



Global construction update: The project delivery issue

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ReedSmith

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Global construction update

Welcome

As 2025 begins, and following several years of disruption to the global construction supply chain, with corresponding effects on construction projects, Reed Smith's global construction team is beginning the year with a focus on project delivery.

Project owners and other stakeholders are adapting the way in which they structure their capital projects from a contractual and execution standpoint to address the challenging and often disruptive forces that the global construction industry has weathered over the past few years in order to mitigate their risks, provide for greater flexibility in a changing economic environment, take advantage of new technologies and secure their preferred construction partners capable of performing their most important projects on schedule and on budget.

In this Project Delivery issue, we explore some of these trends, which include the increasing drive to embrace technology, contractor efforts to distribute project risks among multiple stakeholders, and owner efforts to employ contractual structures that allow for greater flexibility and speed in project execution.

In this edition of Reed Smith's Global Construction Update:

- **Chris Edwards** (Dubai) and **Lauren Banner** (Dubai) discusses the trend on large-scale capital projects in the Middle East region to move away from the traditional single engineering, procurement and construction (EPC) project delivery approach towards an engineering, procurement and construction management (EPCM) model that diversifies the project risk across multiple contractors and suppliers.
- **Antoine Smiley** (Houston) and **Matthew Houghton** (San Francisco) likewise discuss the trend towards multi-prime and multi-phase contracts that increasingly incorporate cost sharing and collaborative features that mitigate possible cost and schedule impact risks.
- **Gesue Staltari** (Pittsburgh) sits down with James Gabriel, the President and Chief Executive Officer of MODLOGIQ, to discuss both the promise of modular construction and the project delivery approaches that best leverage the benefits of that new technology.
- **Liam Hart** (London) discusses the specific contractual mechanisms and project management techniques that project owners should use when employing off-site/modular construction technologies.
- **James Doerfler** (Pittsburgh) speaks with Rajkumar Kuppuswamy, Martin Klein, Jim Short and Tim Cupples, four senior officials at the National Passenger Railroad Corporation, commonly known as Amtrak, about the innovative project delivery approaches and strategies Amtrak has pursued in launching a slate of transformative multibillion-dollar capital projects in the Northeastern United States.
- Finally, **Liam Hart** (London) sits down with **Nina Howell** (London), a London-based partner who represents clients across the globe involved with liquified natural gas (LNG) projects and gets her observations on the trends she has been seeing in her practice and the global LNG industry generally.

We also celebrate the successes of our global construction team over the second half of 2024:

- **Chambers & Partners UK 2025 – Richard Ceeney** was ranked individually as a notable practitioner, and **Laura Riddeck** was recognised as Up and Coming in the Construction: Non-contentious category.
- **Chambers Middle East Awards 2025** – Shortlisted for UAE Construction Dispute Resolution Law Firm of the Year and UAE Non-Contentious Construction Law Firm of the Year.
- **Legal 500 UK 2025** – Received practice rankings for Construction: Non-contentious and Construction: Contentious. **Laura Riddeck** was listed as a Next Generation Partners.
- **Legal 500 Middle East and North Africa Awards 2025 – Michelle Nelson** shortlisted for Construction Lawyer of the Year and **Chris Edwards** shortlisted for Construction Leading Associate of the Year.
- **WWL: Thought Leaders – Construction 2024 – Michelle Nelson** ranked as a Global Thought Leader for UAE Construction.
- **Lexology Index: Construction 2025 – Sachin Kerur** ranked as Recommended for UAE.

Our construction lawyers have been busy presenting at seminars and authoring articles:

- **Juliya Arbisman, James Doerfler, and Niyati Ahuja** discussed strategies for managing supply chain risks in construction projects in Reed Smith's campaign: "Decoding the global supply chain."
- **Peter Rosher** presented at the 32nd Croatian Arbitration Days Conference on the panel: "Organization of the Arbitral Proceedings and Evidence in Construction Arbitration."
- **Peter Rosher** and **Alison Eslick** co-authored a chapter "Preparation and Collection of Evidence" in a new Wolters Kluwer publication, "International Arbitration & Mediation: Construction Arbitration – The Essential Building Blocks," officially launched at the "Colloquium CEPANI Construction and Arbitration" conference, hosted by The Belgian Center for Arbitration and Mediation.
- **Mehak Oberoi**, Legal Head/General Counsel for GE Vernova in Asia, Hydro Power, joined Reed Smith associate **Niyati Ahuja** to discuss the importance of lawyers understanding business needs and the intricacies of construction disputes in an Arbitral Insights podcast episode.
- **Peter Rosher** chaired a panel discussion at the 2024 Society of Construction Law France Conference.
- **Liam Hart** authored an article for Corporate Disputes magazine titled "Good faith obligations in 'relational contracts' governed by English law."
- **Antonia Birt** shared her views on dispute resolution in the UAE with Thomson Reuters Practical Law Arbitration, touching on arbitration popularity for construction matters.

- **Peter Rosher** moderated a panel session at the ICC-FIDIC Conference on International Construction Contracts and Dispute Resolution in Seoul.
- As part of Dubai Arbitration Week, **Ranna Musa** moderated a panel session at the “Middle East and Africa – the New frontier for Dispute Resolution” discussion hosted by Africa Construction Law and sponsored by Reed Smith and others.
- **Vanessa Thieffry** co-led the 3rd edition of the ICC Institute SME Lab on International Contracts, a two half-day webinar held in French discussing different types of construction contracts.
- **Alison Eslick** presented at the Society of Construction Law (Gulf) event: Artificial Intelligence and the Future of Construction Arbitration.
- **Alison Eslick** presented at the ED&I Women in Construction Summit in Dubai on the realities of mentoring within the wider Construction industry.
- **Antonia Birt** delivered the “Introduction to the ERA Pledge” at the event, “Investor-State Dispute Settlement in International Construction Projects” co-hosted by arbitrateAD and CI Arb.
- **Sachin Kerur** attended Construction Week’s “Leaders in Construction UAE.”
- **Alison Eslick** presented at SCL on Artificial Intelligence and the Future of Construction Arbitration (Dubai and Abu Dhabi).
- **Chris Edwards** presented at Sri Lankan Quantity Surveyors-UAE QS Apex 2024.
- **Chris Edwards, Alison Eslick** and **Lauren Banner** authored an article for The Oath Legal Magazine titled “Climate Proofing Construction.”

