Global construction update:
The energy transition issue

July 2024

ReedSmith

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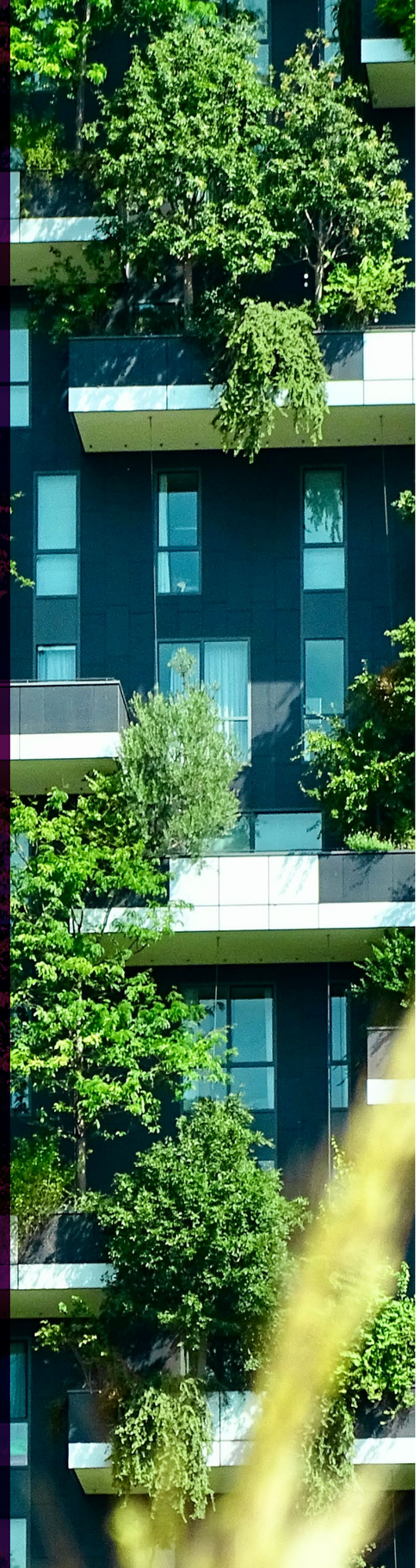
through partnership



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Global construction update
Welcome

The global energy transition is at the forefront of client conversations. Following the UN Climate Change Conference in Dubai last December, commonly known as COP 28, participating countries were encouraged to propose ambitious emission reduction targets and climate action plans by 2025, all with a goal to keep global temperatures from rising above the 1.5°C limit viewed as being critical. For the construction sector, opportunities in the renewables market abound, but bring complex challenges around financing, technology, risk allocation and regulatory developments. In this issue of Reed Smith's *Global Construction Update*, our team shares practical insights on how clients can capitalize on the renewables boom.

- **Antoine Smiley** (Austin) considers carbon capture and sequestration projects in the United States, and innovative strategies to address the novel challenges of their financing and development.
- **Allard Nooy**, (Managing Director Markland Infrastructure Asia and Senior Advisor RPS Deal Advisory), **Joyce Fong** and **Liseah Ang** (Singapore) forecast challenges and opportunities for ASEAN's construction industry as the region grapples with net zero objectives.
- **Philip Rymer**, **Thor Maalouf** (London) and **Alice Colarossi** (New York) focus on vessel construction for offshore wind farms, exploring the role of new technologies and effective management of design and performance risk.
- **Chris Edwards** (Dubai) sits down with **Alex Haynes** (head of Business Development for Energy Transition Projects at Petrofac) to discuss COP 28 and new opportunities in the renewable energy industry.
- **James Doerfler** (Pittsburgh) sits down with **Brendan McNallen** (San Francisco) for a Q&A on Brendan's flourishing renewable energy practice, recent trends in grid-based energy storage systems, and challenges faced by renewables clients in 2024.
- **Antonia Birt** and **Alison Eslick** (Dubai) and **Nicolas Walker** (Paris) consider risk allocation and dispute resolution mechanisms for renewables projects, with contributions from Sebastien Bernard, EDF Renewables

Reed Smith's global construction practice continues to grow from strength to strength, recognized by clients, peers and directories alike. Example awards and recognition are set out below:

- *Chambers Global 2024* and T*he Legal 500 EMEA 2024* both ranked Reed Smith's leading UAE dispute resolution practice.
- **Sachin Kerur**, **Michelle Nelson** (Dubai) and **Peter Rosher** (Paris) have been included again in the *Who's Who Legal 2024* list for Construction.
- Reed Smith lawyers continue to rank in the Hall of Fame for *The Legal 500 EMEA* construction category.
- Our construction team was shortlisted for "UAE Construction Law Firm of the Year" at the Chambers Middle East Awards 2024 for its work with a major UAE developer on incorporating sustainability provisions into its suite of construction contracts.
- **Michelle Nelson** (Dubai) was included in the *Construction Week Top 20* list of the most influential women in construction. Michelle was shortlisted in two categories at the inaugural The Legal 500 Middle East and North Africa Awards 2024, including "Construction Lawyer of the Year."
- **Michelle Nelson** and **Alison Eslick** (Dubai) were shortlisted for the Lexis Nexis Women in Law Awards 2024 for "Equality Initiative of the Year" for Reed Smith's *Maximising female talent in construction* webinar series.
- **Peter Rosher** (Paris) was appointed co-president of the Society of Construction Law (SCL) French chapter.

What else have our construction lawyers been up to, you may ask? Across the globe, our practitioners have been contributing actively to thought leadership and information sharing in the construction space.

- **Peter Rosher** (Paris) and **Alison Eslick** (Dubai) attended the ICC Conference in Nairobi, where Peter Rosher presented in a panel session on "Future of construction dispute resolution in Africa."
- **Joyce Fong** (Singapore), Matt Gorman and guest speaker Allard Nooy recorded a podcast episode for Energy Explored podcast episode on "Energy transition in Southeast Asia: Current trends."
- **Chris Edwards** and **Sachin Kerur** (Dubai) were joined by a panel of experts to discuss sustainability targets, increasingly extreme weather events and how the construction industry can address the risks of climate change.
- **Erwan Robert** and **Peter Rosher** (Paris) co-authored an article on AI and construction for *Corporate Disputes* magazine's April-June 2024 issue.
- **Sachin Kerur** (Dubai) has been invited to moderate a panel session at the Construction Week Leaders In Construction Summit KSA 2024. The panel will focus on "Crafting Experiences: Emerging trends in hospitality construction."
- **Michelle Nelson** (Dubai) was quoted in an *Arabian Business Gulf Insight* (AGBI) article about contractors in Dubai seeing "no payment issues or delays."
- **Kyle Sethi** (London) published a blog on "Insights into the 2024 Design and Build Contract by the Joint Contracts Tribunal."
- **Chris Edwards** (Dubai) and **Joy-Emma Martin** (London) co-authored an article for *Arab News* on the Kingdom of Saudi Arabia's new Civil Code.

As ever, we look forward to working with all our clients and construction industry colleagues throughout 2024 and beyond.

We hope you enjoy reading.

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Navigating energy transition in ASEAN – Insights for the construction industry

The Association of Southeast Asian Nations (more commonly known as ASEAN), comprises Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. If the ASEAN countries formed a single economy, it would have a combined gross domestic product of about $2.6 trillion, making it collectively the third-largest economy in Asia and the seventh-largest in the world.

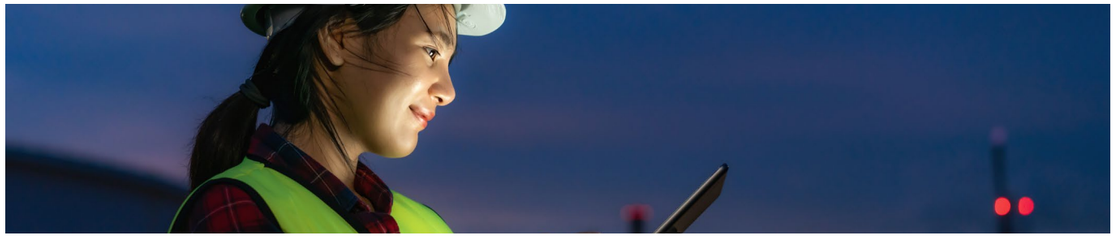
As one of the world's fastest-growing economies, and with an increasing energy demand to match, ASEAN faces the dual challenge of seeking to fulfill its ambitious energy transition targets while grappling with the challenges of rapid economic growth. Although ASEAN countries have collectively set targets to achieve 23% and 35% of renewable energy in total energy supply and installed power capacity, respectively, by 2025, oil, natural gas and coal are forecast to continue to dominate in ASEAN and to account for about 88% of its total primary energy supply in 2050. In other words, non-renewable energy sources are expected to remain prevalent in ASEAN for some years.

