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INSIGHTS

Opposites Attract: How Oil & Gas and Renewables+Storage Are the Perfect Match

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I. Introduction

As the world lives through a global pandemic, it is challenged *inter alia* with persistent blackouts and wildfires threatening the reliability of our energy production and supply chain. Nevertheless, the oil and gas industry continues to evolve and demonstrate resilience amongst uncertainty. Companies across global sectors are committing to "clean energy," "sustainability" and "reducing emissions," including those in oil and gas. The players at the negotiation table have evolved and the oil and gas industry is experiencing a period of growth and fundamental reshaping. While the oil and gas industry and the renewables and storage sectors seem an unlikely partnership, oil and gas producers are uniquely situated to utilize battery storage and renewable technologies to power their operations at all stages of the oil and gas recovery process. As concerns about greenhouse gas emissions loom over all industries, companies are considering how they can integrate renewables into their energy mix; however, with renewable energy resources offering only intermittent supplies, many question the reliability of these resources.

The energy output of intermittent renewable resources, such as wind and solar generation facilities, varies as a function of the weather conditions at any given moment. Continuous 24/7 generation capacity, as a result, is not possible, as is the case with traditional fossil-fueled or nuclear generation. A battery storage system, however, allow oil and gas producers to supplement their renewable generation capacity and store energy produced from an intermittent renewable resource during times when there is more supply than demand and utilize that stored energy when supply from the intermittent renewable resource is unavailable. With this capability, oil and gas producers can more effectively manage the energy produced to meet their needs, thus maximizing the value of a renewable resource powering its operations. This combination of a renewable generation resource plus a battery storage system, referred to herein as a "hybrid system" or a "hybrid facility," provides producers with greater certainty that their equipment will operate as planned and provides a response to the on-going concern over reducing emissions. Recent declines in costs to purchase and implement battery storage systems, access to land, availability of federal tax credits and increased regulatory certainty further support the business proposition for market participants in the oil and gas industry to invest in the development of battery storage systems combined with renewable generation

resources.

This article provides an overview of the growth of the battery storage industry, a discussion of how hybrid facilities can meet emissions and reliability goals of market participants in the oil and gas industry, including a brief description of certain federal tax credits and recent regulatory orders that encourage investment in battery storage facilities and amplify the benefits of hybrid facilities.

II. Growth and Reliability of Battery Storage Industry

In general, energy storage systems enable energy generated at one point in time to be stored for use at a later point in time. Oil and gas producers can rely on energy storage systems as back-up power sources during outages and to support the electric reliability of its operations. With respect to systems that are co-located with a solar or wind generating facility, excess solar and wind generation can be stored and later sold to the grid or directed to the operator's needs. Unlike other commodities (e.g., oil and gas), storing energy has been surprisingly challenging and expensive until recent innovations and associated cost reductions. But now that energy storage solutions are becoming more cost-effective, industries of all kinds are looking to benefit from this technology. In particular, large-scale lithium-ion battery storage facilities***[1]***are being installed across the country in increasing numbers year to year. In 2010, the United States had seven operational battery storage systems, which accounted for 59 megawatts (MW) of capacity.***[2]*** By the end of 2018, the United States had 125 operational battery storage systems, totaling 869 MW of capacity,***[3]*** with 90 percent of such capacity being provided by lithium-ion batteries.***[4]***Developers are predominantly relying on lithium-ion batteries over other types of energy storage technologies because lithium-ion technology is more responsive to system conditions, minimizes the energy lost between recharging and discharging the battery,***[5]*** and supports a longer charge.***[6]***