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EPCM – An alternative procurement route

The engineering, procurement and construction or EPC contract model is often deployed on international construction projects. It is a tried and tested procurement model that offers many advantages to an owner, including bankability, price certainty, a turnkey solution and single-point responsibility, with the turnkey EPC contractor being responsible for designing, procuring and constructing the entire project.

While the EPC model remains popular among owners and investors, contractors are increasingly pushing for alternatives, including the EPCM model in which the construction component of the project delivery model is replaced by a construction management firm – hence the ‘CM’ in EPCM. The EPCM model is not a new form of contract and is quite common in certain industries; however, its use is becoming more widespread due to changing market conditions.

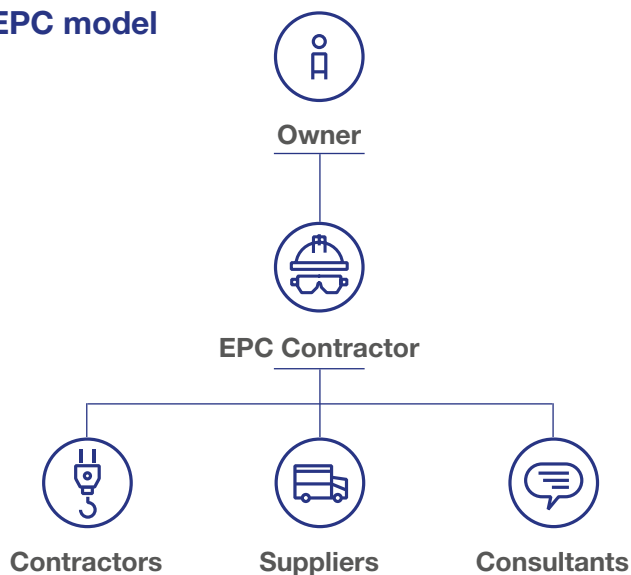
The EPCM model

The meaning and use of EPCM is still relatively unknown in certain segments of the construction industry, particularly in the Middle East, where parties tend to rely heavily on the Fédération Internationale Des Ingénieurs-Conseils or FIDIC suite of construction contract templates, which does not currently include an EPCM standard contract (although a FIDIC task force is reportedly working on the development of one).

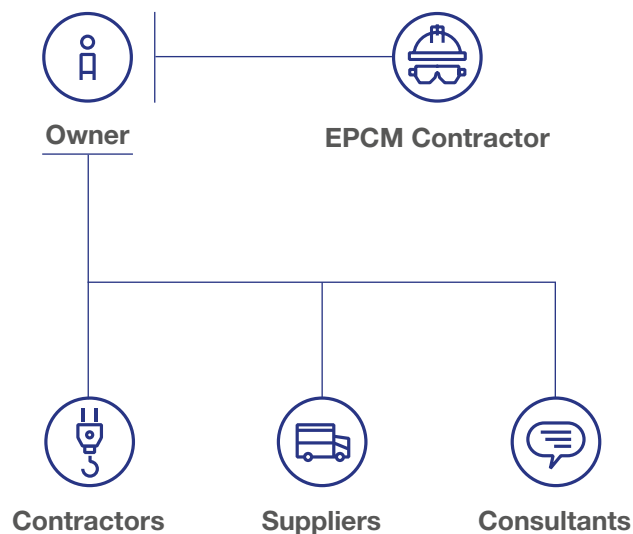
The superficial similarity in the acronyms ‘EPC’ and ‘EPCM’ should not distract contract users from the massive difference between these two forms of procurement. An EPCM contract is fundamentally a form of construction management and is therefore more similar in many respects to a professional services agreement (as opposed to a ‘hands on tools’ construction contract where the contractor actually does the construction work). The EPCM contractor is typically responsible for basic engineering and developing the detailed design, procurement of materials and equipment, and the management and administration of one or more construction contract(s). However, because the EPCM contracts currently in use tend to be bespoke, the precise nature of these contracts can vary considerably from project to project.

The structure of EPC and EPCM models are very different. Under an EPC contract, the owner will usually enter a **single** turnkey contract with the EPC contractor who assumes full responsibility for the completion of the project. Under an EPCM model, the owner will enter into **multiple** contracts and will directly contract with the EPCM contractor as well as separate direct contracts with suppliers, consultants and construction contractors. These differences are illustrated in the project organisational charts for each model shown opposite.

EPC model



EPCM model



Advantages and disadvantages

One of the main benefits to an owner of using an EPCM model is pricing: There is no single contractor absorbing all the project risks for a higher lump sum, and the owner has more control over tendering and appointing the various vendors and trade contractors, which can then lead to cost savings.

Additionally, work may commence more swiftly under an EPCM arrangement than under an EPC model, as work packages can be let as and when required, and design and construction can progress in parallel or simultaneously. Moreover, the project owner or client may not necessarily require all funding to be in place before the construction works commence, as much of the project cost will be in the construction contracts for the works, which can be phased, thus easing cash flow concerns.

Furthermore, risk is spread across multiple contractors. Accordingly, the owner is less exposed to default by a single contractor. However, the downside to this multi-party approach is that when delays, defects or other issues occur, the client may have to pursue several different contractors to recover its losses.

In addition, because of the involvement of multiple parties with different responsibilities, it may be difficult to establish which designer, engineer or contractor is responsible for the default, or to allocate responsibility where multiple parties cause the default.

The EPCM model requires more involvement from the owner. Accordingly, the owner must have a competent, well-resourced and experienced team to support and monitor the EPCM contractor as well as the various construction contractors and suppliers. If done well, this owner oversight can be advantageous, but tasks often take longer and consume more management time of the owner than expected. Even with an EPCM contractor's assistance, the owner or client will need to commit significant resources to project management, which might be better invested elsewhere in the operation of its core business. For owners who are thinly staffed or do not possess the in-house expertise to manage a large capital project, these additional administrative burdens can be significant.

Uses of EPCM

EPCM models have been adopted in the mining and metals sector for some time. Generally, contractors will not produce works on a lump-sum basis in these sectors, where the risks (particularly subsurface risks) involved are beyond the reasonable control of the contractor. Moreover, different suppliers and contractors are usually required to deliver a mining project and often require the construction of separate related infrastructure.

Also, EPCMs are increasingly used in the petrochemical, power and desalination sectors, among others. This trend is particularly evident in the Middle East, where owners are finding it more difficult to attract qualified contractors willing to take on sole responsibility for large and complex projects on owner-friendly EPC terms that would require the contractor to assume critical price and performance risks.