1. Predictions on ASEAN's energy landscape

At the recent United Nations Climate Change Conference (COP 28), ASEAN reaffirmed its dedication to sustainable energy and its commitment to achieving a target of 23% renewable energy in its total primary energy supply by 2025. The following trends are likely to emerge:

a. **Reduction in carbon emissions:** ASEAN's greenhouse gas (GHG) emissions are projected to reach 3,500 metric tons of carbon dioxide equivalent (Mt CO_2-eq) per year in 2030, almost double the amount of 1,815 Mt CO_2-eq in 2020. The energy and power sector (58%) is a major contributor to global GHG emissions in ASEAN, followed by transportation (21%) and the industrial sector (18%). To combat these growing carbon emissions, ASEAN countries are investing in and promoting low-emission transportation solutions, such as electric vehicles, cycling infrastructure, and alternative fuels. Member states are also exploring carbon capture, utilization and storage (CCUS) to mitigate emissions from large point sources, such as power generation or industrial facilities that use fossil fuels or biomass. CCUS captures the carbon dioxide produced, and either transports it for use in other industries or stores it underground, thus preventing the carbon dioxide from entering the atmosphere.

b. **Renewable energy expansion:** Increased investment in renewable energy sources such as solar, wind, hydro, and biomass to diversify the energy mix and reduce dependence on fossil fuels. Rapid advancements in renewable energy technologies and declining costs are driving accelerated deployment and expansion of clean energy capacity across the region.



c. **Energy efficiency improvements:** Prioritization of measures to reduce energy consumption and improve energy efficiency across various sectors, including industry, buildings, transportation, and agriculture. Examples of such measures include setting energy efficiency standards, promoting the use of energy-efficient technologies such as cogeneration (or combined heat and power) systems, investing in infrastructure upgrades, and raising general awareness among businesses.

d. **Energy transition policies:** Governments of ASEAN member states are advancing policies and regulations to promote the energy transition by creating favorable market conditions and incentives for clean energy investments, such as compulsory renewable energy targets, attractive feed-in tariffs, generous tax incentives, and more robust carbon pricing mechanisms. Several of these initiatives target foreign investors because domestic investment alone cannot achieve members' established transition targets.

e. **Grid modernization and integration:** Investment in grid modernization and expansion to accommodate the increasing adoption of renewable energy sources, particularly by enhancing grid stability, flexibility, and resilience through the deployment of smart grid technologies, energy storage solutions, and demand-side management initiatives. In large archipelagos such as Indonesia and the Philippines, this is critical in facilitating reliable access to electricity in many locations.

f. **Regional collaboration and partnerships:** Increased collaboration on regional clean energy initiatives and partnerships to promote knowledge sharing, capacity building, and technology transfer within ASEAN. To date, regional platforms, such as the ASEAN Centre for Energy and the ASEAN Plan of Action for Energy Cooperation, have been formed to facilitate coordination and cooperation among member states to address common energy challenges and opportunities. We expect these bodies will be prominent in the energy transition and similar cooperations within different segments of the energy sector.

Although ASEAN countries have collectively set targets to achieve 23% and 35% of renewable energy in total energy supply and installed power capacity, respectively, by 2025, oil, natural gas and coal are forecast to continue to dominate in ASEAN and to **account for about 88% of its total primary energy supply** in 2050.

2. ASEAN's construction landscape

Turning to the construction industry in ASEAN, we anticipate a significant shift in investment patterns, reflecting broader global trends in renewable energy markets. There are four areas where more construction activity is expected:

a. **Green data centers:** Globally, green data centers have traditionally utilized solar and wind power to meet their energy requirements. However, green hydrogen fuel cells (or hydrogen fuel cells powered by renewable sources) are increasingly seen as a reliable alternative, since hydrogen fuel cells offer superior efficiency and dependability compared to on-grid solutions, produce minimal to zero carbon emissions, require minimal maintenance, and are modular in design (thus allowing for scalability). We expect the global trend toward green data centers and green hydrogen fuel cells to be followed in ASEAN as its data needs increase.

b. **Green hydrogen:** The lack of existing hydrogen infrastructure is a significant hurdle to the widespread adoption of green hydrogen in ASEAN. That said, the public–private partnership (PPP) model is being increasingly used for green hydrogen development in ASEAN, serving as a platform to fund and develop incentives, redistribute risk exposures, exchange information to advance technological progress, create consensus, and coordinate activities. As demand for a robust and reliable green hydrogen supply chain grows, we expect to see a greater focus on green hydrogen infrastructure in ASEAN.

c. **Green ammonia:** Green ammonia is produced using renewable energy sources such as solar or wind power and offers a sustainable alternative to traditional fossil fuels for a variety of applications, including maritime transportation. While investments in green ammonia production infrastructure, technology development, and regulatory frameworks are underway, challenges such as high production costs, limited infrastructure, and technical feasibility need to be addressed for green ammonia to become economically viable and its full potential realized in ASEAN.

d. **Wind power projects:** Onshore wind projects will continue expanding in ASEAN due to the region's favorable wind resources, supportive policies, and declining costs of wind energy technology. Offshore wind power projects are gaining traction in ASEAN, particularly in countries with suitable marine conditions and strong government support, such as Vietnam. However, offshore wind projects are considerably more technically challenging (and expensive) than onshore wind projects. As such, ASEAN's regulatory frameworks for offshore wind projects must be enhanced further in order to attract the levels of investment seen in Japan, South Korea, and Taiwan. In Japan and South Korea, offshore wind capacity surpasses onshore installations, and South Korea's wind capacity is expected to exceed Japan's by 2033. These green and renewable energy technologies are not mutually exclusive and can act in ways that complement each other. For example, the adoption of green ammonia as a fuel source for maritime transportation vessels holds significant potential to drive the development of both offshore and onshore wind projects in ASEAN as a renewable power source to generate green hydrogen.

While construction activity in ASEAN is turning toward the renewables market, listed construction companies within ASEAN are facing increasing shareholder pressure to reduce their own carbon footprint, as investors prioritize sustainability and scrutinize environmental practices. As major contributors to carbon emissions through their building activities and project operations, construction companies are under pressure to adopt green building practices, use eco-friendly materials, and implement carbon reduction measures throughout their operations. Companies that fail to address these concerns risk reputational damage, regulatory penalties, and potential divestment by socially responsible investors.

3. Key challenges affecting the energy transition

Energy transition efforts in ASEAN face various challenges that could impede the region's ability to meet its sustainable energy targets. While we discuss these challenges with a focus on the construction industry, many are not unique to this industry:

a. **Delayed construction and grid integration issues:** Despite recent significant growth in solar and wind capacity, delayed construction of renewable energy projects and challenges integrating these projects into national grids are widespread within ASEAN. Poor infrastructure, policies, and intermittent energy supply issues due to climate-induced extreme weather are notable barriers. Going forward, the ability to connect to a reliable and efficient grid could become a critical issue in ASEAN's energy transition. If the region's governments cannot deliver a reliable energy grid, project developers may lose confidence in projects whose success depends on it.

b. **Prioritization of fossil fuels:** ASEAN countries are heavily reliant on fossil fuels, and this is likely to remain the status quo in the medium term. The lock-in of fossil fuel-based electricity sources through inflexible and long-term power purchase agreements has generally inhibited renewables investment to date. Incumbent interests in coal, concerns about energy security, and uncertainties related to operating under a less-established renewable energy source power model continue to influence overall slow progress in the energy transition.

c. **Lack of investment:** The energy transition within ASEAN relies heavily on financing from the public and private sectors. To meet their sustainability ambitions, ASEAN countries will require greater energy sector investment (estimated to be around $200 billion by 2030), of which more than three-quarters will be in clean energy.[1]

According to the seventh edition of ASEAN Energy Outlook, an annual power investment of $31 billion is required between 2031 and 2040, as the region expands new builds to meet the higher energy demand. Public financing alone is not enough to attract this level of capital; private sector financing is essential to mobilize the additional capital, innovation, and expertise required to accelerate the deployment of renewable energy, energy efficiency, and sustainable infrastructure projects. Many financial institutions are shifting away from coal power projects and prioritizing investment in clean energy technologies, green infrastructure, and climate resilience initiatives. PPPs can leverage the strengths and resources of the public and private sectors to address financing gaps, manage risks, and deliver impactful climate solutions at scale and we expect to see growth in the PPP model of infrastructure delivery.

d. **Regulatory roadblocks:** Governments play a crucial role in setting ambitious climate targets and implementing supportive policies. Inadequate policy and investment frameworks in ASEAN have thus far hindered the development of renewable power in the region.

e. **Geopolitical considerations:** Energy resources and infrastructure are often intertwined with geopolitical interests and rivalries. ASEAN countries rely on a mix of energy sources, including fossil fuels and imported energy resources. Policymakers must exercise caution to avoid transitioning to renewable energy too quickly, which may disrupt energy supply chains and affect energy security. They must also balance competing interests and preferences among different stakeholders, while navigating the geopolitical complexities and diplomatic relations when making decisions about energy transition and international cooperation on energy issues, such as cross-border power connectivity.

1. ASEAN Renewables: Opportunities and Challenges (Imperial College Business School, March 2023).

Conclusion

The coming years will likely herald measures that increase adoption of clean energy sources, aided by advancements in technology and greater collaboration among ASEAN member states. The construction industry in ASEAN will have opportunities to capitalize on the region's energy transition because of the significant investment in the new energy infrastructure that would need to be constructed. However, challenges include regulatory roadblocks, lack of investment, and inadequate infrastructure development. There needs to be a concerted effort by ASEAN governments, businesses, and communities to accelerate the transition toward a sustainable energy-based future in the region.