Much of the growth in battery storage is due to declining costs resulting from advancements in the technology and improved efficiencies in manufacturing. Between 2010 and 2019, battery prices on average fell 87 percent from above $1,100/kWh to $156/kWh.***[7]*** Bloomberg's 2019 Battery Price Survey forecasts that prices will continue to fall to $100/kWh by 2023.***[8]*** As batteries become more economical overtime, we will continue to see an acceleration of the implementation of battery storage systems, in particular in connection with the development of renewable solar and wind facilities. As of May 2020, the US Energy Information Administration's (EIA) latest inventory of electric generators shows that the number of solar and wind generation sites co-located with batteries has grown from 19 paired sites in 2016 to 53 paired sites in 2019.***[9]*** According to planned installations reported to EIA, another 56 facilities pairing renewable energy and battery storage will come online by the end of 2023.***[10]*** Texas, a state with significant oil and gas production, is leading the country in the installation of hybrid renewable plus battery storage projects with 46 percent of country's total hybrid system capacity being installed in Texas.***[11]*** With respect to batteries in general, the growth trajectory of battery storage facilities in Texas is expected to triple in 2020 and again in 2021 to almost 1.2 gigawatts, which is enough storage to store the energy generated from 3 million solar panels or more than 400 wind turbines.***[12]*** As of November 2019, almost fifty percent of battery projects in the Electric Reliability Council of Texas (ERCOT) interconnection queue were co-located with a solar facility.***[13]***

With the recent and ongoing technological advancements making battery storage more efficient and economical, the potential for battery storage facilities to become standard for supporting oil and gas operations continues to grow. The efficiencies of battery storage technology, and in particular in connection with hybrid systems, will only continue to improve as more companies dive into the market and more hybrid facilities are developed. With so much activity taking place in Texas, producers in all regions are well situated to learn from the early adopters who are leading the hybrid renewable plus storage market.

III. Opportunity for the Oil and Gas Industry

The goal of becoming "carbon neutral" is growing across all corporate markets. Investors want, and often require, their business partners to commit to reducing emissions. With an eye toward reducing their carbon footprint, oil and gas companies in particular are committing to implementing reliable clean energy solutions. By including a battery storage component with a renewable intermittent resource as the power source for its operations, oil and gas companies can make great strides in achieving this goal. In addition, location of these hybrid systems is always a key factor in a cost-benefit analysis. Considering that oil and gas companies often have access to land, which is a critical resource for the development of hybrid systems, the oil and gas industry has an advantage over other market participants in terms of implementing the infrastructure necessary to construct a hybrid facility to power its current or future operations.

A. Emissions Targets

The oil and gas industry is already in transition to a cleaner approach for developing its oil and gas products. In response to the threat of climate change, market participants in this sector have been investing in renewable technology and making commitments to lower their greenhouse gas emissions. Various industry targets and environmental, social and governance policies have been established at the global and company levels, which now make clean energy solutions a necessity rather than merely an aspiration.

For example, the Oil and Gas Climate Initiative (OGCI), which is an international consortium of CEOs heading 12 energy companies including Chevron, Exxon Mobil and Occidental Petroleum, announced a plan to reduce the collective average carbon intensity of the aggregated emissions of their upstream oil and gas operations.***[14]*** The OGCI members account for over 30 percent of global operated oil and gas production.***[15]*** As such, achievement of their goal to meet net zero emissions as early as possible***[16]*** would make a large global impact. Together, OGCI members invest around seven billion dollars each year in low carbon solutions.***[17]***

Carbon intensity reflects the amount of carbon by weight emitted per unit of energy consumed through marketed oil and gas consumption.***[18]*** OGCI targets reductions in output of carbon dioxide equivalents by upwards of 52 million metric tons ("MMT") per year by 2025.***[19]*** Per OGCI's announcement, this target, which represents the equivalent of carbon emissions from the energy use of 4 million to 6 million US homes, is consistent with the reduction needed across the oil and gas industry by 2025 to support goals established in the Paris Agreement.***[20]*** In part, OGCI members expect to achieve their new goal to reduce carbon intensity of their upstream operations by "electrifying operations using renewable electricity where possible." ***[21]*** This new carbon intensity target supplements other targets and actions that OGCI already has in place, such as its 2018 target to reduce the collective average methane intensity of its aggregated upstream gas and oil operations by one-fifth by 2025.***[22]***

