, there is a clear cost difference, even within project categories, so potentially, pricing of these insets would reflect the average capital required to generate, verify and monitor the inset in a particular project class. This would encourage the finding and removal of the highest amounts of emissions for the lowest cost per inset. For example, abandoning a very high-emitting old vertical oil and gas well could cost the same as a low-emitting well, but the cost per inset would be significantly cheaper and it would likely be the first well to be abandoned. Insets could either be "banked" by a producer to offset future production (against which the inset would be retired) or exchanged with another producer. Such a system will create a virtuous cycle, whereby the lowest-emitting producers stand to benefit from their superior environmental practices, and the laggards are naturally incentivized to adopt the same or bear the cost of the inset. The exchange will take a very small percentage of the insets generated, and ultimately there would be the ability for industries and corporations outside the exchange to purchase offsets

which would then be retired. All insets would be monitored and verified by an independent third party, similar to the role of reserve auditors who provide a helpful existing analogue in the industry.

Ultimately, the goal is for these insets to be tradable and useful to other industrial processes, and as they are quantified on the same unit basis as offsets (one ton of CO_2e), they could be swappable (at a price differential) with other offsets in different markets, such as those being developed by CME in their GEO product (which uses the aviation CORSIA standard framework). With no common entity or market for offsets globally, and the plethora of new products, offset standards and methodologies emerging in the market, one that focuses on the specific requirements of this industry and enables the acceleration of emissions reduction should be welcomed by investors wanting to see change.

By focusing on the easiest reduction processes to implement, a pathway to significant industry emission reduction can occur by 2030. Figure 9 illustrates the impact of reducing venting and flaring by 80% through better operational practices and protocols, as well as a commitment from midstream operators to manage line pressure. Additionally, combustion equipment emissions can be reduced initially by 40% or offset by electrifying oil field service equipment using wind and solar. Leaks and storage tank emissions could be easily monitored and essentially eliminated. In addition, the adoption of new technology to electrify pneumatic devices can begin today so that it can be at the forefront of the second phase of emissions reductions beyond 2030.

Figure 9: An Achievable Process to Reduce E&Ps' Onshore Production Emissions by 50%

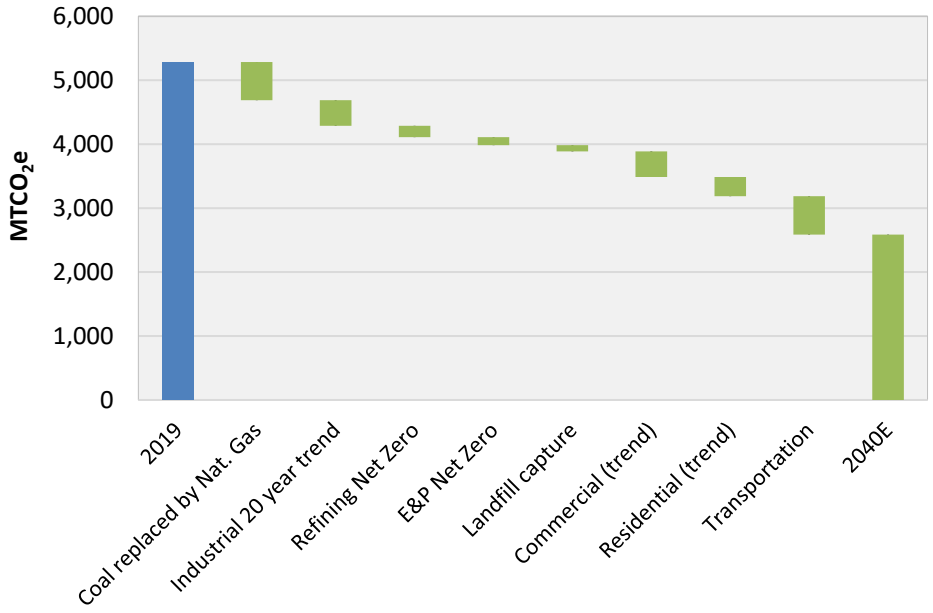


In addition to the reductions outlined in Figure 9, land associated with drilling pads or mineral rights could be used for both community and utility solar projects in grids trying to reduce their carbon power generation. But potentially the greatest one-off GHG emissions reduction could come from the industry proactively plugging and abandoning (P&A) orphan wells, inactive wells and marginally economic wells

that are holding leases through limited production. This would mean permanently keeping some oil and gas reserves in the ground.

E&Ps have a part to play in the emissions reduction strategy in the US which could result in meaningful change by 2040 (Figure 10). We see the potential for E&Ps to lead the way in reducing GHG emissions significantly, initially replacing coal in power generation with natural gas. Having an offset exchange in place for the E&P industry could ultimately expand to refiners and then to the rest of the industrials group.

Figure 10: An Illustrative Path to Reducing Emissions across All Segments including Industrials and E&Ps (Kimmeridge Estimates)



As oil and gas companies move towards net zero commitments, they require the apparatus to get there. With global demand likely to remain robust over the next decade, reducing the carbon intensity of the industry is essential. Within this white paper we have described how the industry can dramatically reduce its emissions, and the incentives needed to transition to a lower carbon economy. There is limited scope for the industry to generate offset credits within the existing offset framework, so the industry must take both its emissions reduction targets and the ability to "offset" emissions into its own hands. We hope that such an internal framework will be acknowledged and endorsed by those seeking a transition to a lower carbon world and that the oil and gas industry will support the establishment of an exchange to facilitate the goal of net zero.

This paper represents the views and opinions of Kimmeridge Energy Management Company, LLC and its employees and affiliates (Kimmeridge) as of the date hereof and is subject to change. The opinions expressed herein are not representative of our views on any particular company, rather they reflect our views on the US energy industry as a whole. All data used in this paper have been sourced from public reports unless otherwise noted and, while based on sources we consider to be reliable, we do not represent that the information presented herein is entirely accurate or complete and it should not be relied on as such. This paper is provided for informational purposes only and is not meant to be relied upon in making any investment or other decision. Nothing herein is designed to be a recommendation to purchase or sell any security, investment product or vehicle, including any investment product managed by Kimmeridge. There is no guarantee that implementing the views presented in this paper will yield positive results for any individual E&P company or the energy industry as a whole. Nothing in this paper represents investment performance of Kimmeridge or any Kimmeridge-sponsored fund. Investing in any sector involves significant risks.