We recognize the contribution of former Reed Smith Partner, Matthew Gorman, to this article.

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NAVIGATING ENERGY TRANSITION IN ASEAN

Offshore wind – constructing the right vessels in the right way for the right projects

Offshore wind projects are technically challenging from several perspectives. With the largest turbines installed several kilometers offshore and at substantial depths, the seabed conditions must be properly assessed, adverse weather conditions can disrupt construction schedules and there may be environmental compliance obstacles raised by the construction process.

In addition to these technical and legal matters, one of the most vexing aspects of erecting offshore wind projects is a purely logistical one – sourcing the right maritime vessels to execute the project. In this regard, a range of vessels are required to support both the initial construction and future maintenance of offshore wind farms, including heavy-lift vessels, semi-submersibles, craned barges, crew transport vessels and self-propelled jack-ups. Vessels must meet the bespoke technical and regulatory requirements of a particular project and, in the case of U.S. offshore wind, the unique requirements under the Jones Act, 46 U.S.C. section 55102 et seq. In this article, we consider the shipbuilding dimension of offshore wind projects, where new technology is emerging to improve project execution and enable more sustainable construction methods. Such new vessel technology raises a range of legal risks that must be carefully managed by buyers, shipbuilders and third-party technology providers.

1. What is the role of new technologies in shipbuilding for offshore wind?

New technologies and innovative vessel designs can facilitate compliance with a project's physical technical requirements, such as the ability to operate in forbidding sea and wind conditions or crane barges large enough to lift nacelles and rotor blades. They can also further a project's overall environmental and decarbonization goals. For example, the integration of fully electric propulsion and foiling capabilities (such as the Artemis Technologies workboat launched in 2022) helps to reduce a project's overall carbon footprint. Such decarbonization goals may be more than "nice to have," given increasing amounts of legislation in the areas of vessel emissions and carbon use in the manufacturing and supply chain (see, for example, the EU ETS and EU Carbon Border Adjustment Mechanism).

In this article, we consider the **shipbuilding dimension** of offshore wind projects, **where new technology is emerging** to improve project execution and enable more **sustainable construction methods**.

2. How can design and performance risks be managed at the contracting stage?

a. Parties should agree upon a clear allocation of the design risk

In most shipbuilding contracts, it is the shipyard's express responsibility to design and build the ship to meet the agreed technical specifications, even where a third party has contributed to some aspect of the design. If that is the case, there will be an implied legal obligation that the builder will use reasonable skill and care to do so and that the ship design, and all integrated technology, will be at the builder's risk because these components of the finished works are an aspect of the good workmanship that must impliedly be exercised by the builder during construction. However, where a shipbuilding project involves new or innovative designs and technology, there will be uncertainty at the outset and throughout the build over both the design specifications and the resulting performance of the ship.

The vessel buyer can aim to control this risk by agreeing to technical specifications that are as detailed as possible, and to which the vessel construction should adhere. For example, if a vessel is being built for a specific project, the contractual specification should record points such as the minimum deck strength and the required dimensions to carry the particular project cargo. However, where a design is truly innovative, the exact specifications may evolve during the build itself. Buyers need to be aware that where a new technology developed by the buyer or by a third-party engineer or supplier is being incorporated into the new build ship, it might not be implied that the builder assumes the risk of the new technology performing as expected. The contract will, therefore, need to clearly state who bears the risks associated with the incorporated technology and possible design shortfalls.

b. Parties should agree upon the builder's warranties for key performance criteria

A buyer can control risk by agreeing upon the builder's warranties for key performance criteria or metrics that the new build ship must meet. These criteria will be measured at the vessel's sea trials prior to her delivery. Given the inherent risk of performance shortfalls with an innovative vessel build, the buyer should also consider the strength of the builder's warranty by assessing counterparty risk at the outset of the project. Understandably, the builder might refuse to provide a warranty of fitness for a particular purpose that a truly new design or technology will meet the buyer's particular needs. In that situation, the builder might seek to limit their obligations to comply with a set of integration specifications from the buyer, third-party engineer or technology supplier. A direct agreement with the third-party engineer or technology supplier may help the buyer gain the control and security they need. Failing a direct agreement between the buyer and the technology supplier and/or an assignment of the builder's warranties from the supplier, the risks associated with performance shortfalls in the new technology may ultimately rest with the buyer. There can also be disputes about design liability where the ship complies with the contract's technical specification but nevertheless fails to meet the agreed performance criteria. It is, therefore, important for the shipbuilding contract to clearly establish liability for meeting specifications and performance warranties, including their measurement. Additionally, the contract should clearly define who gets the benefit of any warranties from third-party suppliers.

3. How can design and performance risk be managed during construction?

a. Careful adherence to the contractual variation regime

The buyer and builder can agree variations to the shipbuilding contract where modifications to the specification are required. The regime for variations is usually set out in the shipbuilding contract. Risk of uncertainty to both parties can be reduced by complying fully with this regime. The builder will be particularly keen to ensure that any variations impacting the price and delivery schedule are properly recorded according to the contract. Parties should be aware that the English courts will generally uphold clauses in shipbuilding contracts requiring strict formalities for agreeing to variations, such as requiring written notices or signature requirements. Although the enforceability of such clauses is less established under U.S. law, it is nonetheless advisable to satisfy the contract's formality requirements, even in those instances where U.S. law applies.

b. Agree a robust testing and trial regime for new vessel technology

Risk can be reduced by developing and agreeing to specific testing and trials programs for specific technology being integrated into the ship build. These programs could be designed and run in conjunction with the builder, buyer and any third-party technology supplier(s) in order to resolve any design or related performance issues as early as possible during the build and minimize the risk of faulty technology and unsatisfactory performance of the finished ship.

The shipbuilding contract should contain clear standards for all tests and trials, and state whether testing will occur during building and/or during the final sea trials. It should also address the consequences of inadequate performance, including whether inadequate performance requires rectification by the builder, extension of the time for delivery or price reductions. In addition, the buyer will need to ensure that any extensions, cancellation rights and liquidated damages provisions in the shipbuilding contract (and the project documents for the intended vessel project) are, as far as possible, back to back.

Developing and agreeing on a thorough contractual testing and trial regime prior to delivery is the buyer's best way to mitigate risk when unpredictable new technologies are being incorporated. This is because unless express rights regarding the safe commercial operation of the vessel are reserved in the written contract (which is rare), the buyer can only typically reject the vessel if it differs significantly from the contractual condition – that is, in a way that is not de minimis. In practice, it is very difficult to predict what is not de minimis. Most shipbuilding contracts governed by English law will expressly exclude the statutory implied terms from the Sale of Goods Act 1979 requiring compliance with description, satisfactory quality or fitness for purpose. Similarly, most shipbuilding contracts governed by U.S. law will include disclaimers of all implied warranties, particularly those concerning fitness for a particular purpose or merchantability of the vessel. The applicability of the 1980 United Nations Convention on Contracts for the International Sale of Goods is also generally excluded. Accordingly, without a contractual testing and trial regime, a buyer may be left exposed and without a remedy if new vessel technology fails.

c. Consider express protection for intellectual property rights

Lastly, the integration of new and innovative technologies may involve the generation of new intellectual property during the build process itself. The buyer should consider agreeing to contractual measures for preserving and allocating the intellectual property rights between the shipbuilder and any third-party design and/or equipment firms who might be involved in the development of the new technologies, to prevent substantially similar designs from being utilized by the buyer's competitors.

4. How can design and performance risk be dealt with post-delivery?

a. Pursue warranty claims within the 12-month warranty period

Once the vessel has been delivered under a shipbuilding contract, the builder will typically provide a warranty period covering the vessel, machinery and equipment for 12 months from delivery and acceptance. The buyer's right to make any other sort of claim, for example, for loss of use, is severely restricted. The time limits on warranty claims are strictly enforced by both English and U.S. courts. The buyer can, therefore, substantially reduce their risk of not being able to make a warranty claim beyond 12 months of delivery by carrying out a rigorous and thorough inspection and testing regime and reporting issues to the builder as soon as possible after delivery.

The importance of early testing and reporting is underscored by the fact that shipbuilding contracts typically exclude liability for loss of use of the vessel due to breaches of warranty. This means that a buyer will not recover losses caused by downtime or interruption of a project resulting from the need to make vessel repairs due to failures by the builder. Such losses could be sizeable if the vessel incorporates novel and bespoke technologies essential to the buyer's planned projects.

b. Manage liability where specifications conflict with performance criteria

A situation may arise where the new build vessel has not complied with performance warranties under the shipbuilding contract but nevertheless complies with the agreed-upon contractual specifications.

Under English law, a shipbuilder's failure to comply with agreed-upon performance criteria is not excused by building a vessel to meet the bare technical specifications. That customary approach has been followed even where it is physically impossible for a vessel to meet the agreed performance criteria because of errors with the agreed technical specification, including where it is simply experimental or state-of-the art.