Projects involving the energy transition to renewable sources, such as wind, solar or battery storage, would also appear to be fertile ground for EPCMs. Much of the technology required for those projects is new or repurposed from other industries. Given the risk of possible delays or cost overruns associated with the use of that emergent technology, some contractors may be reluctant to take on single-point responsibility.

Furthermore, renewable energy projects often consist of multiple work packages. An offshore wind project, for example, consists of wind turbine generators, infrastructure, electrical connections, substations and transformers, vessels and harbour facilities. On a solar project, multiple vendors may be appointed to supply key equipment, with other contractors responsible for installation and interconnections. Where battery storage is required, the battery units will also need to be sourced. Accordingly, an EPCM may be one solution discussed to manage renewable energy projects relying on such different or multiple packages.

Important EPCM contractual features

Given the risk of delayed performance and cost overruns, EPCM contracts often will include incentive provisions related to schedule and cost. The owner may benefit from including an incentive mechanism for the EPCM contractor to ensure timely completion, often taking the form of a liquidated damages provision for late performance or an early completion bonus. Careful consideration should also be given to the dispute resolution mechanisms under an EPCM contract. In particular, because of the multiple parties involved, the dispute resolution clauses ideally should allow for disputes with the EPCM contractor to be consolidated with other related disputes (i.e., with the construction works contractors) to allow for fault to be allocated appropriately and to reduce the number of separate disputes that may arise on a single project.

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Conclusion



The application and use of EPCMs are growing across different industries and sectors, and will likely continue growing, particularly in the current market conditions, where lingering concerns about disruptions in the global supply chain impacting a project's schedule and costs are increasingly making contractors reluctant to assume the risks associated with the EPC model. Further, as we transition to new cleaner energy solutions, the manner in which those projects are delivered seems well-suited to the EPCM model. However, the EPCM model will not be appropriate for all projects and circumstances. The procurement route must be considered with a clear understanding of the project objectives, scope of work, the role of each party and the contract structure as a whole. Where the EPCM model is adopted, it is crucial (i) to appoint an EPCM contractor with a proven track record of delivering projects using the EPCM procurement method and (ii) to ensure that the owner has a competent and well-resourced in-house team.

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Once bitten, twice shy

– contractors turn away from turnkey projects

For decades, energy projects have been synonymous with the use of engineering, procurement and construction (EPC) contracts, competitively bid on a lump-sum turnkey basis and typically accompanied by performance guarantees and liquidated damages for delays.

This model, often seen as the gold standard by funders, promises greater project certainty by delivering a comprehensive design and construction solution through a single contractor at a fixed price early in the project lifecycle. The aim is to minimise risk by transferring as much of it as possible to the EPC contractor, who in turn charges a premium to account for the uncertainties stemming from an underdeveloped design. If successful, the contractor stands to gain more control over the project and potentially higher profits by delivering the project under budget.

Despite the apparent benefits to both sides, the allocation of risk under the lump-sum turnkey model has often favoured owners more than contractors. And whereas contractors were previously willing to accept those risks in a competitive construction market, recent years have seen a shift in a variety of market factors that have tempered contractors' willingness to accept such risks, particularly on large-scale energy projects, or "megaprojects". Increasing complexity, budget blowouts and shifting project dynamics are injecting more risk into these projects for contractors, making it more difficult for owners to convince contractors to continue accepting the EPC model on traditional terms.

This article explores why that has occurred and what it means for large-scale energy and industrial projects.

What is causing this shift in balance?

Let's start with the question: Why is the EPC model becoming less commonly used for large-scale projects? While the EPC model remains the default project delivery method in the industry, several factors are influencing a shift away from the traditional EPC model:

- **Risk imbalance:** As a starting point, since the proliferation of EPC contracts in the 1990s, many contractors have considered the traditional EPC model as treating them as de facto insurers against cost increases and delays largely beyond their control. However, the current risk premium for such projects (i.e., the profits to the contractor) is no longer sufficient to entice the contractor to accept such risks, especially given the ever-increasing scale and complexity of modern energy projects.
- **Supply chain challenges:** Contractors face increased exposure to the unpredictability of global supply chains and material price shocks, particularly in the post-COVID world. The rising demand for raw materials to support global energy projects – and from very limited sources – only exacerbates these risks. Indeed, the U.S. Department of Energy has acknowledged that global investment in new energy projects raises major concerns about the future availability of raw materials, particularly given that the U.S. lacks significant current domestic production of many of these materials.¹

1. U.S. Dept. of Energy, America's Strategy to Secure the Supply Chain for a Robust Clean Energy Transition, 2022.

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- **Resource competition:** In some sectors, contractors face competition over limited resources. In the liquefied natural gas (LNG) space, the acceleration of LNG projects in the Gulf of Mexico has led to competition over a limited pool of resources, including labour, supplies and subcontractors, each exacerbating delays and cost escalation. Projects that will produce 12 billion cubic feet per day (Bcf/d) are currently under construction in the U.S. (which will double U.S. capacity by 2030), with a further 22 Bcf/d approved by the Department of Energy, but awaiting final investment decisions. This staggering rate of investment echoes a situation that occurred in Australia in the 2010s, when multiple LNG megaprojects were being constructed simultaneously and ultimately ran billions of dollars over budget, with most projects having little hope of ever recovering initial capital expenditure, much less turning a profit.

EPC contracts typically yield marginal returns (5% to 7%), while cost and schedule blowouts are commonly reported at 30% to 45%. The risk is not just about eroded profits – in the construction industry it is often existential.

- **Losses and bankruptcy:** Over the last few years, contractors have either witnessed or read about others that have suffered significant losses, or have experienced this firsthand. As such, they are increasingly reluctant to take on the same risks, and the “once bitten, twice shy” mentality is taking hold. At the outset, large-scale energy and industrial projects often come with high costs but notoriously low profit margins. EPC contracts typically yield marginal returns (5% to 7%), while cost and schedule blowouts are commonly reported at 30% to 45%. The risk is not just about eroded profits – in the construction industry it is often existential. On average, two large construction companies file for bankruptcy in the U.S. annually, such as most recently Zachry Holdings, a global turnkey contractor, which filed for bankruptcy in 2024, blaming its demise on logistical issues and supply chain disruptions due to the Russia-Ukraine War. The risk is just as severe in other countries, such as the UK, where in the year ending June 2024, construction insolvencies accounted for almost a fifth of all insolvencies and were 50% higher in number compared with 2020.² With many contractors exiting the EPC space, the remaining players are feeling more emboldened to resist owner demands, and the collective willingness to push back on terms perceived as unfair or a misallocation of uncontrollable risk is further shifting contracting dynamics.