Given that oil and gas production sites are often in remote locations where operations are powered by generators that rely on gas or diesel for fuel, there is ample opportunity for OGCI members to make progress toward their new carbon intensity goal by incorporating hybrid facilities into their operations. For instance, offshore oil and gas platforms globally use 5 percent of the total global production as fuel to generate the 16 tera-watt hours needed to power operations.***[23]*** In an ideal world, that 5 percent of production would be directed to the consumer for the benefit of the bottom line. As a start, many oil and gas producers have already begun implementing renewable technologies into their operations. Up to 28 renewable energy projects were announced within the oil and gas sector in 2018 and 2019 and those projects are expected to avert more than 3 MMT of annual carbon dioxide emissions combined. ***[24]*** By contrast, projects in 2017 only averted 0.3 MMT.***[25]*** The majority of renewables projects within the industry are led by solar deployments followed by hydropower and wind. ***[26]***

Along with many of its peers, Chevron is joining the energy transition. In July 2020, Chevron U.S.A. Inc. and Algonquin Power & Utilities Corp. announced that they will co-develop renewable power projects with the expectation for Chevron to generate more than 500 MWs of its existing and future electricity demand across its global portfolio from renewable sources.***[27]*** Initial projects, expected to begin construction in 2021, will power Chevron's operations in the US Permian Basin, Argentina, Kazakhstan and Western Australia.***[28]*** The president of Chevron Pipeline & Power stated that these projects will advance Chevron's commitment to lower its carbon footprint by investing in renewable power solutions that are reliable, scalable, cost efficient, and directly support Chevron's core business.***[29]***

It is clear that the oil and gas industry is in transition. In response to the various targets and social pressure on oil and gas companies to contribute to climate change solutions, many companies are already taking advantage of the value renewable technologies can offer their operations, their brand and the world. Oil and gas producers can utilize battery storage systems to fully capitalize on the value that these renewable technologies offer by making the technology more reliable. Use of conventional sources of generation, such as diesel or natural gas generators, in oil and gas production can be reduced or even eliminated by integrating hybrid facilities, and (as discussed above) in the context of offshore wind production, that 5 percent of production used to power operations could be redirected to consumers to ultimately improve a company's balance sheet.

B. Reliability

Although solar and wind power generation facilities are great sources of low-carbon energy, they also have their downsides. Opponents of integrating renewable energy facilities into oil and gas operations are likely to cite reliability as a main concern — a concern that is not unfounded because, as we know, the weather is often as volatile as the S&P 500. Oil and gas production requires operations to run 24/7 days to ensure the consistent flow of wells and pipelines, and because production sites are often located in remote areas without access to any grid electrical services, intermittent renewable resources alone may not achieve the reliability concerns of these market participants. Battery storage systems maximize the value of a renewable resource by providing the capability to continuously provide power output at needed levels despite the source of the energy being intermittent, thus allowing an oil and gas producer to meet its 24/7 operational needs. We know that there will be no electricity

produced from solar panels when there is no available sunlight and an alternative source of energy will be needed during, at minimum, nighttime hours to maintain operations. Pairing storage with solar, for example, may alleviate the need to obtain these alternative sources of electricity. Without storage, a company's sole reliance on solar and wind, will cause oil and gas operations to essentially become intermittent and only function when the sun shines or the wind blows sufficiently.

Australian energy company, Santos, is currently in the process of converting 56 beam pumps at its oil wells across the Cooper Basin in Southern Australia to be powered 100 percent by energy generated from a solar plus battery storage system.***[30]*** The pumps are traditionally powered day and night by generators fueled by 140 barrels of diesel fuel daily.***[31]*** Santos anticipates converting over 200 beam pumps across the Cooper Basin to solar generated energy using hybrid systems and ultimately relying on solar generated energy as the standard energy source for new onshore oil wells.***[32]*** This project is expected to bring Santos environmental and commercial benefits by reducing crude oil consumption, long distance fuel haulage and emissions associated with burning crude oil.***[33]***