Therefore, if a builder wants to reduce the risk of performance warranty claims – despite their compliance with the technical specification – they should make this technical compliance-only obligation clear in the shipbuilding contract.

Under U.S. law, courts generally do not impose liability on the builder when the performance issue stems from problems in the design specifications provided by the buyer because there is an implied warranty that the buyer's design specifications will be adequate. However, this implied warranty does not apply when the buyer provides only performance specifications – not design specifications – and delegates the design specification responsibility to the shipbuilder. The liability question becomes difficult when the contract imposes both design and performance specifications, and the vessel is built in accordance with the design specifications but does not comply with the performance specifications. This is more likely to occur in the case of a novel design. In that scenario, a U.S. court would probably consider whether the builder had any involvement in the design specification process and whether the contract gave the builder any flexibility to use their own expertise and ingenuity to achieve the performance specifications. If the answer is negative, then the builder should be able to avoid liability. Buyers should be aware of the implied warranty of design adequacy that attaches when they provide their own design specifications and consider whether they want the performance requirements to prevail over their design requirements. If the buyer wants the performance specifications to prevail in the event of a conflict with the design specification, such an order of precedence should be clearly and expressly reflected in the shipbuilding contract.

5. What role does the U.S. Jones Act play in vessel construction for U.S. offshore wind projects?

Offshore wind vessels must comply with the U.S. build and ownership requirements of the Jones Act when they will be used to transport merchandise and/or passengers between points in the United States. This requirement has significant implications in the U.S. offshore wind sector. Jones Act-compliant vessels are needed to transport wind turbine components, as well as offshore workers who install and operate wind farms, between U.S. ports and wind farms in U.S. waters.
As of today, there is no wind turbine installation vessel (WTIV) that meets the requirements of the Jones Act. To our knowledge, only one such vessel is currently under construction and could be delivered in 2024. Despite the lack of Jones Act-compliant WTIVs, there have been few investments in the construction of such vessels. Among other reasons, the lack of investment is caused by the Jones Act placing high barriers of entry into this niche market. The general rule is that only U.S. individuals and U.S. entities (U.S.-controlled and at least 75% U.S.-owned at each tier in their ownership chain) can own Jones Act-compliant vessels. Moreover, Jones Act-compliant vessels must be built at a U.S. shipyard, which increases their construction cost substantially and makes such vessels often non-competitive in markets outside the United States post-delivery.

While non-U.S. lenders can provide financing for the construction of Jones Act-compliant vessels and obtain mortgages over the vessels upon their delivery from the shipyard, non-U.S. lenders cannot operate the vessels after foreclosing on their ship mortgages. And while Jones Act-compliant vessels can be beneficially owned by non-U.S. passive investors under the Jones Act's lease-financing exception, this exception requires (among other things) keeping the vessels under a bareboat charter of three years or more with U.S. citizens, who must have full control over the vessels. Therefore, non-U.S. companies that play a leading role in the offshore wind industry outside the United States can only have a limited stake in U.S. offshore wind vessel construction projects and must work with local U.S. partners on such projects.

An alternative to building Jones Act-compliant vessels is to use non-Jones Act-compliant vessels but organize operations in a way that avoids any intra-U.S. transportation of merchandise or passengers by such vessels. For example, a non-Jones Act WTIV can be used in the United States but only if it brings the wind turbine components and offshore workers directly from a non-U.S. port or comes to the installation site empty and relies on smaller Jones Act-compliant vessels to bring the equipment to site. Both options present operational challenges, including the safe completion of ship-to-ship transfers in severe sea and weather conditions.
The Jones Act makes it difficult for the United States to reach its goal of installing 30 GW of offshore wind capacity by 2030, for want of Jones Act-compliant WTIVs.

Conclusion

As the foregoing demonstrates, vessel construction contracts, including those involving new technology or related to offshore wind projects, are not for the faint-hearted and involve complex considerations related to design, construction and local law compliance issues. Ultimately, taking the time to carefully draft the clauses relating to the implementation of new technologies, ideally with the help of specialized lawyers, will help anticipate and, hopefully, avoid incidents or disputes at a later construction stage. Given the large value and scale of such contracts, these disputes are typically complex, extended and expensive, and have a detrimental effect for all parties involved. Therefore, ensuring the contract terms are appropriately defined prior to execution is a prudent investment of time and resources that helps keep the legal "ship" charted on a favorable course.toward a sustainable energy-based future in the region.

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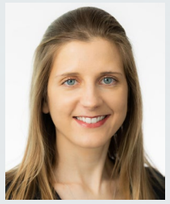

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Challenges and complexities in constructing carbon capture projects

In recent years, investment in carbon capture, utilization and storage (CCUS) – the process whereby carbon dioxide emissions are captured and repurposed or permanently sequestered – has surged significantly, driven by a growing recognition of its vital role in meeting national, regional and corporate net zero goals.

This surge in investment is being propelled by various factors, including the imperative to curb carbon emissions and protect human living environments, the rising interest in low-carbon hydrogen production and policy incentives. With a promising investment landscape, it is timely to consider some of the unique challenges involved in developing and constructing these ambitious projects. These challenges must be acknowledged and addressed to ensure the successful implementation of future CCUS projects.

1. The rise of CCUS

Since at least 2018, it has been recognized that significant investment would be needed in CCUS technologies as a mitigating technique during the transition to neutrality and as a key factor in achieving neutrality by 2050.[2] For the energy sector, scientists have suggested that global CCUS capacity must increase by a factor of 120 by the year 2050 to prevent global temperatures from rising above 1.5 degrees Celsius.[3]

Investment in the burgeoning CCUS industry is off to a promising start, driven by a combination of decarbonization mandates and regulations, shareholder sentiments and efforts to capitalize on enhanced tax credits. In the United States, much of the growth since 2020 has been fueled by low-carbon hydrogen (sometimes called "blue" hydrogen) projects or projects that generate hydrogen using carbon-based fuels made in a way that creates little to no greenhouse gas emissions. The investment environment for CCUS in the United States improved due to new policy incentives that have yielded $25 billion in funding for CCUS projects since 2020 (for example, the Air Products Hydrogen Project, Louisiana). As a result, the U.S. market is now expected to grow sevenfold between 2024 and 2033.[4] If all the projects currently in the pipeline come to fruition by 2030, the existing capacity could expand tenfold from around 50 million tonnes per annum (MTPA) today to more than 500+ MTPA.[5]

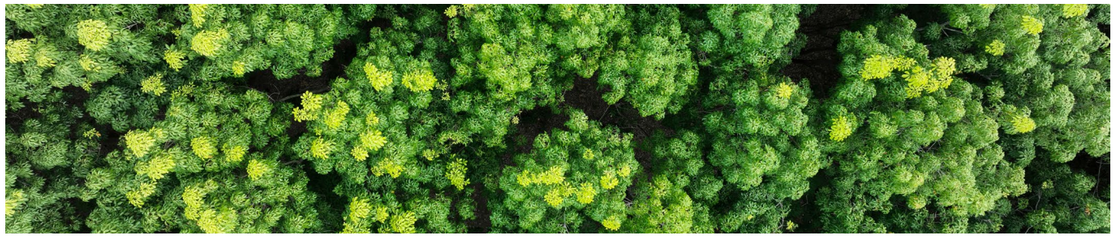
2. See for example, Intergovernmental Panel on Climate Change (2018), "Special Report: Global Warming of 1.5 ºC." Available online at: https://www.ipcc.ch/sr15/

3. McKinsey & Company (2024), "Global Energy Perspective 2023: CCUS outlook." Available online at: www.mckinsey.com/industries/oil-and-gas/our-insights/global-energy-perspective-2023-ccus-outlook

4. King L (2023), "The future of CCUS: five key questions." Available online at: https://www.woodmac.com/news/opinion/future-of-ccus/

5. McKinsey & Company, op. cit.

CHALLENGES AND COMPLEXITIES IN CONSTRUCTING CARBON CAPTURE PROJECTS



The explosion in CCUS investment is projected to spark a boom in related construction projects. Currently, there are 16 CCUS facilities operating in the United States, with the combined capacity to capture 0.4% of the nation's total annual CO_2 emissions. An additional 129 CCUS facilities are under construction or in development, and that number is expected to rise significantly over the coming decade. The growth is reminiscent of prior booms in industries such as wind, solar and liquified natural gas. History confirms that construction projects involving relatively new technology in a new or burgeoning industry, evolving within a short time span, carry substantial inherent risks for owners, developers and contractors. One such inherent risk when new technology is deployed on a project is performance reliability and underdesign of the key equipment. A majority of the early CCUS projects that failed to achieve success blamed the underperformance of the carbon capture equipment against their design capacity.[6]

In addition to the inherent risks are several unique risks specific to CCUS projects. We will consider some of these risks in the context of CCUS project dynamics, industry-specific delays and midstream risks.

6. B Robertson (2022), "Carbon Capture Has a Long History of Failure." Bulletin of the Atomic Sciences. Available online at: https://ieefa.org/resources/carbon-capture-has-long-history-failure or as first published at: www.thebulletin.org/2022/09/plagued-by-failures-carbon-capture-is-no-climate-solution.