For projects that were already vulnerable to delays or cost overruns, these factors are placing contractors at greater risk of exposure to their project owners. Some contractors are no longer willing to sign onto these projects under traditional contracting terms, having decided that said exposure now outweighs the potential profits in the post-COVID market.

2. The Insolvency Service, Company Insolvency Statistics, October 2024.

What alternative models are being considered?

While contractors have shown a new reluctance to accept projects on traditional EPC terms, the pressure to move forward with these projects has never been greater. The current global investment forecast for energy projects is staggering. The IEA's World Energy Investment 2024 Report estimated that global energy investment was set to exceed US\$3 trillion for the first time ever in 2024 and is expected to grow in the coming years.

Thus, investors and owners under pressure to deliver these projects are asking: What do they need to do to persuade preferred contractors to accept their projects? And, more specifically, how can these owners and investors do so while still protecting their own interests?

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1. Modified EPC model

Moving away from a well-known, if imperfect, contracting model is not an easy ask. Other, less tried models present theoretical benefits to the new market conditions but bring uncertainty.

Owners reluctant to move away from the familiarity of the EPC model have taken a more direct approach, negotiating EPC contracts for their projects with adaptations that make the traditional contract less rigid and more palatable for contractors. Adaptations have included:

- **Risk reallocation:** Shifting some scope risk to owners by, for example, including specific procurement delays perceived to be beyond the contractor's control as force majeure events, or adopting hybrid payments models that blend lump-sum and cost-plus elements for different portions of the construction work.
- **Shared savings/overruns:** Introducing provisions to share cost savings or overruns between the owner and contractor, which have been used successfully in other industries, but have been less common on energy projects.
- **Targeted liquidated damages:** Assigning liquidated damages only to specific portions of the project likely to cause the greatest cost impact for the owner, rather than linking liquidated damages to completion of the entire project.
- **Interim milestones:** Breaking down the project into milestones and offering rewards for interim successes or limiting liability for interim delays.

These changes aim to balance the risk-reward equation, making the contract less of an "insurance policy" for owners. This modified approach requires owners to absorb more of the cost and schedule risks, especially in the event of delays or supply chain shocks, but arguably lessens the prospect of protracted disputes and misalignment of interests that are notorious under traditional EPC contracts.

2. Alternative contracting models

Other owners have gone even further and abandoned the traditional EPC model altogether. Instead, these owners have opted for alternative contracting methods, such as the following:

- **Multi-prime approach**

Some owners have opted for a multi-prime approach, where different contractors are awarded separate scopes of work. This model has been used for many years in the wind industry.³ Unlike solar projects, where the EPC model is the preferred and common approach, the EPC model never gained traction in the wind industry, except for projects in developing countries. Instead, the wind sector has adopted a multi-prime contracting model, typically involving separate contracts with the turbine supplier, and the civil and electrical contractors. Sometimes upwards of nine separate prime contractors are engaged.

A multi-prime approach spreads the overall project risk across multiple contractors. Because the risk is lower for the individual prime contractors, owners are more likely to be successful in keeping their preferred traditional risk protections in place (such as liquidated damages clauses). However, the drawback for the owner, compared to the traditional EPC model, is that they no longer have single-point responsibility and face the added risk of issues arising from scheduling and coordination between the multiple contractors and also finger-pointing between the contractors should there be a dispute. As such, it is crucial in these multi-prime arrangements that the contracts clearly delineate scopes of responsibility and coordination obligations between the various prime contractors.

- **Phased delivery**

Similar to a multi-prime approach, phased delivery breaks the project down into multiple contracts. The difference is that, instead of dividing the project scope across multiple contractors, owners can award the project in sequenced phases to one or more contractors. This preserves the single-point responsibility of the traditional EPC model while allowing risk to be spread over time and to be more accurately allocated at later stages, when more information is available. It also gives the parties greater certainty at the time of entry into the agreements for subsequent phases, meaning less risk and less contingency. The downside is that phased delivery, like the multi-prime approach, creates added coordination risks and challenges.

- **Emergence of EPCM and other alternative contracting models**

As the scale, complexity, sophistication and cost of a project increase, typically so too does the level of effort put toward contracting.

One of the alternative contracting models with renewed emergence is the engineering, procurement and construction management (EPCM) contract. Its growing popularity led the Institution of Chemical Engineers to release a standardised EPCM contract (the Blue Book) in 2023.

EPCM contracts differ significantly from traditional EPC contracts. Typically, the EPCM contractor carries out the detailed engineering and design function for the project and takes responsibility for procurement of major equipment, but usually does not directly perform the construction work or take full responsibility for delivering the completed project by an overall completion date or within an overall capped cost limit. Instead, the contractor acts as the owner's agent, managing and coordinating the construction process.

3. A 2006 UK tender for an offshore wind project, which attempted to solicit interest under an EPC model, famously received no bids.

The primary advantage for owners is flexibility and greater control over costs, quality and the schedule, but this places a larger burden on the owner to manage the construction process and requires a sophisticated in-house project management team. While there is growing interest in the EPCM model in the U.S., it has actually been in use for some time. For example, in 2008, the US\$2.4 billion expansion of the Valero Port Arthur Refinery in Texas was constructed by Technip under an EPCM contract.

The search for creative options in responding to the current market conditions has spawned a full spectrum of other hybrid contracting and pricing arrangements. Time will tell which of these will become part of the new “standard”.

As investors, owners and contractors are renegotiating traditional EPC terms in response to current market conditions, they are thus also in the process of establishing **new norms in contracting for energy projects.**

Conclusion



So, what does all of this ultimately mean for these projects moving forward?

It means that the “industry standard” is changing. Contractors and owners favour using the same contracts that they have become familiar with on prior projects, and the negotiations almost always start with pre-existing contract forms. As investors, owners and contractors are renegotiating traditional EPC terms in response to current market conditions, they are thus also in the process of establishing new norms in contracting for energy projects.

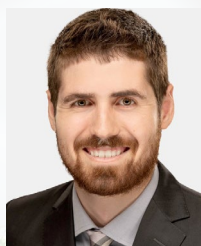
While the alternative contracting arrangements discussed in this article can alleviate some of the contractor-allocated risks of the EPC model in the current market, they also introduce uncertainty and untested ideas. Moving away from the traditional approach may present unforeseen risks, and both parties should carefully consider the long-term implications before shifting to less familiar contractual terms.

