REARVIEW MIRROR 2022:
A TUMULTUOUS YEAR IN ENERGY

BAKER BOTTS

EDITOR'S NOTE

To our clients and friends,

Each year we take the opportunity to review significant developments in the worldwide energy industry for the previous year and offer our views on what these developments may mean for the coming year.

As we reflect on 2022, we look back on a tumultuous year in energy, with geopolitical strife and legal developments disrupting markets for both traditional and developing energy sources. 2022 began with Russia's invasion of Ukraine, and the ongoing war was a major driver of supply concerns in energy markets throughout 2022. At its offset, the price of natural gas spiked, particularly in Western European markets, as Russia began to slow and ultimately halt the transmission of its gas through both Nord Stream Pipelines. Ultimately, the price of natural gas leveled off to a pre-war norm, but the spike resulted in Western Europe being far more reliant on U.S. LNG. In fact, exports of U.S. LNG to Europe more than doubled between 2021 and 2022. The war is also thought to have some degree of inflationary impact on the price of oil and gasoline. Russia's actions deepened the political divide between it and Western Democracies, which led to the imposition of an EU ban, and a G7 price cap, on Russian oil imports. The impact of these tactics on Russia's oil exports and its broader economy remains to be seen, but neither has substantially disrupted global oil markets to date.

2022 was also marked by continued momentum in energy transition. Companies continue to face pressure to reduce their carbon emissions and align with carbon neutral goals. Further, the market saw continued growth of environmental, social and governance ("ESG") practices and disclosures, as well as investor demand for ESG-focused investments. However, pushback to ESG investing began to prominently emerge in 2022. Certain states decried the use of public funds for ESG-related investments, generally arguing that funds should be allocated solely in such a way to maximize returns and that ESG-investments produce suboptimal returns. Major institutional investors began to reconsider their commitment to ESG or its prevalence among their offerings. Further, in March, Securities and Exchange Commission ("SEC") announced proposed climate disclosure rules that, if adopted would represent a dramatic increase in a public companies' ESG-reporting obligations, including the Companies Scope 1 and 2 emissions, various scenario analyses, transition plans, short, medium and long-term risks and effects on such company's strategy. Although the rules are still being commented upon and have yet to be adopted, they signal that ESG-related information is becoming a focus of the SEC.

2022 also saw Congress and the Biden administration pass a signature piece of infrastructure legislation, the Inflation Reduction Act (the "Act"), in August 2022. The Act was a pared-down version of 2021's Build Back Better Act, yet still carried with it a price tag of roughly $737 billion. The Act authorized around $370 billion of clean energy and decarbonization expenditures over the next ten years, making it the largest investment in clean energy in the nation's history. The Act advances these goals through a medley of policy levers such as new and expanded tax credits, incentives and public-private partnerships. Further, the Act aims to spur robust domestic energy production and storage.

We expect the demand for ESG-focused investments and clean energy to continue to grow in 2023, but see greater headwinds as government's role in their development is beginning to reemerge as a political talking point. On the flip side, we see traditional, publicly traded fossil fuel energy companies are increasingly trying to straddle an ever shifting line of carbon-based profitability (particularly after many oil majors saw record profits in 2022) versus investment into clean energy and related technologies, which bring the promise of political goodwill, carbon reduction and the allure of long-term revenue. One natural result of this tension is the transfer of carbon-intensive assets from public to private hands, whether through take-private transactions, acquisitions or dispositions, a trend which we expect to continue in 2023.

We appreciate the trust that you place in us to handle your legal matters and wish you further success in 2023.

Baker Botts Energy Team

"The Baker Botts team brings powerful legal analysis that is coupled with an extremely commercial approach. They have a wealth of market knowledge and deploy that in their advice. They are much more like partners than advisors. They roll up their sleeves, dig into a project and become part of the deal team."

—Legal 500 US 2022

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POWER & UTILITIES

North American Power & Utility Sector and Generation Assets

As North American industrial activity and other physical commerce continued to recover from the lows of the COVID-19 pandemic, U.S. power consumption rose to a record high in 2021. While sales and retail electricity prices also reached record highs in 2022 across industry sectors, so too did costs, primarily due to rising domestic natural gas prices. Natural gas price increases were driven by economic growth in Asia and constraints on Russian natural gas exports to Europe, resulting in surging international demand for U.S. LNG exports.

After losing ground in the power generation mix for the first time in recent history in 2021, natural gas fueled 38% of U.S. electricity generation in 2022. Coal-fired electricity generation fell 3%, while generation from renewable power sources (primarily solar and wind) increased by 2%. The trend of increased power generation from renewable sources continued in 2022, and is anticipated to continue moving forward, despite headwinds from supply chain disruptions, trade policy uncertainty and inflationary pressures.

Two primary trends underlined 2022 deal activity in the sector. First, market participants regained confidence in the longevity of the natural gas utility industry as a result of the previously discussed increased demand and the IEA providing consistent guidance that it expects natural gas demand and prices to remain high for the foreseeable future. Second, in what was an already rapidly growing sector driven largely by environmental, social and governance (ESG) initiatives, the Inflation Reduction Act of 2022 addressed investor concerns that government incentives may be transitory, which dramatically expanded the range of renewable project opportunities that can provide the economic returns sufficient to drive investment.

In 2023, while the rising interest rate environment will certainly be a concern for utilities and their budgets, refinancing risk is expected to be manageable. We expect that the overarching challenges for North American utilities and power generators will remain balancing already elevated consumer rates stressed by an inflationary and high commodity price environment with (i) the heightened capital expenditure requirements driven by grid reliability and resiliency demands and (ii) the need to finance aggressive growth in clean energy asset portfolios in order to meet publicly stated ESG targets.

READ THE FULL ARTICLE.