2. CCUS project dynamics

a. Primary components of CCUS projects

CCUS projects can take several forms but for illustrative purposes, we will consider a greenfield CCUS project that has four primary components: first, the point source emission facility that generates the CO_2 to be captured; for example, an ethanol producer, gas-fired power plant, ammonia or blue hydrogen producer or similar industrial facility; second, the carbon capture equipment, which is installed at the facility to trap flue gas, separate CO_2 from the exhaust stream and compress or liquify it; third, the transportation component, typically a dedicated pipeline that carries the captured CO_2 from the emission source and transports it to the sequestration site; and fourth, the sequestration site, which is typically where the $CO_2$is injected into subsurface storage strata via an injection well for permanent storage sequestration.

b. Primary parties in CCUS projects

The primary parties in a CCUS project are the project developer on the one hand and the emitters on the other. The project developer may be in the business of capturing, transporting and sequestering carbon, while the emitter acts as the source of CO_2, typically a power plant, natural gas processing facility or industrial facility.

Due to the influx of investment in CCUS and the relative scarcity of compatible emission sources, emitters often enjoy outsized leverage compared to their CCUS project developer counterparties, leading to lower margins and higher risk for developers. This risk is compounded by the fact that developers, in addition to owning and controlling the carbon capture equipment, the transportation network and the sequestration site, must also manage the development and construction of such components. The developer thus acts as owner, developer and general contractor for the planning, construction and/or installation of all plant and infrastructure from the capture point to the injection well.

This model differs from that employed in other project development contexts in energy and related industries, where owners can sometimes shift and allocate a significant portion of the overall project risk to a sophisticated general contractor under one or more turnkey or engineering procurement and construction (EPC) contracts. Such models are not yet available in the context of CCUS, where large and well-financed specialized contractors have yet to emerge in the embryonic industry. As such, developers tend to have the most relevant and sophisticated knowledge necessary to vertically integrate the various project components. Such models are also poorly suited to projects involving thin margins for the developer, who cannot therefore afford the cost of paying a risk premium to a general contractor to accept such project risks.

These problems are unlikely to improve for some time in the face of increasing costs of capital and high materials inflation. CCUS developers will, therefore, continue to absorb risks that in other contexts could have been borne by contractors, particularly in relation to vertical integration and interfacing between multiple construction and supply contracts. A CCUS developer may be required to enter into separate contracts at each phase of the project, including:

i. at the capture location: an EPC contract with a general contractor for the installation of capture equipment and an O&M agreement for ongoing operations and maintenance;

ii. at the midstream stage: right of way agreements with landowners, manufacture and supply agreements for pipe and related materials, construction agreements for pipeline installation and contract operator agreements for midstream operations and maintenance; and

iii. at the sequestration site: pore space leases and surface use agreements with landowners, and service agreements with drilling and completions contractors and other wellsite vendors.

3. Regulatory and construction delays

a. Termination for delays

Like other industries, one of the most pervasive issues potentially impacting CCUS construction projects is the risk of project delay. However, for several reasons, CCUS developers are especially vulnerable to project delays. Typically, there are long lead times and substantial capital outlay between project inception and the revenue-generating phase of CO_2 injections. Added to that is the fact that agreements with the emitter entity or entities will typically include a longstop date at which time the emitter is given an express right to terminate its agreement with the developer.

Termination by an emitter near the end of the construction phase can spell disaster for a CCUS project because its economics are heavily dependent on the availability of CO_2 emissions. A CCUS project without a committed CO_2 emitter is, per se, not viable. But even if a portion of emitters are lost, this contingency will also cause serious financial harm because significant fixed assets are typically associated with and developed for individual emitters. The loss of a committed emitter may result in the capital-intensive midstream and pore space components becoming stranded, leaving the developer with little choice but to expend even more capital to reroute the pipeline (assuming suitable replacement emissions can be secured), and/or dismantle and liquidate the assets, likely at a substantial loss.

Like other industries, one of the most pervasive issues potentially impacting CCUS construction projects is the **risk of project delay**.

b. Delays related to drilling permits

Currently, there is much attention rightly being paid to delays arising from the backlog of applications for Class VI Underground Injection Control permits, which are necessary to commence drilling of CO_2 injection wells. With a few limited exceptions,[7] the United States Environmental Protection Agency (EPA) has jurisdiction over the review and approval of such injection permits in the United States.

Despite additional funding intended to clear the backlog, the delays persist, seemingly due to a shortage of technical staff to review the applications. In 2021, the EPA had roughly a dozen permit applications pending. As of September 2023, the number of pending applications had ballooned to 159.[8] It is currently the EPA's stated goal to review complete Class VI applications and issue permits within 24 months, though this timeline will likely be impacted by factors such as the complexity of the project and the quality and completeness of the application.

7. WY, ND, LA

8. F. Eames (2023), "Fixing the Class VI Permit Application Backlog," The National Law Review. Available online at: www.natlawreview.com/article/fixing-class-vi-permit-application-backlog

9. D. Kahn and J. Wolman (2023), "Popping the carbon capture bubble," Politico. Available online at: www.politico.com/newsletters/the-long-game/2023/06/02/popping-the-carbon-capture-bubble-00099883

10. L. Douglas (2023), "US carbon pipeline faces setback as residents refuse to cede land rights," Reuters. https://www.reuters.com/world/us/us-carbon-pipeline-faces-setback-residents-refuse-cede-land-rights-2023-03-09

4. Pipeline risk

a. Lack of pipeline capacity

Pipelines represent a critical component of many CCUS projects. While CO_2 emission sources can be found throughout the United States, suitable geologic storage sites are largely concentrated in various regions of the country. To transport captured carbon from an industrial point source to the injection site, CO_2 is pressurized and liquified then passed through miles of pipe. However, CO_2 pipeline development and operation are fraught with risks, including steel corrosion from carbonic acid, hydrogen sulfide, nitrogen dioxide and water, among other impurities, in the CO_2 stream. This means that generally, CO_2 cannot be transported safely via the same pipe that previously transported natural gas. Despite the existing network of approximately 5,000 miles of CO_2 pipeline currently in operation in the United States, there is still a need for additional pipeline, especially interstate, to facilitate the efficient shipping of captured carbon oxides to the ideal storage or utilization sites.

The necessity of corrosion-resistant pipe, coupled with its booming demand as a result of the CCUS industry's growth, has produced significant procurement challenges for CO_2 midstream developers.[9] CO_2 pipeline material costs continue to climb, while availability lags behind.

b. Pipeline access challenges

In addition to the challenges of sourcing materials, midstream developers face further obstacles with respect to pipeline access and permitting. In order to connect the emission source with the sequestration site, a CO_2 pipeline may cross hundreds of different properties. This necessitates either the acquisition of rights-of-way from myriad private landowners or the (often controversial) exercise of eminent domain powers, both of which can be time-consuming and costly.[10]

c. Underdeveloped pipeline regulations

Developers must navigate the patchwork of underdeveloped regulatory regimes with jurisdiction over pipeline permitting. Following protracted permitting efforts for its planned 1,300-mile CO_2 pipeline across Illinois, Iowa, Minnesota, Nebraska and South Dakota, Navigator CO_2 Ventures recently canceled the project, citing as the primary reason "the unpredictable nature of the regulatory and governmental processes involved."[11] The contracting parties must consider relevant state law because of a drastic split between jurisdictions. While some states, such as Illinois and Texas, have created a regulatory framework dealing with CO_2 pipelines, others, including California, have maintained that no agency within the state has clear authority to exercise jurisdiction over pipelines designed to carry CO_2, except for maintaining public health and safety. Currently, no federal entity is responsible for permitting the placement of interstate CO_2 pipelines across federal and non-federal lands.

Conclusion

CCUS projects have immense potential as a means of mitigating carbon emissions. Their rapid expansion in recent years is a promising early development in the lead-up to 2050 net zero greenhouse gas emission goals, but this relatively new industry faces unique challenges and is showing signs of growing pains. These challenges include the backlog of permit applications, uncertain market demand and supply chain strains. As more CCUS projects are given the green light for investment and inevitably grow larger in scale, navigating these hurdles will be pivotal to ensuring their success.

In recent years, **investment in carbon capture**, utilization and storage... has surged significantly, driven by a growing **recognition of its vital role in meeting national, regional and corporate net zero goals**.

11. J. Dura (2023), "Navigator cancels proposed Midwestern CO_2 pipeline, citing 'unpredictable' regulatory processes," Associated Press. Available online at: www.apnews.com/article/carbon-dioxide-pipeline-co2-navigator-canceled-73dee04da685b512d6aefa01302cdae3

We recognize the contribution of former Reed Smith Partner, Ryan Haddad, to this article.

CHALLENGES AND COMPLEXITIES IN CONSTRUCTING CARBON CAPTURE PROJECTS

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Q&A with Alex Haynes of Petrofac's Energy Transition Projects

Chris Edwards, Counsel in Reed Smith's Dubai office, sat down with Alex Haynes, Head of Business Development for Energy Transition Projects at Petrofac in Woking, England, for a fascinating discussion regarding the Energy Transition, Conference of the Parties and government's ambitious net zero targets.