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Modular construction

– A conversation with Jim Gabriel, President and CEO of MODLOGIQ, Inc.

To meet the demands associated with expected population growth, the world's buildings must double in number by 2050.¹ Achieving this feat will require owners and contractors to rapidly increase the pace and efficiency of construction. To this end, an increasing number of owners and contractors will undoubtedly and necessarily turn to modular construction techniques.

Modular construction has a proven (and improving) track record: By some estimates, well run modular projects finish between 20% and 50% faster and cost up to 20% less than comparable, traditionally-built projects.² But this tool, like all tools, must be employed appropriately to maximise its utility and efficiency. To understand more about harnessing the benefits of modular construction, I sat down with Jim Gabriel, President and CEO of MODLOGIQ, Inc., a U.S.-based modular builder with facilities in Pennsylvania and Ohio. Our conversation³ follows.

For the uninitiated, how would you define 'modular construction' and how does it compare to 'pre-fabrication'?

Modular construction is a building process that involves the off-site construction of entire sections of a structure (such as whole rooms or units) in a controlled environment. These modules are then transported to the project site for final assembly. Pre-fabrication, on the other hand, involves the off-site production of smaller-scale building components (such as the components of walls or floors), which enhance traditional construction processes by quickening the components' on-site installation.

How does modular construction help owners avoid delays associated with weather, design changes and materials compared to traditional building methods?

Modular construction offers several potential advantages over traditional construction. First, constructing modules in a controlled, factory environment shields the construction process and building components from adverse weather and other site-related delays. Second, the construction of modules off-site allows necessary on-site civil work to proceed in parallel, significantly reducing total construction time. Third, construction proceeds according to an organised schedule that tracks standardised manufacturing processes, making it more accurate. Fourth, factory processes provide the constructor with better control over material inventory, thereby reducing waste and material-related delays. Fifth, the factory setting provides consistent conditions for quality control, resulting in fewer on-site defects and re-work. And sixth, because the modules ship 80% to 90% complete, on-site assembly is very quick, thereby reducing the risk of site-specific delays.

1. Global Alliance for Buildings and Construction, *2019 Global Status Report for Buildings and Construction*, United Nations Environment Programme, 3 (2019).

2. See, e.g., Nick Betram, et al., *Modular Construction: From Projects to Products*, McKinsey & Company, 10 (2019); Rob Mills, *Cost Model: Modular Construction*, AECOM, 5 (2017).

3. Edited for clarity and brevity.

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What advice do you have for an owner considering the application of modular construction to their project?

Owners should research particular designers and manufacturers with modular construction expertise as applied to the owner's specific building application or geography. The site geography, for instance, might impact transportation costs and logistics, and an owner with a particularly remote or urban project location should consider whether their site might complicate the delivery and assembly of modules. Pre-planning early in the design and pre-construction phase can help mitigate or eliminate these limitations. Given this and other challenges, choosing and engaging a qualified, experienced modular designer and builder is the real key to success. So, too, is hiring a qualified construction manager with experience in modular construction (especially because modular manufacturers are often subcontracted to prime contractors, and few manufacturers can deliver turnkey projects on their own). In modular construction, the construction manager plays a more integrated role in the design and construction phases, and coordinates between the off-site manufacturing and on-site assembly of the modules. This coordination is crucial to ensuring that the various modules fit together seamlessly.

How does the design of a building to be built using modular construction differ from the design of a building built using traditional methods?

Modular design requires a manufacturer's mindset. The design philosophy focuses on standardisation, precision and the integration of systems (such as mechanical, electrical and plumbing systems) across modules, with a strong emphasis on pre-planning, efficiency and repetition. The need to transport finished modules from the factory to the site for assembly also imposes some size and shape constraints that are not usually present in traditionally built buildings and may limit design possibilities for modular buildings. Modular design may, however, be applied to complex projects and spaces. For example, MODLOGIQ is currently constructing a 100,000 square foot/9,300 square metre, four-storey hospital in Athens, Ohio that, when completed in summer 2025, will be the largest permanent health care facility in North America built using off-site modular construction.

The need to transport finished modules from the factory to the site for assembly also imposes some size and shape constraints that are not usually present in traditionally built buildings and may limit design possibilities for modular buildings.

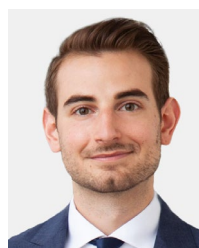
Given that modular construction integrates design with fabrication or construction, it seems like a design-build project delivery method is more appropriate for a modular construction project than the traditional design-bid-build delivery method. Is that right?

Yes, using the design-build delivery method is key to maximising the value and benefits of modular construction. It is also our preferred project delivery method. Modular construction requires precise coordination between the designer and the manufacturer in the pre-construction phase to promote the standardisation and repetition of the design and to permit the full integration of the various systems in and between the modules. Modular construction does not lend itself to a traditional design-bid-build delivery method because that method's fragmented design process creates high potential for misalignments, conflicts and inefficiencies in the manufacturing process. Further, because there are few modular builders with particular building application experience, it is often difficult to competitively bid these types of projects. To overcome these challenges, owners opting to pair modular construction with a design-bid-build delivery method might suggest or require 'open book' or GMP-style contracts to manage the overall cost of the project.

What do you think the future holds for modular construction?

In the next 10 years, modular construction is likely to see significant growth and transformation, due in part to an ever-tightening skilled labour market, increased labour costs and the increased adoption of advanced technology. The integration of improved technology will increase design customisation and ease, and will usher in more scalable, sustainable and cost-effective module production and assembly processes. I also believe we will see modular construction expand across various sectors, including residential (especially low-cost and affordable housing), commercial and even large-scale infrastructure projects. Modular construction's increasing capabilities will be accompanied by easier regulatory approvals and permitting as more and more jurisdictions adopt regulations to encourage modular design and construction. While this might surprise people, I think modular construction is poised to make traditional construction the exception.

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Jim Gabriel

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Reducing the contractual risks of off-site/modular construction

Traditional methods of procurement and project management can be ill-suited to modular construction, which is increasingly used in complex and high value projects. In this article, we explore issues that owners and contractors should think about when negotiating contracts for modular construction projects to reduce their legal and performance-related risks.