Bitcoin and Large Loads in ERCOT

For the past three years, Texas has been in the midst of a bitcoin-mining gold rush. While early bitcoin miners relied on residential power supply to run mining algorithms on personal computers, modern bitcoin mines are large industrial facilities with peak demands as high as 450 MW.

Citing environmental and security concerns, regulators in China, Quebec, and New York, have imposed restrictions on bitcoin mining, making Texas, with its deregulated energy markets, an attractive jurisdiction for relocating bitcoin miners. Particularly as Texas allows Large Flexible Loads ("LFLs") (such as bitcoin miners) to participate as load resources on the ERCOT Grid to participate in ERCOT's energy and ancillary service markets.

Despite the price of bitcoin retreating from its 2021 high, the number of bitcoin mines proposed in ERCOT continues to grow. While only a fraction of the planned bitcoin mines will likely come to fruition, they will still significantly change the ERCOT's load profile. Integrating these miners into the ERCOT system has also proved logistically difficult for several reasons.

In 2022, ERCOT established the Large Flexible Load Task Force ("LFLTF") to evaluate modeling, nodal pricing, primary frequency response, and under-frequency load shedding issues associated with the integration of large loads on the ERCOT System. The LFLTF also serves as a forum for ERCOT and market participants to design a permanent process for the interconnection of large loads and explore methods to help ensure that bitcoin miners will not exacerbate grid conditions during periods of insufficient generation. We expect 2023 will continue to see significant growth in both the ERCOT-based bitcoin mining and the continued development of bitcoin mining-related energy regulations.

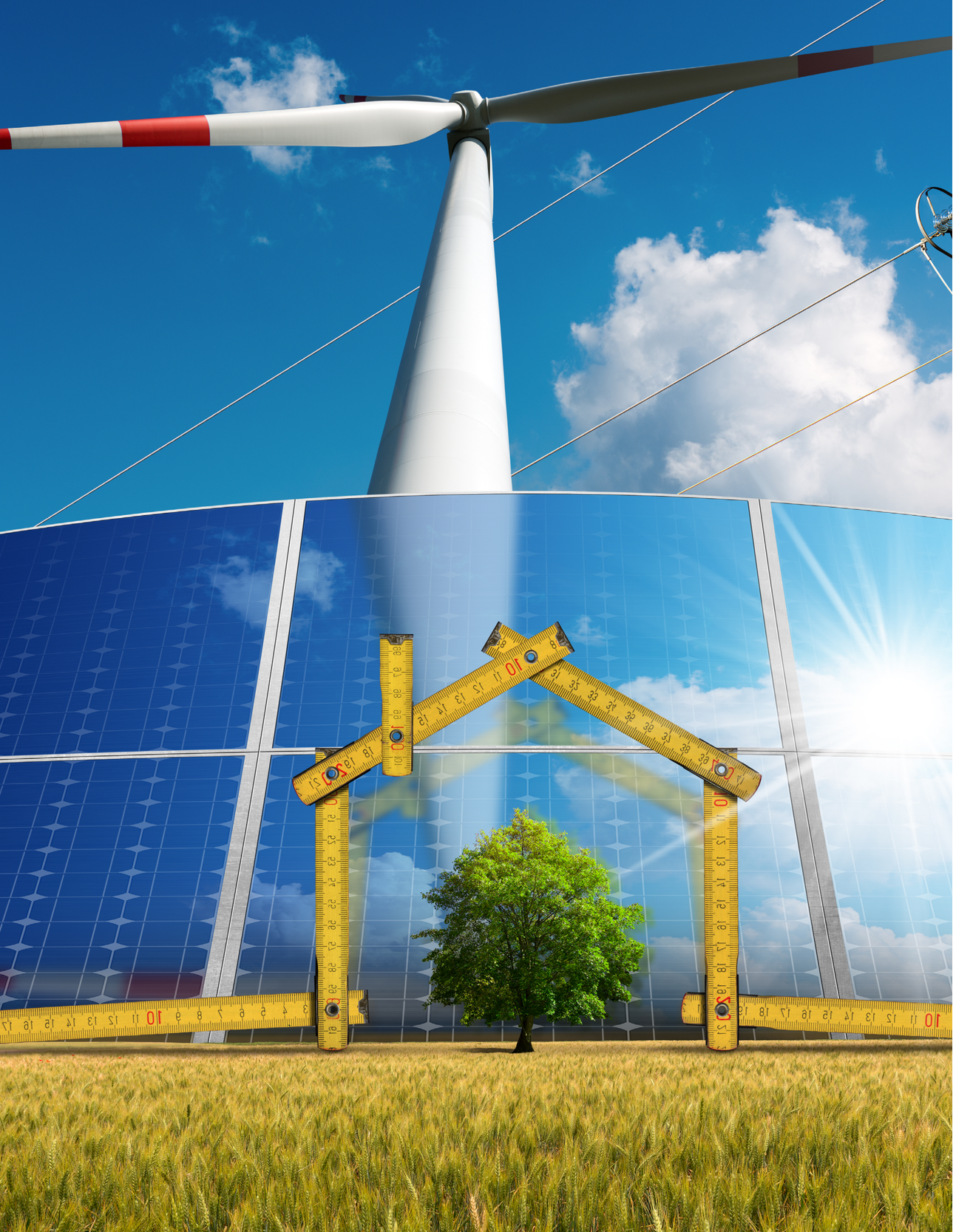
READ THE FULL ARTICLE.

TOP RANKED Chambers USA 2022 Baker Botts LLP

Band 2 - Energy: Electricity (Transactional) Nationwide
Band 2 - Energy: State Regulatory & Litigation (Electricity) Texas

The LEGAL 500 UNITED STATES TOP TIER 2022

Tier 1 - Energy - Transactions: Conventional Power
Tier 3 - Energy - Litigation: Conventional Power



POWER REGULATION

California Ends Retail Rate Net Metering for Distributed Generation; Adopts Lower Compensation through New "Net Billing" Program

In late 2022, the California Public Utilities Commission ended retail rate net metering for Californians with distributed generation (including residential solar systems) and replaced it with a new program referred to as "Net Billing" or "NEM 3.0.", where customers' investor-owned utility credits will be reduced to the avoided cost rate, resulting in an approximately 75% reduction in credit value.