What led you to work in the field of renewable energy?

I had a rather unusual career trajectory. I studied Art at university and then spent five years in the Army. I started working in the oil and gas industry around 20 years ago but more on the commercial side. I had roles in logistics, human resources and eventually business development. I have lived and worked on projects in various locations including Africa, the Middle East, and Asia and over this period became increasingly interested in the energy transition.

How did the Energy Transition Projects Team at Petrofac come about?

I joined Petrofac in our Woking office in 2019 as Head of Business Development, Asset Solutions. Petrofac is a 40-year-old multinational engineering and construction firm that designs, builds, and operates energy assets. Historically, most of these projects have been in the oil and gas sector for well-known project developers, international oil companies such as BP and Shell, and national oil companies such as ADNOC and Sonatrach among many others. From the outset, I was interested in Petrofac's nascent energy transition strategy. Petrofac had already been working in the wind sector since 2009. Within the first month, I began by holding regular calls with experienced people within the company to discuss and assess opportunities and trends in the global energy transition and to understand how we could support our clients with their evolving energy needs. Our understanding of the opportunity in this new sector expanded quickly, building momentum within the company over the next 18 months, and in 2021, I became the Head of Business Development focusing exclusively on energy transition projects.

1. Energy transition projects

What are the key areas that you focus on at Petrofac Energy Transition Projects and why?

The Energy Transition Projects Team is focused on providing Petrofac's services in the new energy sector and working toward achieving a low carbon energy economy. We focus on five key areas:–

Wind – Wind is fundamental and the technology and market are perhaps five to ten years more developed than the other energy transition areas on which we are currently focusing. If you are going to decarbonize you need a cheap and abundant source of energy. It also has to be oversized, as wind is, by its nature, intermittent. At Petrofac, our wind offering relates to the engineering, procurement, construction, installation, and commissioning of both onshore and offshore substations rather than the wind turbines themselves. Our experience across oil and gas facilities means we already have a good understanding of how substations work and have delivered several large-scale wind industry substation projects in the last decade.

Carbon capture – this is the process of capturing carbon dioxide produced by burning fossil fuels and other processes and using or storing it in such a way that removes it from the atmosphere. Usually, storage is via long-term geological storage underground. The goal is net zero – there will be emissions going forward, so we need to find solutions that minimize and/or capture them for storage. Depleted oil and gas fields are a suitable solution as they have held natural gas for millennia. Again, we are relying on our knowledge of oil and gas processing to manage the safe capture, transport and storage of carbon dioxide. However, instead of bringing gas out of the ground, we are capturing it and pumping it back underground where it cannot escape. This solution is particularly applicable for those hard-to-abate sectors, such as cement and steel production, where, for the foreseeable future, there will still be some form of emissions which must be captured and stored to reach a Net Zero goal.

Hydrogen – Manufacturing processes that require high temperatures, for example, glass fabrication, and some food and drinks production, are hard to electrify (via renewables) because of the sheer volume of energy needed to drive the manufacturing process. Here, you can either capture the emissions (via carbon capture) or you need an alternative fuel that does not generate carbon-based emissions. This is where hydrogen comes in. Hydrogen is not (yet) an easily tradeable commodity; it is currently expensive to produce cleanly, and it is energy-inefficient to liquify and transport. Petrofac sees two markets for hydrogen: first, the domestic market where hydrogen is used by a direct offtaker who will use it in their production processes, and second, perhaps to support the fuelling of heavy goods vehicles related to that manufacturing. The international market in countries such as Chile, Oman, Morocco, and Egypt, who can produce lots of clean hydrogen, don't have large domestic markets for its use. In these cases, the hydrogen is typically planned to be turned into other energy carriers such as methanol and green ammonia for trade on the international market or used as shipping fuel.

Waste to value – It is difficult for the aviation industry to use hydrogen or electricity as a fuel source for long-haul flights. Accordingly, there is a need here for sustainable aviation fuel. Petrofac's EPC experience, process knowledge, and petrochemical design skills equip us well to support waste-to-value projects that transform waste feedstocks into valuable products, including biofuels and sustainable aviation fuels. This is quickly becoming a reality – Virgin Atlantic flew the first transatlantic flight from Heathrow to New York on 100% sustainable aviation fuel in November 2023.

Emissions reduction – Fossil fuels will continue to be extracted and used for the foreseeable future. But we need to produce and use them in a more efficient and low-carbon manner. At Petrofac, we deploy digital technology and value engineering to help our clients across oil, gas, refining, and petrochemicals to reduce the emissions intensity of their assets. We also look for opportunities to reduce and monetize flared gas as well as ways to electrify assets to displace the use of gas or diesel, be that through the deployment of solar PV for onshore assets or ways to connect offshore assets to the grid, or other renewable energy sources.

The **Energy Transition Projects Team** is focused on providing Petrofac's services in the new energy sector and working toward **achieving a low carbon energy economy**.

2. Conference of the Parties – UNFCCC

a. **What is the purpose of the Conference of the Parties, or COP, meetings and what impact do they have on the energy transition?**

COP meetings are essential in setting the targets and guidelines for countries aiming to reach net zero. This is the global forum where we can all agree on the steps needed to solve the climate challenge we face. Net zero is the short-hand term for when we reach a carbon balance. (It can be measured either on a company, country, or global scale.) Human activity generally has a carbon impact from the energy and resources we use to go about our daily lives. Switching to renewable energy, recycling materials and reducing packaging and transport goes a long way to mitigating our carbon emissions. But most net zero models also include an element of carbon capture and permanent storage for the residual emissions we cannot avoid. Hence, overall, we can be balanced and reach a net zero level.

b. **What were the three biggest achievements at the recent COP28 hosted by the UAE in November 2023?**

Firstly, it was the first time that the vast majority of countries agreed to transition away from fossil fuels. Quite a result in a region that has thrived off extracting and selling fossil fuels.

Secondly, it was the creation of a fund to help pay for loss and damage caused by climate change, something that has been asked for over multiple COP meetings.

Finally, the one achievement that I find the most exciting and a clear call to immediate action is the agreement to aim to triple the amount of installed renewable energy by 2030.

c. **What, in your view, should be high on the agenda for COP29, to be hosted by Baku in November 2024?**

Holding countries to account against their pledges and aims so far, seeing where we are falling short, and trying to solve these obstacles together.

3. Outlook

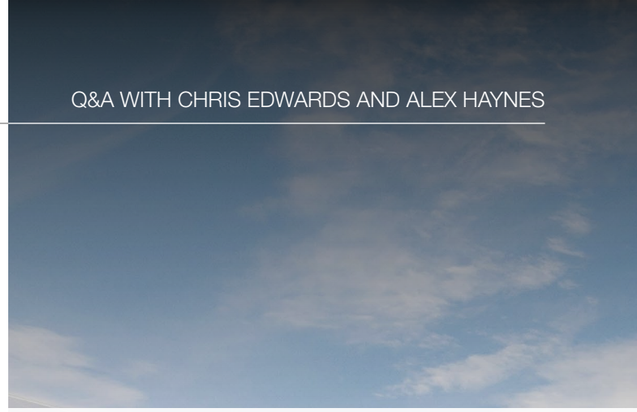
a. **Do you think we will hit the ambitious net zero targets set by governments?**

Unfortunately, hitting net zero targets in the timeframe we are aiming for will be challenging. A lot of the technology is still at the design stage rather than being ready to move to construction. Some areas, such as wind, are more advanced, but others are still in their infancy. Things are certainly moving in the right direction, but it will take more time and resources to achieve the goals set by COP28. Much of the technology needed for the energy transition is new, or repurposed from other industries, and the contracting approach needs to provide flexibility for developers and their partners to learn and improve as we go. Expecting everything to go smoothly is unrealistic. Project stakeholders need contracting structures that provide flexibility, pragmatism and aligned incentives to create the right collaborative environment for us to move at pace. We are trying to "rewire" the global energy system – a massive effort. So, it's not surprising it will take some time to design and construct the infrastructure needed.

b. **What is key for making continued progress toward net zero?**

Under the Western economic model, businesses need to make money. The energy transition is not new. We have been here before with previous technology changes. For example, we used to rely on wind power to propel boats, then we switched to steam because of speed and reliability. These transitions happened because they were ultimately more efficient and better for business. We need to find a model that is both good for business and affordable for the wider population; you can't penalize people into decarbonization, you must attract them and make it feasible for them to be part of it. That's the only way to get the required scale and pace into the transition. We sorely need speedy action if we are to meet the climate targets set at COP15 in Paris in 2015. These targets aimed at limiting global warming to less than 1.5oC above pre-industrial levels, so we can all avoid some of the more severe impacts from climate change. We cannot lose sight of these goals, as the cost of inaction is predicted to be far higher than the cost of decarbonizing now.

Q&A WITH CHRIS EDWARDS AND ALEX HAYNES



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Renewable energy disputes – where green projects go wrong

At the most ambitious COP conference yet, held in Dubai from 30 November to 13 December 2023, over one hundred countries pledged to triple renewable energy capacity by 2030. For the renewable energy industry, the prospect of winning new business has multiplied. However, in the excitement to secure deals, stakeholders should approach renewables projects with 'eyes wide open'. Renewables projects pose unique legal, contractual and commercial risks.