Modular construction is a process in which a building or the component parts of a building are constructed off-site, under controlled plant conditions. Although initially used in relatively simple components or building structures, off-site/modular construction is now increasingly being used for more substantial and complex projects. However, many standard form construction contracts do not contain specific provisions dealing with the particular risks that arise with modular construction.

Owners and contractors should recognise that if their contracts fail to address the risks unique to modular construction, the negative consequences can be significant. In the following sections, we address specific phases of the modular construction process and identify the relevant issues that need to be addressed during each phase.

- **Due diligence:** The first question owners and contractors should ask, of course, is whether their project is actually suited to modular construction from a practical perspective. If the project is suited for modular techniques, then owners will also want comfort that the main contractors are experienced in and have a proven record of successfully delivering projects on that basis. Owners will require extensive rights of due diligence in respect of any subcontractors appointed by main contractors to undertake off-site works. From the earliest stages of the project, the owner may demand a role in identifying and approving critical subcontractors or fabricators. Contractors may likewise want to have a comfort level with their subcontractors and be reluctant to give fitness for purpose warranties in respect of the work of subcontractors appointed by the owner with whom they are unfamiliar. Contractors appointed on a multiple directly-appointed contractor basis will want comfort that the other contractors with whom they will be expected to interface are experienced and capable. All parties using off-site manufacturers need to be confident that those manufacturers are solvent, quality-focused and reliable. This is vital on a modular construction project because by the time the modules are delivered to site, any poor workmanship will already be integrated into the works, making it difficult and costly to rectify the problem.

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- **Procurement structure:** Owners of complex, high-value projects often prefer turnkey engineering, procurement and construction (EPC) contracts because they provide for single-point responsibility in respect of one main contractor, and therefore avoid the risk of jurisdictional disputes in which multiple directly appointed contractors blame each other for delays and cost overruns. Main contractors tendering for such projects are often willing to accept single-point responsibility because the EPC contract gives them a significant degree of control over their methods and means of construction, in particular with respect to choosing, programming and overseeing subcontractors.

However, the risk/reward allocation arguably changes so fundamentally with modular construction that the typical EPC model can be problematic. From a main contractor's perspective, the change in risk allocation occurs because of the huge reliance on the off-site manufacturer. As a result, it is difficult for the contractor to accept all risk under the traditional EPC contract. If the bulk of the work is undertaken off-site by a subcontractor, then the EPC contractor's role may, in practice, be more similar to that of a project manager providing professional services than the typical role of an EPC contractor. Notwithstanding the fact that the owner may, in reality, be relying more heavily on the off-site subcontractor or fabricator than the EPC contractor, the EPC contractor nevertheless retains all of the responsibility if the project becomes distressed. This may be unattractive to the contractor.

From the owner's perspective, the fact that the EPC structure does not reflect the actual risks faced by the main contractor is likewise unhelpful, in that the owner potentially derives false comfort as to budget and the completion date. An EPC structure typically gives the owner recourse against the main contractor in the event of delays and cost overruns through the fixed price, delay damages, bonds, other performance guarantees and other contractual mechanisms.

However, those contractual mechanisms may be scant comfort for an owner awaiting completion of a distressed project and/or engaged in a dispute with the main contractor in circumstances where the owner may be unable to incentivise key subcontractors further down the supply chain to deliver essential components manufactured off-site.

One alternative procurement route is to have multiple contractors retained directly by the owner in respect of specific, virtually integrated packages of work. However, this alternative procurement route poses its own risks, such as multiple contractors blaming each other for delay, confusion as to ultimate design responsibility, and confusion as to who is ultimately responsible for coordinating the works. The construction industry is familiar with these risks, but the impacts become significantly magnified on a project using modular construction. The appointment of a consultant to oversee these issues can be helpful, but is also not straightforward, as the typical limitation of liability amount in a consultant's contract of appointment is likely to be a fraction of the actual loss suffered if there is a delay to a major project.

The construction industry is familiar with these risks, but the impacts become significantly magnified on a project using modular construction.

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- **Subcontracts:** The owner of a large project using modular construction will want comfort over the course of the project that the manufacturer of the modular components is progressing the work according to the programme and within the required technical parameters. If the off-site manufacturer(s) is a subcontractor, then it is crucial that owners have transparency as to the subcontractor's obligations, and owners may therefore stipulate in the main contract that a pro forma subcontract shall be used. Although such stipulations are common on major projects, they become even more important on projects involving modular construction, where subcontractors may execute a large proportion of the work off-site and where the consequences of subcontractor underperformance can be calamitous. Typically, the owner will demand that the major subcontracts are back-to-back with the main contract and contain terms that protect the owner, such as step-in rights, rights of assignability, novation, compatibility of disputes processes, bonding, rights of access for the owner and rights for the owner to undertake quality assurance/quality control. The main contractor may be reluctant to grant the owner such wide-ranging rights to deal directly with and inspect the subcontractors' works, on the basis that it may undermine the main contractor's commercial position in respect of subcontractors. While many contractors would object to owner interference in matters traditionally under contractor control, some contractors may welcome a more wide-ranging role demanded by owners, as an active owner role may allow a contractor subsequently to argue that any delays or cost overruns have been caused by the owner's interference with the works. Owners must be astute to the risk of owner "interference" claims and address the risk expressly in the contract and in a way consistent with how their contractual rights will be exercised.
 - **Design:** Whichever procurement model is used, it must be clear who is responsible for the design, especially if the off-site vendor or contractor has a design role. For similar reasons, if there are separate onshore and offshore contracts, or contracts where multiple suppliers are supplying different parts of the works, then the contractual structure must make it clear who has overall design coordination responsibility. The aim of modular construction is to undertake as much work as possible off-site and limit the on-site tasks as far as possible to assembly and final testing/commissioning. On-site amendments to the works, and the risk that components will not fit together, negate the aims of modular construction. There is less opportunity for rework and redesign in a modular construction context, as making adjustments on-site may be expensive and difficult to execute outside of the off-site manufacturing facility. The contract must therefore provide a firm cutoff date for design changes and should state in express terms the cost and time consequences of late changes. Building information modelling (BIM) is an especially useful tool when using modular construction. If BIM is to be used, the parties should clearly define who is responsible for creating and updating the relevant information model, and who is liable if the information is inaccurate. A clear date when the BIM model is 'locked', after which no more changes will be accepted, should also be established. If numerous sub-packages are included within an EPC contract and let to separate off-site vendors, working 'in silos' must be avoided, and the contracting and project management structure must proactively address the risk that impacts of design changes affecting multiple silos will not be picked up.