In addition to the avoided cost credit, customers located outside of the San Diego area will also receive a transition adder of 2.2-4.0 cents, subject to an annual 20% step-down. The adder is available for 5 years and only to customers interconnecting by the end of 2027. No adder is available for systems installed on new homes covered by the California Energy Commission's solar installation requirements. For customers that enroll in Net Billing during this five-year transition period, the avoided cost credit plus the adder will be set for a 9-year period based on a set table of values.

Further, customers are also now allowed to overbuild systems by 50% compared to their 12-month historical demand and may build larger systems than permitted by historical usage if they attest that they expect to increase their usage next year by that amount.

The order also provides for the following:

- Utilities are required to offer highly differential time-of-use rates to net billing customers that are designed to encourage consumption mid-day and export later in the day.
- Net Billing customers will not be subject to a program-specific fixed charge, which had been under consideration. Instead, Net Billing customers will pay the fixed charge required by their rate schedule for service from the utility.

READ THE FULL ARTICLE.

The Legal 500 United States Top Tier 2022

Tier 2 - Energy - Regulatory - Conventional Power

Energy Storage Issues in the ERCOT Market

In 2022, the Electric Reliability Council of Texas, Inc. ("ERCOT") initiated and implemented several revisions to its policies, rules, and guidelines in an attempt to manage the growing integration of energy storage resources ("ESRs") on the ERCOT System and mitigate reliability concerns.

In short, the revisions are:

- May 1, 2022: the Public Utility Commission of Texas approved ERCOT-proposed Nodal Protocol Revision Request ("NPRR") 1096.
- December 2022: ERCOT staff adopted revisions to its Business Practice Manual to describe ERCOT's SOC expectations for ESRs.
- Throughout 2022: ERCOT stakeholder groups, including the Protocol Revision Subcommittee, Wholesale Market Subcommittee, and Reliability and Operations Subcommittee, considered another ERCOT-proposed NPRR (NPRR 1143) that would allow ERCOT to decide when ESRs can charge during an Energy Emergency Alert Level 3.
- December 21, 2022: ERCOT proposed a Planning Guide Revision Request to require Interconnecting Entities to complete all conditions for commercial operation of an ESR "within 180 days of receiving approval for Initial Synchronization from ERCOT."

In pertinent part, these changes: (1) enhance requirements for Resources to provide certain types of ancillary services ("AS"); (2) provide ERCOT with authority to conduct unannounced testing on ESRs that provide those types of AS; (3) establish ESR state-of-charge ("SOC") expectations; (4) attempt to give ERCOT the authority to determine when ESRs can charge during emergency conditions; and (5) attempt to create a deadline for ESRs to achieve commercial operation.

READ THE FULL ARTICLE.

Texas Wholesale Electricity Market Redesign

The Public Utility Commission of Texas ("Commission") is engaged in the most dramatic reform of the Texas wholesale electricity market in a generation. For the first time since the market was unbundled, and an "energy-only" wholesale market introduced, the Commission has recommended a plan to develop a capacity-like payment system. The Commission's proposed Performance Credits Mechanism ("PCM") would require load serving entities, like retail electric providers, to purchase credits allocated to electric generators based on their actual activity during the hours of highest risk. The Commission believes that the credits will help support the operations of existing dispatchable generation, while incenting the development of new generation the Commission argues would help prevent another significant blackout. But the proposed PCM has garnered significant controversy. Stakeholders have lined up for and against the PCM proposal. And the Texas Legislature has warned the Commission against finally adopting the PCM without its approval. Both the PCM's costs and its efficacy are in question. The ultimate resolution of this issue will shape the Texas wholesale electricity market, and indeed the Texas economy, for the next decade.

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Chambers TOP RANKED Global 2023
Baker Botts LLP

Band 1 - Projects & Energy - Oil & Gas: Global-wide

TRADITIONAL ENERGY

Master Limited Partnerships and Midstream C-Corps – 2022 Review

MLPs and midstream companies were able to produce solid returns despite a challenging year in the markets. The equity and debt capital markets proved difficult for another consecutive year with modest value. M&A transaction activity increased slightly from 2021, but was overshadowed by an approximately 50% reduction in transaction value. The sector could continue operating as a market safe haven during what most experts think will be a volatile year in the broader market, largely due to the expectation that MLPs and midstream companies will continue generating free cash flow.

In 2022, the Alerian MLP Index (AMZ) generated a solid return amidst an unsteady year in the market (30.9% total return). Similarly, the Alerian Midstream Energy Index (AMNA) and Alerian MLP Infrastructure Index (AMZI) posted total returns of 21.5% and 31.4% for 2022, respectively. The AMZ, AMNA and AMZI greatly outperformed the broader market, highlighted by a loss of 18.1% on a total-return basis for the S&P 500.

While this performance was encouraging, it did not translate into burgeoning capital market activity. Traditional equity capital market transaction deal flow dropped to just six public equity transactions, as compared to eight in 2021, with debt market activity down as well.

Merger and acquisitions activity increased slightly in the number of transactions but overall deal value decreased substantially, falling by approximately 50%. As has been common over the past several years, 2022 saw several roll up transactions, including the roll ups of the remaining major-backed MLPs.

Despite the generally negative outlook towards the market in 2023, MLPs and midstream companies have the potential to produce solid returns for another consecutive year. Companies are largely expected to continue generating free cash flow. MLPs and midstream companies will continue to increase distributions and undertake equity buybacks as important tools for returning capital to investors.