Following completion of a pilot pump in 2018, Santos was confident that solar and batteries can maintain reliability and availability for oil well sites located off grid in the Cooper Basin and began its project to convert 56 beam pumps to run 100 percent on solar power.***[34]*** In 2019, Santos had completed the conversion of 22 of the 56 beam pumps, which consisted of installing 160 solar panels at each site***[35]*** that are ground-mounted on existing well pads.***[36]*** According to AGL Energy, the developer who performed the installation for Santos, the installations were sized to ensure continual operation for 24 hours a day, 365 days a year, and will avoid the need for a back-up generator.***[37]*** The 22 converted pumps account for 1.2 MWs of solar panels and more than 2 MWh of batteries.***[38]*** At completion, the project will have a combined maximum capacity of 3.2 MW of solar power.***[39]*** Installation of all 56 beam pumps will cost $16 million with $4.2 million of that total cost being funded by the Australian Renewable Energy Agency, an agency established by the Australian government to further the competitiveness and supply of renewable energy in Australia, which has stated that this project "will demonstrate that integrating solar PV and battery storage systems into high availability applications can provide secure and reliable sources of energy for 24/7 remote operations."***[40]***According to Santos' managing director and CEO, the Cooper Basin project "is good for the environment, it's good for reducing fuel consumption and it is good for the bottom line."***[41]***

C. Access to Land

Oil and gas production sites typically span tens to hundreds of acres, depending on the number of wells. Just as Santos and Chevron have endeavored to develop renewable intermittent resources or hybrid systems, other market players in the industry are considering mechanisms to integrate renewable or hybrid facilities into their existing infrastructure or even convert existing equipment to support such facilities. Oil and gas producers should consider if their mineral or land leases allow such improvements to their existing equipment. Some companies, like Chevron, already own the land where their operations are located.***[42]***For those companies, the likelihood of finding value of incorporating a hybrid system will be easier, considering that they can skip the costly and involved step of acquiring the necessary acreage.

As illustrated by Santos' project in the Cooper Basin, integrating hybrid facilities into oil and gas production can bridge the gap between the industry's goals for reducing emissions and

concerns for reliable generation. While some companies already understanding the value that renewables can bring to their operations and their brand, the addition of battery storage provides further value by maximizing the potential offered by renewable resources by providing a pathway to manage risk that their renewable generation source will not be available at certain times. Further, if a company already has access to land, an expensive and critical resource, the value is that much easier to identify. Proponents of renewable resources and increased reliability infrastructure would say a company has achieved the trifecta "clean energy," "sustainability" and "reducing emissions" upon such integration. Even beyond emissions and reliability, a hybrid system can also contribute to reduced expenses related to fuel, maintaining generators and hauling fuel to production sites.

IV. Tax Credits

Hybrid facilities also provide the opportunity to benefit from certain tax incentives. By integrating a hybrid renewable and battery storage facility into its operations, an oil and gas company can take advantage of certain federal tax credits. The two federal tax credits available for renewable facilities are the Investment Tax Credit (ITC) and the Production Tax Credit ("PTC"). Energy storage is generally seen in the context of the ITC, which is available for solar facilities and allows a credit equal to a defined percentage of taxpayer's cost for installing a qualifying renewable energy facility.***[43]*** Currently, the tax credit stands at 26 percent for systems commencing construction in 2020, 22 percent for systems commencing construction in 2021, and 10 percent for systems commencing construction in 2022 and beyond.***[44]*** Energy storage systems installed with a solar project are eligible to qualify for the ITC, as well, so long as 75 percent of the power used to charge the system is derived from solar generation; however, a taxpayer is only eligible for the tax credit based on the percentage of power used from the renewable resource.***[45]*** In other words, if a storage system is charged 100 percent by renewable energy, the owner of the system can claim the full value of the ITC. But, if the storage system is only charged 75 percent by renewable energy, the taxpayer can only claim 75 percent of the available ITC.***[46]*** In considering whether a hybrid renewable plus storage facility could benefit its operations, a market participant should consider the additional value tax credits can bring to it or its investors.