- **Off-site inspection/completion/release:**

The contract may provide for the contractor to maintain a permanent staff at the modular manufacturing facility to monitor progress and check quality. It is crucial that all parties understand that the 'site' for the purposes of inspection and progress reporting has undergone a fundamental shift and encompasses both the place where the modules will be assembled/the work completed (i.e., the project 'site' in the traditional sense) and the manufacturing facilities where the modules are fabricated. The inspections at manufacturing facilities involve several sub-requirements:

- a. The contract should provide the owner with full rights of access to the manufacturing facility and a right to inspect the manufacturer's records in respect of the work (including, for example, quality assurance / quality control (QA/QC) records and labour records).
- b. Progress reports and quality control reports should be in a format that is accurate and easy for the owner's inspection team to use. This may involve changes to the manufacturing facility's internal reporting procedures to ensure that the language of the contract is used for reporting. Vendors and contractors who are newcomers to the modular construction market (such as shipyards diversifying into process plant manufacturing), may be unfamiliar with or resistant to the demanding inspection regimes required by owners, and it is therefore especially important that precise obligations are discussed and defined. It is important that the reporting regime strikes the right mix between keeping the owner informed and burying the owner's inspection team in data. A right to inspect the off-site vendor's or contractor's books will, in itself, be of limited use without structured reports, as it will be difficult for the owner's team to process and interpret masses of unstructured information.
- c. The off-site testing protocol should set out when the final off-site tests should take place and who is responsible for certifying that the modules are ready for shipping to site.

- **Transportation and delivery:** The risk of delays caused by transportation problems (such as shipping issues, the unsuitability of/responsibility for improving roads and bridges, and hold-ups at ports and customs) is a key issue to be addressed in the contractual structure. The supply chain will also generally be responsible for insuring the components until delivery and unloading. One of the benefits of off-site construction is that it should, in theory, give the parties a better opportunity to sequence deliveries, but a corresponding downside of so many off-site components is that receiving large items on-site and integrating them into the works can be logistically challenging. The contract should therefore provide for an adequate laydown for large items arriving on-site and for suppliers sharing the site to sequence their works around deliveries and the related spikes in activity.

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- **On-site completion, testing and commissioning:** Testing will be required to identify any damage caused during transit and ensure integration of the various modular components. An owner will want direct agreements with off-site suppliers to address the risk of a failure of key components to achieve the required technical performance. A detailed protocol will be required to coordinate the on-site testing and commissioning if multiple off-site vendors are used. It must be clear who is responsible for certifying completion of the works, both at the ultimate place of assembly and at the manufacturing facility. A third-party certifier might be specified if that process is likely to be contentious.
 - **Payment:** Construction contracts often provide for periodic payment against the certification that specified activities have been completed. Specific challenges arise when deploying that model in a modular construction context. The contractor may wish to break down the elements of the off-site construction into more granular, discrete activities in order to facilitate cash flow. The requirements for ongoing off-site inspections and inspection on-site may mean that several stages of certification may also be required. The fact that off-site vendors or contractors have possession off-site of prefabricated modules potentially puts them, rightly or wrongly, at an advantage in respect of payment disputes, as they may seek to make release of the work contingent on payment. Owners should therefore ensure that contractual and legal rights of set-off are limited to the extent possible and that the contract clearly provides that work must be released even in circumstances where there is a payment dispute. The owner must be aware of any rights that the off-site vendor or contractor may have within the country of manufacture to retain possession of the works pending payment of debts. The parties should also consider who is responsible for storage and preservation of the works if a module is ready for shipment but the site of assembly is not ready to receive it.
 - **Protection against insolvency:** Modular construction significantly increases the impact of a supplier insolvency, as key elements of the project may be uncompleted and/or stranded at distance from the project. Prior to contracting, owners should confirm with local counsel whether they have an easily enforceable right to take possession of materials in the country where the off-site manufacturer is based in the event of an insolvency. The contract should provide for a system of vesting certificates or other procedures to ensure that title in materials passes when payment is made to the off-site vendor or contractor, and the owner should confirm that this process is speedily enforceable through the local courts. Even with such protective systems in place, modular construction significantly magnifies the impact of a supplier insolvency. In the worst-case scenario, the contractor lacks key elements of the construction following an insolvency event. This is a particular risk if the manufacturing facility is in a jurisdiction where local courts favour domestic creditors, as the contractor's rights to remove the fabricated modules are likely to be unclear or contested. The owner must also be confident that, in the event of an insolvency, it has the right to use the intellectual property rights in the relevant drawings and specifications to complete off-site components or, if necessary, to have new components manufactured elsewhere. There should, of course, also be the usual requirements in respect of performance bonds, parent company guarantees and collateral warranties/third-party rights from suppliers.



- **Dispute resolution:** The dispute resolution provisions in the off-site fabrication contracts should align with the contracts for the works on-site and should contain express language to allow disputes arising under the contracts to be consolidated or joined into one set of arbitral proceedings. This alignment is necessary to avoid a situation where various members of the supply chain blame each other for problems in the works; in the absence of consolidation language, the client will be forced to initiate an arbitration against each, potentially with different tribunals reaching piecemeal or different conclusions.

Modular construction holds great promise to increase the efficiency with which projects can be built. However, as modular construction becomes increasingly common in the industry, and becomes deployed on larger and more complex projects, the risks rise for the contractual participants. Prudent owners and contractors need to establish contractual protections and project management tools that recognise the changed challenges they now face and mitigate their risks so that they can enjoy the benefits of these new techniques without assuming unnecessary legal and financial exposure.

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On track – Amtrak’s senior officials discuss the company’s project delivery overhaul for a new wave of capital projects

James Doerfler, a partner in Reed Smith’s Pittsburgh office, sat down with four senior officials at the National Railroad Passenger Corporation, commonly known in the United States as Amtrak, to talk about the company’s receipt of governmental grant approvals to undertake a series of transformative capital projects and some of the strategic project delivery decisions the company has made about how to perform those projects. He met with Jim Short, Vice President, Program Development & Project Services; Rajkumar (Raj) Kuppuswamy, Senior Director of Procurement and Subcontracts - Mega Projects; Martin Klein, Senior Director of Construction Procurement; and Tim Cupples, Assistant Vice President, Project Development & Commercial Management.

These are exciting times for Amtrak, with its recent announcement of government funding for major infrastructure projects in the Northeast Corridor of the United States – the busiest segment of the passenger rail network in the United States. For our readers, can you briefly describe some of these key projects and what they will entail?