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"Baker Botts has its roots in energy; it's a first-rate practice."

—Chambers USA 2022

Best Lawyers BEST LAW FIRMS U.S.News 2023

Tier 1 - Law Firm of the Year - Oil & Gas Law

2022 Trends Among U.S. Pure-Play Refiners

U.S.-based pure-play refiners in 2022 were largely able to turn the page on the demand destruction and turmoil of the COVID-19 pandemic as product demand and refining margins surged driven by continued reopening and new geopolitical pressures. 2022 was also a significant year in terms of legislative and regulatory developments for refiners in the U.S. Finally, refiners continued their focus on sustainability and renewable fuels buoyed by increasingly robust subsidies and incentives.

As refiners were forced to reckon with the market turmoil stemming from the Russian invasion of Ukraine and recovering demand for refined products from the lows of the COVID-19 pandemic, commodity prices and refining margins drove a very strong 2022 for refiners financially, allowing refiners to focus on returning cash to shareholders through dividends and stock buybacks.

Refiners in 2022 were also met with a rapidly changing legislative and regulatory landscape. Refiners were forced to focus on feedstocks as the Russian invasion of Ukraine and resulting Western sanctions made Russian heavy crudes less available and forced a rebalancing of trade flows. Further, the Inflation Reduction Act of 2022 added or amended a number of tax credits of interest to refiners with respect to renewable fuels, while simultaneously planning a 1% tax on share buybacks that may skew how refiners approach returning capital to their shareholders. In 2023, refiners can expect continued regulatory pressures on their business, but can likely expect fewer big ticket legislative items coming out of a closely divided Congress.

Refiners continued to invest heavily in renewable projects in 2022. Each of Valero Energy Corporation, Marathon Petroleum Corporation and HF Sinclair Corporation commenced operations at new renewable diesel plants in 2022, while Phillips 66 made a final investment decision around converting its San Francisco refinery to process renewable fuels. Expect refiners to continue innovating in the areas of renewable fuels and beyond in 2023.

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"Baker Botts does a great job understanding issues and works well with clients."

—Chambers USA 2022

TOP RANKED Chambers USA 2022 Baker Botts LLP

Band 2 - Projects (USA): Oil & Gas
Band 1 - Projects (USA): LNG
Band 1 - Oil and Gas (USA): Litigation

The EU's Long-awaited Joint Gas Purchasing Regulations: The Rational and Legal Pitfalls

Concrete steps were taken at the end of 2022 to realize the European Union's ("EU") long-awaited joint gas purchasing ambitions. Some form of a European gas buyer's consortium might become a reality in 2023.

A new Council Regulation 2022/2576 in December prescribes joint purchasing in a two-step process. The first is mandatory and the second voluntary. In the first step, gas purchasing companies must aggregate their demand using an EU-wide dedicated service provider, selected through a public procurement procedure. Member States must ensure at least 15% of their storage filling requirements for next year are included by their companies in the demand aggregation process (approximately 13.5 billion cubic meters across the EU as a whole). Beyond the 15% aggregation will be voluntary but based on the same mechanism. Having matched demand with supply through this aggregation process, the second step would involve some of these companies voluntarily deciding to form a gas purchasing consortium (or multiple, regional consortia).

An Industry Advisory Group has also been established to assist the Commission in providing "the industrial dimension." This body comprises representatives from some 27 energy companies.

The new demand aggregation tool is scheduled to be active by spring 2023 in order to have an impact on gas supplies during the next filling season (i.e., ahead of winter 2023/2024). Joint purchasing remains voluntary and so far, there seems little appetite for EU companies to sign up to EU wide or regional consortia. The joint platform may not only be commercially unattractive for some players in the sector but the potential legal pitfalls – even if not unsurmountable – are undoubtedly discouraging.

READ THE FULL ARTICLE.

"The US-headquartered Baker Botts (UK) LLP is well known in the market for handling very large cross-border M&A deals, financings, disputes and project development work in the oil and gas sector."

—Legal 500 UK 2023

Chambers RANKED IN UK 2023

Baker Botts UK LLP

Band 2 - Energy & Natural Resources (UK): Oil & Gas

UK North Sea Licensing Round for Oil and Gas Companies Attracts Over 100 Bids

The North Sea Transition Authority ("NSTA") has announced that Britain's first oil and gas exploration licensing round since 2019 attracted 115 bids from 76 companies.

The 33rd North Sea Oil & Gas Licensing Round, which launched in October, saw 898 blocks and part-blocks offered with the UK Government targeting the award of 100 petroleum licenses to stimulate exploration activity in the basin. UK production from the North Sea has dipped to 1.5 million BOE/D, from a peak of around 4.4 million in 1999, and today's acreage offering represents the latest in a series of steps taken by the UK to promote its energy security in the face of prolonged underinvestment and the current geopolitical pressures affecting world energy markets.

The NSTA is aiming to reduce the average time from discovery to first production on the UK Continental Shelf which stands currently at five years. To this end, the 33rd Licensing Round identified four high priority cluster areas in the Southern North Sea – historically a prolific natural gas producing area – and which benefits from technically mature prospects, in proximity to existing infrastructure connecting to the proposed Bacton hydrogen hub, identified as a key element in the UK's Net Zero strategy. Acreage was also offered in the West of Shetland, Central and Northern North Sea areas, as well as the East Irish Sea.

The North Sea has a long history of delivering energy security, jobs, and substantial revenues for the UK economy. Results of the process are expected in late spring and the NSTA have said hope to begin awarding the licenses from Q2 this year.

READ THE FULL ARTICLE.