V. Regulatory Certainty

In the past, regulatory uncertainty and high costs to implement energy storage systems have deterred market participants from investing in an energy storage platform. A change of tide has occurred recently with respect to regulatory certainty and clarity. To the extent an oil and gas producer interconnects its energy storage system to the electrical grid under Federal Energy Regulatory Commission's (FERC) jurisdiction,***[47]*** certain recent FERC rulings support the development of an energy storage system.

A. FERC Order No. 2222

Most recently, on September 17, 2020, FERC issued a landmark final rule that aims to remove barriers for distributed energy resources, including electric storage systems, to participate in wholesale markets regulated by FERC through aggregators. A distributed energy resource supplies energy near the point of use as opposed to centralized generation sources from utility-scale power plants that are often interconnected directly to the transmission system.***[48]*** Historically, distributed energy resources have largely been limited to state-approved retail

programs such as net metering or participating in wholesale markets regulated by FERC as a demand response resource.[49] Order No. 2222 adopts a number of reforms to wholesale markets operated by FERC-jurisdictional Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) that may enable distributed energy resources that may be "too small" and, thus, may not meet certain RTO/ISO qualification and performance requirements because of the operational constraints they may have as small resources to directly participate in these wholesale markets by allowing entities to aggregate these smaller distributor energy resources together to offer such resources in the capacity, energy and ancillary services markets.

B. FERC Order No. 841

The reforms of Order No. 2222 build on FERC's ruling under Order No. 841, which the Court of Appeals for the District of Columbia Circuit upheld on July 10, 2020.[50] FERC Order No. 841 aimed to remove barriers to energy storage in participating in the RTO/ISO wholesale markets regulated by FERC.[51] The order required FERC-jurisdictional RTOs and ISOs to create a new participation model under which energy storage providers could directly participate in such wholesale markets while recognizing the physical and operational characteristics of energy storage resources that may have previously disqualified such resources from participating in those markets. FERC's Chairman Neil Chatterjee said in a statement that Order No. 841 will be seen as the single most important act FERC could take to ensure a smooth transition to a new clean energy future.[52] Now that Order No. 841 has been upheld, it is likely that the wholesale marketplace with see more activity from storage resources within FERC's jurisdiction.

C. FERC Order No. 845

FERC Order No. 841 further advanced the regulatory certainty for energy storage systems initially set by FERC's Order No. 845 in April 2018. FERC's Order No. 845 provided for certain updates to FERC's standard interconnection agreement and procedures that are specifically helpful to energy storage developers.[53] One important change was the broadening the definition of "Generating Facility" to specifically include storage devices whether developed as a stand-alone project or in combination with another generating facility.[54] Although some transmission providers had interpreted the term "Generating Facility" contained in the standard interconnection agreement to include storage resources, FERC determined that a revised definition was necessary to provide clarity across all wholesale electric markets that storage resources are included within the definition of a Generating Facility. Order No. 845 also permitted interconnection customers to request interconnection service that is lower than the full nameplate capacity of the planned facility, which prevents interconnection customers with intermittent resources from having to pay for costly system upgrades that may be needed to reliably interconnect such resources at full nameplate capacity and instead aligns the system upgrades needed based on the output with the requested level of interconnection service.[55] Further, battery systems co-located with an intermittent resource can utilize the spare capacity that the generating resource doesn't need, so long as the quantity of energy injected into the transmission system does not exceed the requested level of service.[56] The vice president for the Energy Storage Association emphasized the value of FERC Order No. 845 by noting that more electric service with the same amount of transmission equals more efficient use of transmission dollars.[57]

FERC's initiatives in the orders highlighted above adopt key reforms that are moving the wholesale markets in the right direction and may provide stand-alone storage and hybrid facilities with additional commercial opportunities to participate either directly or indirectly through aggregators in FERC-regulated wholesale markets. While much of Order No. 2222 will be subject to challenge, FERC has seemingly shined a new light on the energy storage industry and the forecast for storage resources appears favorable. Importantly, given FERC's decision to give each RTO and ISO flexibility on how to implement the reforms adopted in Order No. 2222, what approach each RTO and ISO takes to implement Order No. 2222's directives will determine the degree that the order actually incents storage development in the footprint of those RTO/ISO markets.