Developers, sponsors, contractors and investors can mitigate the risks of renewables projects with careful planning, a pragmatic approach to risk, and a 'dispute avoidance' mindset that will help ensure profits for business, communities and – ultimately – the planet.

1. Major risks on renewables projects

Renewable energy projects of all kinds — including solar, onshore and offshore wind, bioenergy (waste to fuel), hydro, geothermal and green hydrogen projects — often require the development of complex infrastructure. They are frequently delivered using an 'EPC' contract structure, where a single EPC contractor delivers the engineering, procurement, construction (and testing and commissioning) of the project. The EPC constructor essentially "wraps" the risk of its specialist sub-contractors vis-à-vis the developer. The EPC contractor will ultimately be responsible to the developer for delay, defects and all other performance liabilities, regardless of whether they are caused by the EPC contractor or its subcontractors. Accordingly, there are several common challenges in terms of risk allocation and project delivery, which can lead to conflict and unprofitable outcomes.

a. Environmental Impact Assessment Challenges

It is a broadly accepted reality that renewable energy projects encompass a trade-off – while they have a significant role to play in reducing our carbon footprint, their development can cause serious impacts for the environment and local communities.

Because of this, most renewables projects typically require preparation of 'environmental impact assessment' ("EIA"), often as a pre-condition to obtaining development approval or an environmental operating permit. The exact requirements for the scope and content of EIA and associated will depend on local laws, but they are typically guided by common environmental principles that have been developing since the 1960s. Under any kind of non-recourse project finance scheme, senior lenders typically require environmental approvals to be obtained as a condition precedent to funding, regardless of local law requirements. As explained by Sebastien Bernard, of EDF Renewables:

> *"Lenders may require detailed and high-quality EIA reports to make sure they are not financing a project with an adverse impact on environment or society. So, the EIA needs careful attention. In certain parts of the world, project opposition can be a problem. Here in the Gulf, offtakers tend to lease developers a piece of barren land in the desert or some kind of remote areas for the project, so in my experience we do face the same environmental or social problems associated with land clearing and development as in other regions. An issue in the Middle East can be the presence of archaeological finds (i.e. antiquities) or former source of pollution (i.e. oil spills) on the project land."*
>
> **Sebastien Bernard, EDF Renewables**

The type of environmental assessment and approvals needed for any given renewables project will naturally depend on the nature of the project and the jurisdiction and location where it is being developed. The EIA process can be especially challenging for foreign stakeholders who are navigating an unfamiliar regulatory system.

For projects delivered on an EPC basis, the EPC contractor may generate significant environmental and social impacts during the construction phase and will also need to design and engineer a project that meets applicable environmental standards. Obtaining environmental permits may be within the EPC contractor's obligations, or it may be required to provide technical support for the Employer's own application for permits. It follows that EPC contractors must pay careful attention to risk allocation associated with the EIA process, including the risk of delays associated with ESA and other environmental approval.

The authors would like to thank Sebastien Bernard of EDF Renewables for his valuable contributions to this article.

b. ‘First of a kind’ technology challenges

Renewables projects that push the boundaries of existing technology can present unique risks, particularly in relation to design and workmanship defects. Design changes and coordination issues can also pose problems. If the project is developed on an EPC basis, the contractor will typically utilize several subcontractors with specialist expertise. Taking offshore wind as an example, an EPC contractor may need to engage several specialist subcontractors for the turbine supply, the foundation supply, the turbine installation, cable installation and foundation installation, as well as any sub-stations. Similarly, in a solar project, the panels will be procured from a specialist photovoltaic (PV) supplier, while a specialist mechanical subcontractor drives the steel pile foundations and installs the panels, and a specialist substation subcontractor will design and construct the substation.

It is relatively common for specialist subcontractors to be testing the boundaries of new technology. To some extent, they may be ‘learning on the job’. Given the recent focus on renewables, there will also be inexperienced market entrants who have diversified from other sectors. Accordingly, finding experienced EPC contractors can be a major challenge for renewable energy projects. As explained by Sebastien Bernard, of EDF Renewables:

> *“A significant challenge for developers/sponsors is finding a suitable EPC contractor – there are not as many EPC contractors who have the capabilities to deliver large scale renewable energy projects, such as solar and wind projects we usually come across in the Middle East.”*
>
> **Sebastien Bernard, EDF Renewables**

Whilst developers and sponsors can mitigate the risks of inexperienced contractors and subcontractors through appropriate due diligence, the use of nominated subcontractor provisions, and ensuring robust oversight by a competent owner’s engineer, disputes arising from design and workmanship defects are sometimes inevitable in this context. Parties are well advised to maintain accurate and detailed project records to enable an efficient resolution of disputes, as and when they occur, and utilise BIM technology (where feasible) to enable proper coordination of design and engineering works.

Renewables projects that **push the boundaries of existing technology** can present unique risks, particularly in relation to **design and workmanship defects**.

c. Joint-venture disputes

Traditionally, in power and water projects, the EPC contractor is expected to bear most of the project risk (i.e. providing an ‘EPC wrap’ to the developer/sponsor). As explained by Sebastien Bernard, of EDF Renewables:

> *“In our experience, most disputes emanate from the EPC contract, because project risks tend to be pushed down to the EPC contractor whenever possible. The EPC cost is the big portion (by far) of total project costs. Less experienced EPC contractors may get tripped up because they discover risk ‘live’ on the job. They may not be fully aware of all contractual risks at signing.”*
>
> **Sebastien Bernard, EDF Renewables**

Considering the significant risks an EPC contractor must accept, it is not uncommon for EPC contractors to consider **delivering a renewables project through a joint venture or consortium structure**...

Considering the significant risks an EPC contractor must accept, it is not uncommon for EPC contractors to consider delivering a renewables project through a joint venture or consortium structure, whereby two or more contractors bring respective expertise, know-how and technology to the project and share the EPC contract risk.

This JV or consortium model might be particularly attractive to EPC contractors who are diversifying into the renewables space. They may not have the track record or expertise to successfully bid for a renewables project alone and would be exposed if relying solely on specialist subcontractors whilst lacking the skills to assess their performance. Teaming with an experienced contractor who has specialist expertise can be a viable way to win work and successfully deliver it. In such cases, EPC contractors might consider whether they establish a separate project vehicle (which contracts with the developer) or use an unincorporated model (where the contractors enter into a separate contract as between themselves, but each are also parties to the EPC contract with the developer and have joint and several liability thereunder).

In either structure, the applicable shareholders agreement, consortium agreement or joint venture agreement must be carefully considered, with the parties’ respective rights and obligations clearly defined and a procedure in place for decision-making in respect of project budgets, relations with the developer, claims, and a clear definition of responsibility with respect to who delivers what. Matters such as insolvency of a party should be considered, and how profits, and indeed losses, will be distributed relative to the parties’ investment on the project.

d. Dispute avoidance and resolution

Depending on how a renewables project is structured, there may be scope for conflicts to reach a 'breaking point', typically in the form of project suspension, termination and/or bond calls. Many disputes will occur at the EPC contract level, because the EPC contractor bears most of the risks.

However, the developer/sponsor often has financing arranged, with lender involvement often acting as a deterrent to heavy litigation or arbitration. As explained by Sebastien Bernard, of EDF Renewables:

> *"If there is a dispute, it means the entire project is at risk of collapse. In the world of project finance, there is an incentive to avoid a dispute. Any dispute (including a suspension, termination or bond call) needs to be disclosed to the lenders – who will typically ask developers/ sponsors to put more equity into the project. Everyone on these projects has too much 'skin in the game' to allow the project to fail. If there is a problem under the EPC contract, the offtaker will play hard ball to protect the project, the lenders will play hard ball because they don't want to take any risk, and the sponsor/ developer is stuck in the middle, while the EPC contractor risks having its bonds called. However, unless there is a very serious/grave situation, the parties have a common interest to find a solution. After all, the Project somehow belongs to the lenders, right until the very end."*
>
> **Sebastien Bernard, EDF Renewables**

Nonetheless, formal disputes are occasionally unavoidable. Significant delays at or design deficiencies (in particular considering 'first of kind' technology challenges) may lead to formal proceedings, even as financiers renegotiate other project risks. Moreover, joint venture/consortium disputes, as well as other commercial disagreements, may increase the risk of formal proceedings. Where the contractual documentation is typically composed of significant related contracts between many separate parties, it is vital to consider dispute risks at the outset of the contractual structuring and include appropriate dispute resolution clauses across the various agreements.

Once a dispute has arisen — considering the pressures and incentives on stakeholders to find workable solutions — mediation or other forms of ADR may be a suitable. For disputes of a technical nature, relying or expert determinations or independent expert panels might also be an appropriate ADR tool.

...there may be **scope for conflicts to reach a 'breaking point'**, typically in the form of project suspension, termination and/or bond calls.