"Good knowledge of the oil and gas business – really know their sphere of work"

—Legal 500 UK 2022

The LEGAL 500 UNITED STATES TOP TIER 2022

Tier 2 - Industry Focus - Energy - Regulatory - Oil & Gas

Tier 1 - Industry Focus - Energy - Transactions: Oil & Gas

CLEAN ENERGY

Energy Technology—Strong Tailwinds and Continuing Investment in 2022 and a Bright Outlook in 2023

While 2022 was a volatile year for global energy, Energy Technology continued to grow in 2022 after a record year in 2021. Geopolitical events (such as Russia's invasion of Ukraine and its accompanying sanctions) highlighted the need for countries to find alternative sources of energy and, in the long term, continue to transition to clean energy sources, which can facilitate greater energy independence and resilience. This, in turn, accelerates the deployment of new solutions to capitalize on business opportunities, help achieve climate goals and resolve energy crises. Continuing supply chain issues have also created additional market opportunities for new approaches to clean energy.

The Inflation Reduction Act of 2022 (the "IRA") provides $369 billion in policies to address climate change and accelerate the transition to clean energy, through tax credits and direct investment for clean energy businesses. The IRA is expected to "be a core driver of US investment in carbon and emissions tech—supporting both new startups and existing projects," and make renewables more competitive. Further, although the IRA is only applicable to U.S. companies, other countries are following suit "to avoid losing an 'advantage' to the US market due to potentially favorable incentives the Inflation Reduction Act provides."

Venture capital investment and corporate investment in clean energy businesses continued to grow despite an overall slowdown in venture capital investment in 2022. Based on the IEA's Energy Technology Perspectives 2023 report, "There is a global market opportunity for key mass-manufactured clean energy technologies worth around USD 650 billion a year by 2030 – more than three times today's level – if countries worldwide fully implement their announced energy and climate pledges." Related clean energy manufacturing jobs are expected to more than double, and continued industrial and employment growth is anticipated in the following decades. Long term efforts are required to achieve results in clean energy technologies, businesses and climate initiatives, but the confluence of support from government, universities, research organizations, venture investors and corporations are enabling the development of transformative solutions to energy and climate challenges and capitalizing on their related business opportunities.

READ THE FULL ARTICLE.

"Baker Botts' renewable energy practice is robust and is amplified by deep experience representing developers, tax equity and long-term investors."

—Legal 500 US 2022

Market Trends in Green and Sustainability-Linked Financings

In recent years, the size of the sustainable debt market has increased dramatically, in parallel with rising investor demand for environmentally-oriented debt products. However, 2022 saw the first decline in the sustainable debt market after years of strong growth. This decline is largely due to the decline in the overall market coupled with heightened volatility and inflation rates.

According to Bloomberg, green, social, sustainability and sustainability-linked bonds raised a total of $863 billion in 2022, a 19% drop from the record $1.1 trillion issued in 2021. Sustainability-linked bonds – the most scrutinized segment of the market for environmental, social and governance-related debt – dropped 21% to $86 billion. Meanwhile, green bonds, which were propped up by a surge in sales from China, saw the smallest bond decline – dropping 11% to about $480 billion. Sustainability-linked loans dropped only 1% to about $474 billion, while green loans dropped 30% to about $118 billion. Increased interest and participation in the sustainable debt market has also generated concern among investors and ESG activists that many of the products being offered do not incorporate ambitious and material sustainability goals.

Despite the decline in 2022, many expect sustainable debt issuances in 2023 to recover to at least 2021 levels if the general global debt market stabilizes, but with it, tighter guidelines and increased scrutiny from investors, market observers and regulators.

In 2022, regulators and participants in the debt market continued to increase emphasis on addressing "greenwashing" in the sustainable debt market. Greenwashing occurs when a company purports to be environmentally conscious for marketing purposes but actually is not making any notable sustainability efforts. Many critics have noted that key performance indicators selected by sustainability-linked debt issuers often appear to be lacking in ambition, too easily achievable, or not sufficiently material, and the consequences for failing to achieve the specified sustainability performance targets often appear to be minor.

For now, there remains significant variability and discretion in selection of relevant ESG criteria in the sustainable debt market, but market trends suggest that 2023 will see additional scrutiny of sustainable debt instruments by investors, market observers and regulators, and an increase in standard setting and harmonization in the market.

READ THE FULL ARTICLE.

Public and Private Support for Clean Energy Companies in the UK

Although the UK is recognized as one of the most important international markets for cleantech, young clean energy companies have historically found it challenging to secure late-stage funding, especially when compared to other industries which are popular in the UK entrepreneurial ecosystem. Nearly half (47.6%) of energy-tech companies in the UK are stalled at seed stage. However, the light at the end of the tunnel could be not just near, but here – in the form of not only significant government support, but also meaningful private investment directed at the cleantech space.

In November 2020, the UK Government announced a £12 billion "Ten Point Plan" to lead a "Green Industrial Revolution." The plan aims to generate £42 billion of private investment by 2030, with the goal of reducing UK emissions by 180 million tonnes of carbon dioxide equivalent between 2023 and 2032. Aiming to raise its total R&D investment to 2.4% of GDP by 2027, the Government directed £100 million of investment into new greenhouse gas removal technologies in its Ten Point Plan. Building upon this initial investment, it also instituted the £1 billion Net Zero Innovation Portfolio, which aims to accelerate the commercialization of low-carbon technologies, systems and processes in various industrial sectors. In the Plan, the Government has pledged an additional £100 million for energy storage and flexibility innovations.

Alongside public funding, the Government is also encouraging greater private investment in green innovation, building on 2019's Green Finance Strategy and the corresponding launch and seed funding of the Green Finance Institute – which has established a Coalition for the Energy Efficiency of Buildings, a Zero Carbon Heating Taskforce and a Green Finance Education Charter.

In addition to this significant government support, energy-tech startups can now look forward to an enthusiastic influx of private capital as well. Venture capital investment in cleantech has more than doubled in just one year, from approximately £1.24 billion in 2021 to approximately £3.15 billion in 2022.