VI. Conclusion

While there is uncertainty in our current economy and an ongoing global pandemic, we are encouraged by the technology and innovation that has progressed in the energy sector. The global corporate commitment to reducing greenhouse gas emissions and relying on clean energy with an emphasis on increased reliability continues to be a goal that corporate America will strive toward. While some corporate partnerships seemed unlikely a few years ago, common goals are bringing different sectors of the energy industry together. Oil and gas producers are distinctively positioned to benefit from the implementation and utilization of battery storage systems and renewable technologies to power their operations at all stages of oil and gas recovery. We anticipate continued growth in the battery storage sector and development of hybrid facilities. With the positive outlook on these facilities, we are optimistic that clean energy and reliability goals will be met across multiple sectors of the energy industry.

[1] A battery storage system with a nameplate capacity of at least 1 MW.

[2] *Battery Storage in the United States: An Update on Market Trends*, U.S. Energy Information Administration (July 2020), https://www.eia.gov/analysis/studies/electricity/batterystorage/pdf/battery_storage.pdf.

[3] Id.; Alex Mey, et al., *Utility-Scale Battery Storage Capacity Continued Its Upward Trend in 2018*, U.S. Energy Information Administration: Today In Energy (Aug. 10, 2020), https://www.eia.gov/todayinenergy/detail.php?id=44696#.

[4] *Battery Storage in the United States: An Update on Market Trend*, supra note 2.

[5] Id.at 13.

[6] *Solar-Plus-Storage 101*, Off. Energy Efficiency & Renewable Energy (Mar. 11, 2019), https://www.energy.gov/eere/solar/articles/solar-plus-storage-101.

[7] Veronika Henze, *Battery Pack Prices Fall As Market Ramps Up With Market Average At $156/kWh In 2019*, BloombergNEF (Dec. 3, 2019), https://about.bnef.com/blog/battery-pack-prices-fall-as-market-ramps-up-with-market-average-at-156-kwh-in-2019/.

[8] Id.

[9] Maxwell Hayes & Sara Hoff, *Large Battery Systems Are Often Paired With Renewable Energy Power Plants*, U.S. Energy Information Administration: Today In Energy (May 18, 2020), https://www.eia.gov/todayinenergy/detail.php?id=43775U.

[10] Id.

[11] *Id.*

[12] Chris Tomlinson, *Batteries Begin Storing Wind and Solar Energy for the Texas Grid*, Houston Chronicle (Sept. 7, 2020, 8:29 A.M.), https://www.houstonchronicle.com/business/columnists/tomlinson/article/Batteries-begin-storing-wind-and-solar-energy-for-15532401.php.

[13] Rao Konidena, *Why is Texas a Ripe Market For Hybrid Energy Storage?*, Renewable Energy World (Mar. 10, 2020), https://www.renewableenergyworld.com/2020/03/10/why-is-texas-a-ripe-market-for-hybrid-energy-storage/#gref.

[14] Chris Anchondo, *Oil and Gas Companies Announce a New CO2 Emissions Target*, E&E News (July 17, 2020), https://www.scientificamerican.com/article/oil-and-gas-companies-announce-a-new-co2-emissions-target/.

[15] Oil & Gas Climate Initiative, https://oilandgasclimateinitiative.com/ (last visited Sept. 21, 2020).

[16] *Id.*

[17] *Id.*

[18] *OGCI Sets Carbon Intensity Target*, Oil & Gas Climate Initiative (July 16, 2020), https://oilandgasclimateinitiative.com/carbon-intensity-target-pr/.

[19] *Id.*

[20] *Id.* The Paris Agreement is an international treaty signed by the members of the United Nations Framework Convention on Climate Change that aims to strengthen the global response to the threat of climate change by keeping a global temperature rise this century below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius. *Paris Agreement*, art. 2.1(a), Dec. 12, 2015, T.I.A.S. No. 16-1104, https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf.