Conclusion

While the ambition of COP 28 country participants to triple renewable energy capacity by 2030 brings immense opportunities, it also creates significant legal, contractual, and commercial risks. Renewable energy projects, with their complex infrastructure and diverse stakeholders, require meticulous planning and a proactive approach to risk management to avoid disputes. Challenges such as environmental impact assessments, cutting-edge technology issues, joint venture complexities, and the critical importance of dispute avoidance and resolution, highlight the intricate landscape of renewable projects. By adopting a comprehensive risk mitigation strategy and maintaining an open dialogue among all parties involved, stakeholders can navigate these challenges effectively, ensuring that the transition to green energy is not only profitable but also sustainable and resilient. The insights shared by industry experts like Sebastien Bernard underscore the necessity of careful consideration and strategic planning in making renewable energy projects successful. The biggest loser of failed renewables projects is arguably our planet, which cannot afford the costs of delay and disruption of infrastructure that is critical to achieving a 'net zero' objective.

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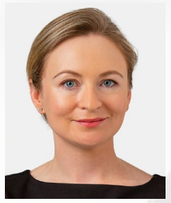

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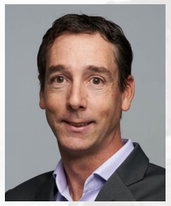

Sebastien Bernard
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An interview with renewable energy specialist Brendan McNallen

James Doerfler, a partner in Reed Smith's Pittsburgh office, sat down Brendan McNallen, a Reed Smith energy projects lawyer partner who is leaders in the energy transition movement in United States to discuss the trends he has seen in the development of renewable energy projects in the United States over the past several years and what are key issues looking ahead.

1. **The focus of this issue is energy transition, or the move from traditional carbon-based fuel sources toward renewable energy sources. Your practice seems uniquely situated at the forefront of this movement, with your work spanning wind farms (both terrestrial and offshore), solar projects, and grid-based battery electric storage system projects. Please tell our readers about your practice, how it has developed over the years, and what you have seen in terms of overall trends relative to the adoption of renewable energy alternatives.**

   I am an energy projects attorney with a focus, as you note, on renewable energy and battery energy storage projects. I work on the development, procurement, construction, and financing of these types of projects, predominantly in the United States.

   I started my career in the project finance group of another law firm, working primarily on conventional energy projects and infrastructure. The work was challenging and interesting, and allowed me to live and work in fascinating parts of the world like Kazakhstan. After some time, though, I decided that I wanted to focus my work in renewable energy as much as possible, which is why I came to Reed Smith.

   In 2010, the team at Reed Smith – many of whom I still practice with today – was working almost entirely in renewable energy, which was unique at that time. I have seen the industry evolve significantly over the last 14 years, both in the size and value of the projects, and in the complexity of the transactions. All of the stakeholders have become much more sophisticated over that time as well.

   The most recent trends I have seen are the emergence of battery energy storage – both as stand-alone projects or combined with solar or wind projects – and the growth of offshore wind in the United States. The battery projects offer some new complexity as the owners, utilities, and often the OEMs themselves learn how large utility-scale installations will operate under various conditions. We have worked through a number of issues with owners, regarding performance and safety, that are novel to batteries. There have been a lot of growing pains for that technology as it scales up but considerable enthusiasm for the future of battery energy storage.

2. **Which parties do you typically represent?**

   Typically, I represent developers, owners, and strategic acquirers of solar and battery energy storage projects. On the wind side, I generally represent manufacturers, contractors, and vendors. On all types of projects, I have represented both lenders and borrowers on financing, including development loans, construction debt, and back-leveraged debt. These are not hard and fast rules but that is how my practice has evolved over time. I have found that representing the interests of the various stakeholders has given me a pretty unique insight into how each party around the table evaluates the risks and rewards of these types of transactions.

3. **You mentioned earlier the emergence of offshore wind in the United States. We have seen U.S. offshore wind farm developments garner considerable press, initially for opposition from local groups to their construction and, more recently, because a number of these projects have been put on hold or cancelled due to high interest rates or declining governmental support. Can you describe how you have seen these conflicts play out between owners and their suppliers?**

   We have seen delays on several of the U.S. offshore wind projects as a result of the clash between fixed-price power purchase agreements and the rising costs of equipment, construction, and financing. In some cases, it has led to conflicts between owners and suppliers under their supply agreements for the projects. More often than not, though, we see the parties come to the table with the goal of reaching a pragmatic solution in light of the macroeconomic realities that will allow the project to move forward while the owners attempt to renegotiate more realistic offtake arrangements.

4. **You have advised on energy projects all over the world. Are there any commonalities or key differences in renewables projects?**

   I have been fortunate to work on projects in a number of locales outside of the United States, including in Europe, the UAE, India, Kazakhstan, and elsewhere. Most recently, I have worked on the financing of solar and wind projects in Chile and Brazil. There are a lot of commonalities between those projects and the projects in the United States. The project-level risks are generally the same. The complexity comes from the purely local issues – where we tend rely either on the knowledge of our colleagues in other Reed Smith offices or, in some cases, other local law firms – and cross-border issues, such as taxes, monetary restrictions, and the like. Generally speaking, I have represented the United States on each of the transactions – usually a lender or investor – and the primary transaction documents have been New York law-governed where possible. Every transaction is different but the contracting norms tend to be similar to U.S. contracting norms, by and large. That being said, each project presents its unique challenges regardless of where it is located.

5. The New York Times recently published an article entitled "Giant Batteries Are Transforming the Way the U.S. Uses Electricity" describing how grid-based energy storage systems are transforming the electrical grids in California and Texas. Can you talk briefly about the growth you've seen in that sector in recent years, how it fits into the overall energy transition picture, and how it works with other renewable sources such as wind and solar?

The growth has been incredible over the course of the last decade. We started representing clients on utility-scale lithium-ion battery energy storage projects in 2015, which was relatively early for the industry. During that year, the largest single project that we advised on was 10 MWh, which seemed big at the time. In just the last three years, we have advised on 5,000+ MWh of supply and construction agreements that have closed, with another 8,000+ MWh currently under negotiation. As I alluded to earlier, there have been a lot of growing pains as the owners, utilities and OEMs learn how this equipment will function in different environments and through different uses. That knowledge has flowed through the agreements, where parties are negotiating far more detailed terms and conditions around such things as performance guarantees, defects and the like. At the same time, we are seeing from our own government increased scrutiny around forced labor issues and, more recently, increased tariffs.

Our clients remain optimistic about the long-term value of battery energy storage, both as stand-alone projects in places such as California and Texas, and in combination with other renewable energy generation methods.

6. What major legal developments have impacted renewables projects, in the United States or globally, in recent years and do you foresee anything forthcoming in 2024?

The most significant recent development is the increased tariffs on Chinese imports of solar and battery equipment. It still too early to know exactly how detrimental those will be to our clients' projects. We have seen in the past that an increase in the tariff on Chinese goods has the effect of increasing the prices of equipment sourced from everywhere else as non-Chinese suppliers see increased demand and an opportunity to arbitrage the price difference. So, we know that it will slow and halt development of some projects, at least in the near term.

All eyes are also on the election in November. Our clients are concerned that a change in administration could spell even further tariff increases or geopolitical instability that will make it more expensive and more challenging to develop renewables projects.

7. What are the biggest challenges faced by your renewables clients in 2024?

For the clients developing solar and battery projects, the increased tariffs and a change of U.S. administration would pose potential challenges, as noted above. Our clients are concerned that a Trump administration will target the renewables and seek to curtail the benefits of the Inflation Reduction Act in any number of ways.

In addition to trade issues and regulatory uncertainty, the other primary challenges our clients are facing are delays in obtaining interconnection, permitting delays, local landowner opposition, and supply chain issues.

8. When you are not negotiating renewables contracts, how do you spend your spare time?

I am a big northwest sports fan, particularly the Mariners and Gonzaga basketball. I try to catch as many games as I can.

AN INTERVIEW WITH RENEWABLE ENERGY SPECIALIST BRENDAN MCNALLEN

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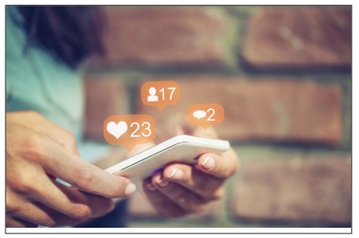
Thought leadership

Energy Explored podcast

Energy Explored covers the challenges of achieving a carbon-neutral global economy: cutting emissions of pollutants and setting up new energy systems. Reed Smith lawyers and guest speakers shed light on the most important trends in emissions control and new fuels. Tune in, as we follow the ever revolving journey through the transition of energy.



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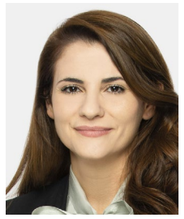
Trading Straits provides legal and business insights at the intersection of shipping and energy. This podcast series is hosted by Reed Smith's market-leading team of shipping and energy lawyers. Join us to hear key developments across the industry, including on emissions, sanctions, LNG and shipbuilding.

Have a question?

If you have questions or would like additional information on the materials covered in this newsletter, please contact one of the authors – listed below – or the Reed Smith lawyer with whom you regularly work.



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