This is a unique moment in that the public and private support for clean energy technologies in the UK today is positively overwhelming. Companies in the energy-tech space would do well to take advantage of this incredible opportunity to fuel their worthy ambitions.

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Tier 2 - Industry Focus - Energy - Renewable/Alternative Power

HYDROGEN

Favorable Public Policies Drive Uptick in Patent Applications for Hydrogen Innovations

Hydrogen has emerged as a leader in the world's energy transition towards cleaner fuels. In the last five to 10 years, favorable shifts in public policy and regulations have not only encouraged significant new investments, but have also driven research and development, with large corporations, universities, government-sponsored labs, and many others focusing on developing hydrogen technologies.

The new technologies being developed address hydrogen generation, storage, and distribution, as well as consumer products such as hydrogen-fueled vehicles and their specific components. In tandem, there has been a dramatic uptick in patent applications to protect these technologies and the considerable investments being made to create them.

There has been a substantial increase in patent filings related to electrolysis (known as green hydrogen) and hydrogen generation using natural gas combined with advanced carbon capture technology to reduce emissions (known as blue hydrogen) in the last 20 years as compared to traditional hydrocarbon-based (known as gray hydrogen) generation, which has remained somewhat flat.

Besides patents for hydrogen generation, innovators are also coming up with technologies that facilitate the storage and distribution of hydrogen. Additionally, hydrogen technology developers are focusing on the consumption front, with the best-known example of this type of technology being vehicles that use fuel cell technology. The automotive sector is heavily invested in harnessing the power of hydrogen and data from Techson shows that the top five patent owners in this area are all in the automotive industry, as are many more of the top 25.

The best countries in which to file for a patent will depend on a corporation's individual business operations and the details of the specific invention, but the markets with substantial activity related to a developer's invention are a good place to start.

Companies and other players entering the hydrogen market for the first time or introducing a new product or service should consider whether or not they should perform a freedom-to-operate study. This study provides a more comprehensive look at the patent landscape surrounding products and services that may not be captured in a prior art or patentability search. Specifically, this study looks for any patent rights that may be infringed by the intended use of your own products or services.

Once armed with a better understanding of other patents implicated by their own patents and products, innovators must decide how to approach licensing those other patents and how they might handle licensing their own patents to others. Again, this can be a decision that depends greatly on a company's individual business needs.

READ THE FULL ARTICLE.

Texas Intrastate Hydrogen Pipeline Regulations

Recent reports have highlighted Texas's numerous strengths that enable the state to be a leader in hydrogen market development, including accessible low-cost renewable energy and natural gas, a welcoming climate for infrastructure investment and development, and a well-developed industrial sector. Texas already has an established hydrogen market and the largest hydrogen pipeline network in the United States. As the Texas hydrogen market grows, hydrogen facility operators will require additional intrastate pipelines to transport hydrogen between production plants, storage facilities, refineries, and customers. The Railroad Commission of Texas ("RRC") has regulatory authority over intrastate hydrogen pipelines in Texas.

Hydrogen Common Carrier Requirements

The Texas Natural Resources Code's definition of a common carrier includes a person who "owns, operates, or manages, wholly or partially, pipelines for the transportation of carbon dioxide or hydrogen in whatever form to or for the public for hire."

Importantly, as a common carrier, a hydrogen pipeline must (1) make and publish tariffs and (2) receive and transport pipeline products without discrimination. In exchange, common-carrier hydrogen pipelines (1) "have the right and power of eminent domain;" (2) "are entitled to lay, maintain, and operate [pipelines] along, across, or under a public stream or highway in this state;" and (3) are "entitled to lay . . . pipe or pipeline under any railroad, railroad right-of-way, street railroad, or canal in this state."

Hydrogen Pipeline Permit Requirements

To obtain a pipeline permit, hydrogen pipeline operators must first register with the RRC by filing Form P-5 (Organization Report). Next, operators must complete and submit Form T-4 (Application for Permit to Operate a Pipeline in Texas).

In addition to filing Form P-5 and Form T-4, operators of hydrogen pipelines must notify the RRC before beginning construction of a hydrogen pipeline by filing Form PS-48 (New Construction Report). Generally, operators must file Form PS-48 30 days before construction. However, if the construction is for "a new, relocated, or replacement pipeline 10 miles in length or longer," operators must file the form 60 days before construction.

Looking Forward

Texas already has around 550 miles of intrastate hydrogen pipelines in operation. The recent passage of hydrogen incentives in the Infrastructure Investment and Jobs Act and the Inflation Reduction Act will likely encourage additional hydrogen development in Texas. Effectively managing this expanded hydrogen activity will require new intrastate hydrogen pipelines.

READ THE FULL ARTICLE.

CLEAN ENERGY TAX

Inflation Reduction Act of 2022

On August 16, 2022, the United States enacted the most significant clean energy legislation in the nation's history. The Inflation Reduction Act of 2022 ("IRA") will be an outsized influence over investments across the energy landscape for the coming decade, and every participant in the U.S. energy market should be familiar with the key aspects of this new legislation.

IRA will provide hundreds of billions of dollars in direct government support for a vast range of energy infrastructure investments, from renewables like solar, wind, and geothermal power generation, to hydrogen and renewable natural gas production, carbon capture, electric vehicles and charging infrastructure, energy storage, sustainable fuels, and countless energy efficiency investments. This direct government support will facilitate trillions of dollars of investment in U.S. energy infrastructure over the coming decade.

READ THE FULL ARTICLE.

Inflation Reduction Act Offers Tax Incentives to a Wide Range of Clean Energy Technologies

The IRA enacted tax provisions to incentivize a wide range of clean energy technologies, constituting almost $300 billion of the climate-related expenditures implemented by the legislation. In addition to the significant extensions and increases applicable to tax credits for wind, solar, clean hydrogen and carbon capture projects, there are extensions and increases in existing and new credits for numerous other clean energy technologies.