The authors note that, while the OCGI supports the Paris Agreement, the United States will officially withdraw from the agreement in November 2020. Press Statement, Michael R. Pompeo, Secretary of State, U.S. Dep't of State, *On The U.S. Withdrawal from the Paris Agreement* (Nov. 4, 2019), https://www.state.gov/on-the-u-s-withdrawal-from-the-paris-agreement/. Despite the United States' withdrawal, certain states have signed on to U.S. Climate Alliance to the further goals of the Paris Agreement. *See* U.S. Climate Alliance, http://www.usclimatealliance.org/governors-1 (last visited Sept. 21, 2020).

[21] *OGCI Sets Carbon Intensity Target*, *supra* note 18.

[22] *Talking Transition: Keeping the Accelerator on Methane Reduction*, Oil & Gas Climate Initiative (April 2020), https://oilandgasclimateinitiative.com/keeping-the-accelerator-on-methane-reduction/#:~:text=In%202018%20OGCI%20member%20companies,over%20the%20next%20five%20years.

[23] Malcolm Forbes-Cable, *Oil and Gas Companies Can Power Offshore Platforms with Renewables*, Greentech Media (Nov. 21, 2019), https://www.greentechmedia.com/articles/read/oil-and-gas-companies-can-power-offshore-platforms-with-renewables.

[24] *Energy Companies Begin Turning to Renewables to Power Oil and Gas Operations, New IHS Markit Research Shows*, IHS Markit (July 13, 2020), https://news.ihsmarkit.com/prviewer/release_only/slug/bizwire-2020-7-13-energy-companies-begin-turning-to-renewables-to-power-oil-and-gas-operations-new-ihs-markit-research-shows.

[25] *Id.*

[26] Nicholas Nhede, *Increase in Oil and Gas Companies Turning to Renewables*, Smart Energy International (July 15, 2020), https://www.smart-energy.com/renewable-energy/increase-in-oil-and-gas-companies-turning-to-renewables-to-power-operations/; *Energy Companies Begin Turning to Renewables to Power Oil and Gas Operations, New IHS Markit Research Shows*, supra note 24.

[27] *Chevron and Algonquin Announce Agreement to Co-Develop Renewable Power Projects*, Chevron (July 30, 2020), https://www.chevron.com/stories/chevron-and-algonquin-corp-announce-agreement-to-co-develop-renewable-power-projects.

[28] *Id.*

[29] *Id.*

[30] *Santos Rolls Out Renewable Energy in the Cooper Basin*, Santos (Dec. 12, 2018), https://www.santos.com/news/santos-rolls-out-renewable-energy-in-the-cooper-basin/; Natalie Filatoff, *Solar PV and Batteries to Provide 24-hour Power for Santos Oil Pumps*, pv mag. (Mar. 25, 2019), https://www.pv-magazine-australia.com/2019/03/25/solar-pv-and-batteries-to-provide-24-hour-power-for-santos-oil-pumps/.

[31] *Santos Rolls Out Renewable Energy in the Cooper Basin*, *supra* note 30.

[32] *Id.*

[33] *Id.*

[34] *Id.*

[35] *AGL Converts Santos Oil Wells to Run on Solar Power*, AGL (Jan. 30, 2020), https://www.agl.com.au/about-agl/media-centre/asx-and-media-releases/2020/january/agl-converts-santos-oil-wells-to-run-on-solar-power.

[36] Lauren Cella, *Converting Crude Oil Beam Pumps to Solar Power in the Cooper Basin*, Pump Industry (July 15, 2020), https://www.pumpindustry.com.au/converting-crude-oil-beam-

pumps-to-solar-power-in-the-cooper-basin.

[37] *AGL Converts Santos Oil Wells to Run on Solar Power*, *supra* note 35.

[38] Michael Mazengarb, *Santos Turns to Solar and Storage to Power Remote Oil Wells*, Renew Economy (Jan. 31, 2020), https://reneweconomy.com.au/santos-turns-to-solar-and-storage-to-power-remote-oil-wells-57117/.