The IRA revamped the credit profile for the production of clean fuel. It extended through 2024: (1) the income and excise tax credits for biodiesel and biodiesel mixtures at $1.00 per gallon, (2) the $0.10 per gallon small agri-biodiesel producer credit, (3) the $0.50 per gallon excise tax credits for alternative fuels and alternative fuel mixtures, and (4) the second generation biofuel income tax credit. It also creates a new sustainable aviation fuel (SAF) income tax credit and excise tax credit, applicable to sale or use of qualified mixtures after 2022 and before 2025.

The IRA created a new technology-neutral clean fuel production credit in section 45Z that applies after 2024 and before 2028. Fuels may qualify for the credit if their lifecycle emissions are sufficiently below the U.S. average for fuel production.

The IRA also expands the production tax credit for hydropower projects placed in service after December 31, 2022. In particular, the IRA eliminates the 50% production tax credit reduction under current law for qualified hydroelectric production and marine and hydrokinetic renewable energy.

Furthermore, the IRA creates a new tax credit, in new section 45U, for the production of zero-emission nuclear power (the "Nuclear Power Production Credit"). In general, the Nuclear Power Production Credit equals a base rate of 0.3 cents per kWh of electricity produced at a qualified nuclear power facility and sold by the taxpayer to an unrelated person during the taxable year, less the "reduction amount." If prevailing wage requirements (but not apprenticeship requirements) are satisfied, the amount of the Nuclear Power Production Credit otherwise available is quintupled.

The IRA introduced or enhanced tax incentives for many other clean energy technologies, including for geothermal projects, waste energy (heat) recovery property, thermal energy storage, electric vehicles, microgrid controllers, dynamic glass and residential energy efficient property. All of these incentives will serve to foster increased interest and investment in clean energy projects in the United States.

READ THE FULL ARTICLE.

Inflation Reduction Act Offers New Ways to Monetize Clean Energy Tax Credits

The IRA has enacted two significant new ways to monetize, i.e., to turn into cash, federal tax credits generated from clean energy projects such as wind, solar, hydrogen, carbon capture or renewable natural gas projects, among others.

New Internal Revenue Code section 6417 allows certain parties to elect to be treated as having made a payment of tax equal to the amount of their eligible clean energy tax credits. Thus, if the claimant does not have a tax liability against which to use the credits, the effect of the election will be to cause the government to pay a tax refund for the deemed payment of tax. For parties that do not have a tax liability, such as tax-exempt organizations and certain companies with net operating losses, the election will therefore monetize the credit and the claimant is not forced to carry forward such credits to a future year when a tax liability may arise. The election is referred to as a "direct pay" election.

A second very significant new method of monetizing tax credits is offered by the IRA in the form of Code section 6418, which provides that, starting in 2023, taxpayers may effectively sell clean energy tax credits. The transfer must be to an unrelated party and must be for "cash."

It is expected that markets, including online services, will develop to match buyers and sellers of credits, along with brokers offering to put buyers together with sellers in exchange for a fee.

Under pre-IRA law, tax credits generally could not be sold or transferred. Allowing transferability of these clean energy tax credits is expected to expand the universe of potential investors and provide an alternative or supplement to tax equity financing.

READ THE FULL ARTICLE.

Inflation Reduction Act Extends and Increases Tax Credits for Wind and Solar

The IRA extended and increased the existing investment tax credit ("ITC") and production tax credit ("PTC") under the Internal Revenue Code, and provided for the future replacement of those credits with similar, but technology-neutral, credits for projects that begin construction after 2024.

The ITC is a tax credit equal to a percentage of the initial tax basis of a qualifying project at the time it is placed in service. It applies to a variety of clean energy projects, but historically the primary beneficiary has been solar projects. The IRA extended the ITC at its full historic rate, retroactive to the beginning of 2022.

The PTC is a tax credit per kWh of electricity produced during the initial years of operation of a qualifying facility (for example, 10 years in the case of wind facilities) and sold to an unrelated party. The IRA extended the PTC at its full historic, inflation-adjusted rate, retroactive to the beginning of 2022.

During the 15 years prior to the enactment of the IRA, solar facilities were ineligible for the PTC. Solar facilities placed in service after the enactment of IRA may elect to claim the PTC rather than the ITC.

The IRA also allows an increased amount of ITC or PTC for projects that contain sufficient domestic content, are located in "energy communities," or are located in low-income communities and received an allocation of credit upon application to the Treasury Department. These credit enhancements can apply separately or be stacked.

The IRA requires that the credit amounts described above be reduced by an 80% haircut if a project has a maximum net output of at least one megawatt, begins construction after January 28, 2023, and fails to satisfy "prevailing wage" and "apprenticeship" requirements detailed in the IRA.

For projects that begin construction after 2024, the IRA provides that the traditional ITC and PTC generally no longer apply. They are replaced by a new technology-neutral clean electricity production tax credit (similar to the PTC) and a new clean energy investment tax credit (similar to the ITC). Eligibility for these credits generally requires that the facility's greenhouse gas emissions be no greater than zero.

READ THE FULL ARTICLE.

New Clean Hydrogen Tax Credits

The IRA created a new tax credit, in Internal Revenue Code section 45V, for the production of clean hydrogen (the "Clean Hydrogen Production Credit") by a taxpayer at a qualified facility beginning in 2023 during the ten-year period beginning on the date such facility is placed in service.

The amount of the Clean Hydrogen Production Credit is not a flat amount per kilogram of hydrogen produced. Instead, the credit amount turns on the carbon intensity of the process used to produce the hydrogen. For example, the credit is equal to the "applicable percentage" of $3.00 per kilogram of hydrogen in the case of projects that meet, or are not subject to, certain prevailing wage/apprenticeship requirements, indexed to inflation.