[39] *Conversion of Remote Crude Oil Beam Pumps to Solar & Battery*, Austl. Renewable Energy Agency (last updated Sept. 2, 2020), https://arena.gov.au/projects/conversion-of-remote-crude-oil-beam-pumps/.

[40] *Id.*; *About*, Austl. Renewable Energy Agency (last updated Aug. 24, 2020), https://arena.gov.au/about/.

[41] Cella, *supra* note 36.

[42] *Chevron and Algonquin Announce Agreement to Co-Develop Renewable Power Projects*, *supra* note 27.

[43] 26 U.S.C. §48 (2020).

[44] *Id.* The IRS has given guidance to determine when construction has begun on eligible energy property. There are two methods for making this determination, which each consist of two prongs. The first prong requires a taxpayer to demonstrate that enough progress has been made so that the taxpayer may claim that construction has started on the energy property, either through proving physical work of a significant nature has taken place, or by meeting a safe harbor based on having paid or incurred 5% or more of the total cost of the energy property. The second prong of each test requires the taxpayer to demonstrate continuous progress towards the completion of the property's construction. I.R.S. Notice 2018-59, 2018-28 I.R.B. 196.

[45] I.R.S. Priv. Ltr. Rul. 121432-12 (Feb. 22, 2013); Emma Elgqvist, et al., *Federal Tax Incentives for Energy Storage Systems*, Nat'l Renewable Energy Laboratory, https://www.nrel.gov/docs/fy18osti/70384.pdf (last visited Sept. 21, 2020).

[46] Elgqvist, *et al.*, *supra* note 45.

[47] FERC regulates, among other things, the interstate transmission of electricity, natural gas and oil. *What FERC Does*, FERC, ***https://www.ferc.gov/about/what-ferc/what-ferc-does*** (last updated July 15, 2020). Certain regions of the country, such as the majority of Texas, are not under FERC's jurisdiction because the grid services in those areas are not transmitted in interstate commerce. *ERCOT*, FERC https://www.ferc.gov/industries-data/electric/electric-power-markets/ercot (last updated July 13, 2020).

[48] FERC defines a distributed energy resource as "any resource located on the distribution system, any subsystem thereof or behind a customer meter." *Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators*,

Order No. 2222, 172 FERC ¶ 61,247, at P 114 (2020).

[49] Demand response is a reduction in the consumption of electric energy by customers from their expected consumption in response to an increase in the price of electric energy or to incentive payments designed to induce lower consumption of electric energy. 18 C.F.R. § 35.28(b)(4) (2019).

[50] Nat'l Ass'n of Regulatory Util. Comm'rs v. Fed. Energy Regulatory Comm'n, 964 F.3d 1177 (D.C. Cir. 2020); Jeff St. John, *'Enormous Step' for Energy Storage as Court Upholds FERC Order 841, Opening Wholesale Markets*, Greentech Media (July 10,2020), https://www.greentechmedia.com/articles/read/court-upholds-ferc-order-841-opening-wholesale-markets-to-energy-storage.

[51] *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order No. 841, 162 FERC ¶ 61,127 (2018).

[52] Andy Colthorpe, *FERC Order 841: US About to Take 'Most Important' Step Towards Clean Energy Future* (July 13, 2020), https://www.energy-storage.news/news/ferc-order-841-us-about-to-take-most-important-step-towards-clean-energy-fu.

[53] *Reform of Generator Interconnection Procedures and Agreements*, Order No. 845, 163 FERC ¶ 61,043 (2018).

[54] Id. at 5.

[55] *Reform of Generator Interconnection Procedures and Agreements*, Order No. 845, 163 FERC ¶ 61,043 at P 282 (2018).

[56] Peter Maloney, *FERC Order 845 Opens Door a Little Wider for Energy Storage*, Utility Dive (Apr. 23, 2018), https://www.utilitydive.com/news/ferc-order-845-opens-door-a-little-wider-for-energy-storage/521992/.

[57] *Id.*