The credit is available only for clean hydrogen that is produced within the United States. The hydrogen must be produced for sale or use, so a taxpayer may claim the credit for producing the hydrogen for its own use in the production of another product, such as ammonia.

There is no upper limit on the amount of clean hydrogen production for which the credit may be claimed.

There are a number of issues surrounding implementation of new section 45V; guidance from the Internal Revenue Service as to the specifics of its application is needed. In this regard, an issue of particular importance is whether taxpayers may include their purchase of renewable energy certificates ("RECs") or other environmental attributes in determining the carbon intensity of their projects for purposes of determining the credit amount.

In addition to section 45V for clean hydrogen production, new section 48(c)(6) offers a credit for energy storage property that extends to hydrogen storage, defined as: "Property which receives, stores and delivers energy for conversion to electricity (or, in the case of hydrogen, which stores energy)."

READ THE FULL ARTICLE.

Inflation Reduction Act Enhances Carbon Capture Tax Credit

The IRA has enhanced and extended the credit in section 45Q of the Internal Revenue Code for carbon capture and sequestration. The significant increase in the amount of the credit is expected to accelerate the development and construction of many carbon capture projects through better economic returns.

The construction period for qualified carbon capture projects has been extended: the tax credit is now available for facilities that begin construction before 2033, whereas previously construction had to begin before 2026.

Additionally, the amount of the credit has been increased: as revised, the credit is $85 per metric ton of carbon oxide captured and sequestered in secure geological storage, and $60 per metric ton of carbon oxide captured and used by the taxpayer for enhanced oil recovery or other allowable utilization, in both cases for facilities that meet, or are not subject to, certain prevailing wage and apprenticeship requirements for labor in the construction of the facilities. Starting in 2027, these credit amounts will be increased by an inflation adjustment factor.

With respect to qualified direct air capture facilities, the IRA also provides an enhanced credit at a rate of $180 per metric ton for carbon oxide captured for geological storage and $130 per metric ton of carbon captured and used by the taxpayer for enhanced oil recovery or other allowable use (in both cases again assuming prevailing wage and apprenticeship requirements are met).

READ THE FULL ARTICLE.

ENERGY ENVIRONMENTAL & SOCIAL JUSTICE

Environmental Enforcement Trends: 2022 Update

Rebounding from the COVID-19 pandemic, many observers wondered whether environmental enforcement cases would increase in 2022. With another year under its belt, the Biden EPA has had more time and stability to pursue its policy objectives and adjust enforcement priorities. Recent announcements and data released by the EPA suggests that as the Biden agenda becomes more entrenched, EPA and DOJ are prioritizing enforcement cases involving energy interests, particularly in areas of environmental justice ("EJ") concern, even as the total number of federal environmental enforcement cases continue to gradually decline consistent with long-term trends.

Data from EPA suggests that overall case initiations and conclusions remained fairly steady in 2022, in line with enforcement trends over the last decade. On the criminal side, enforcement numbers continued a downward trend from last year. 2022 saw the fewest number of criminal cases opened since 2017 and by far the fewest total years of prison sentencing in EPA's dataset.

In conjunction with EPA's memo, Strengthening Enforcement in Communities with Environmental Justice Concern, EPA has significantly increased its monitoring efforts in areas of potential EJ concern, which has in turn concentrated enforcement in those areas. In 2022, nearly 57% of on-site inspections occurred at facilities affecting communities with potential EJ concerns, exceeding the goal established in EPA's Strategic Plan, which aims for 45% of EPA's on-site inspections to be conducted in such areas by 2026.

It remains to be seen whether this downward trend of enforcement action continues into the future or whether EJ concerns will continue to drive enforcement decisions. Looking ahead to 2023 and 2024, companies should be prepared to encounter more exacting scrutiny from EPA and DOJ for operations in areas of potential EJ concern. Such facilities should expect more inspections and heightened monitoring while preparing to face a higher likelihood of federal enforcement interest.

READ THE FULL ARTICLE.

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—Legal 500 US 2022

Equity and Justice Developments in the Energy Sector

The environmental, social, governance ("ESG") movement advanced in 2022 in response to various market and boardroom forces supporting the adoption of ESG-conscious policies and practices. Federal and state regulators were active in this space, both offering incentives and taking enforcement actions to steer companies towards increased ESG-conscious practices.

Striving to meet and exceed regulator, public, and shareholder expectations, more companies proactively incorporated environmental justice ("EJ") and civil rights issues into their ESG efforts. Additionally, 2022 saw the emergence of racial equity audits. These audits evaluate a company's policies, practices, and procedures to determine the company's impact on a variety of social issues while also identifying potential areas for improvement.

The billions of dollars in clean energy project funds available to companies under the Inflation Reduction Act ("IRA") also put a spotlight on the nondiscrimination mandate of Title VI of the Civil Rights Act of 1964. EJ considerations are also relevant to companies pursuing carbon sequestration projects, particularly in well siting. The permit process for siting of Class VI underground injection control wells and geologic sequestration facilities will require companies to analyze impacts on vulnerable communities and to develop community inclusive processes.

2022 also saw federal regulators take tangible steps to show how EJ and equity would drive their case selection and resources. In Fall 2022 EPA launched a new Office of Environmental Justice and Civil Rights, to support enforcement work in communities with EJ concerns as well as to disperse $3 billion in EJ IRA grants. DOJ announced it would pay particular attention to criminal violations implicating EJ communities, and Attorney General Garland directed U.S. Attorneys to appoint EJ Coordinators in their districts, nationwide.

Energy companies are well-positioned to be prepared for equity and justice requests and initiatives with 2022's release of analytical tools to identify community concerns. These include EPA's overhaul of EJScreen in 2022 and the White House's release of the Climate and Economic Justice Screening tool.

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