Jim Short: These are indeed exciting times for Amtrak! The infusion of billions of dollars from the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law, provides Amtrak with a generational opportunity to address decades of underinvestment as we improve our infrastructure, renew our fleet and expand/modernise our major stations. Summaries of each of these areas are outlined below.

Improve our infrastructure: This area includes replacing ageing bridges, building new tunnels, rehabilitating existing tunnels and more. Examples of these infrastructure upgrade projects include the following:



Susquehanna River Bridge

Replacing ageing bridges

Susquehanna River Bridge: This project will replace the existing single two-track bridge built in 1906 between Havre de Grace and Perryville, Maryland, with two new two-track bridges on the Northeast Corridor (NEC). This programme includes the construction of five route miles of track realignment, two tracks dedicated as high-speed tracks for Amtrak and two tracks primarily for the Maryland Area Rail Commuter (MARC) rail system and freight services (Norfolk Southern), as well as modernisation of the catenary and signals to enable higher speed operations.

Connecticut River Bridge: This project will replace the existing 116-year-old bridge between Old Saybrook and Old Lyme, Connecticut, with a two-track, electrified railroad movable bridge. The new bridge and rail infrastructure upgrades will support increasing maximum speeds by 55%, while also improving maritime navigation and safety.

Sawtooth Bridges: These four bridges in Kearny, New Jersey carry more than 400 Amtrak and New Jersey Transit trains per day over tracks used by New Jersey Transit, the Port Authority Trans-Hudson subsidiary of the Port Authority of New York and New Jersey, and Conrail freight trains. When complete, the new four-track NEC structure will double track capacity in one of the most congested and complex locations, where these different services all come together.

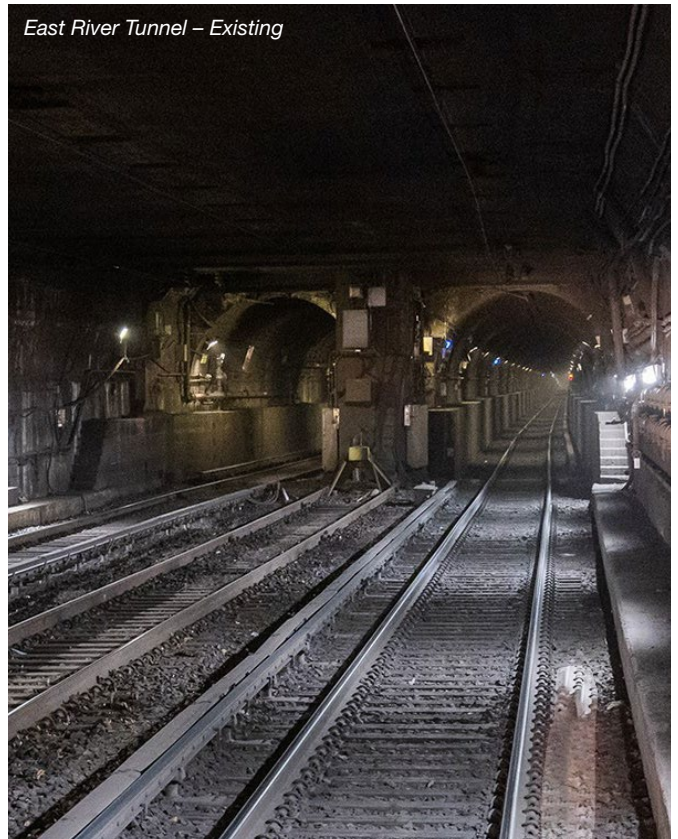
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Tunnels

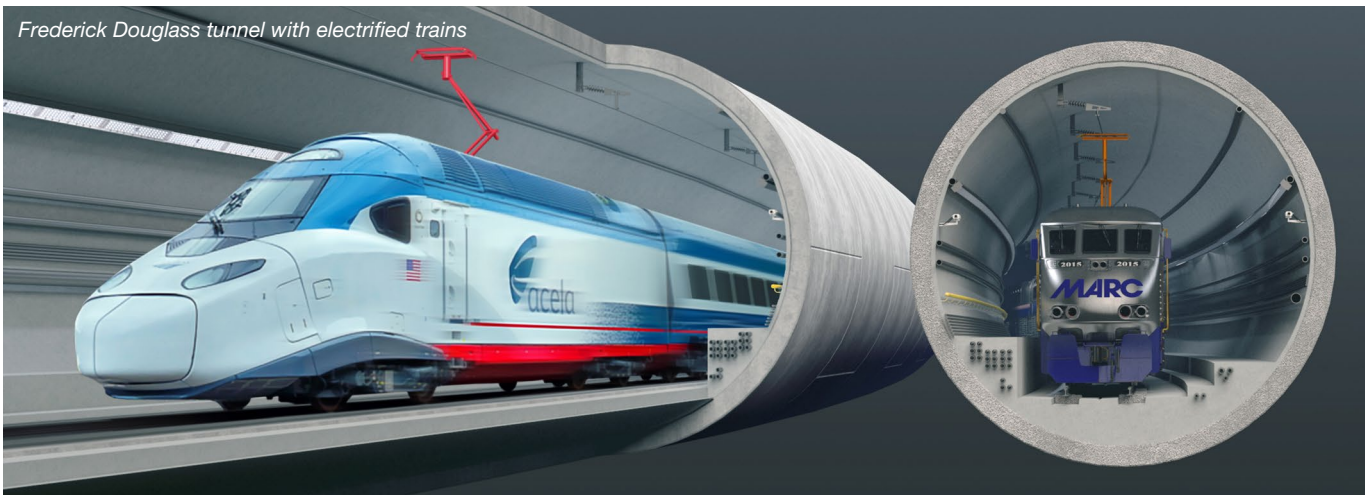
Frederick Douglass Tunnel Program: These two new high-speed tunnels will modernise and transform a 10-mile section of the NEC designed for electrified Amtrak and MARC passenger trains. Also included is a new West Baltimore MARC station that will meet Americans with Disabilities Act accessibility requirements. This programme addresses the biggest bottleneck along the NEC between Washington, D.C. and New Jersey by replacing the existing 151-year-old deteriorating tunnel that supports the more than 12 million MARC and Amtrak passengers per year on the NEC and MARC's Penn Line. The new tunnels will also decrease travel time (enabling travel between Baltimore and Washington, D.C. in under 30 minutes) and increase capacity, reliability and safety (modernised fire and life safety systems).

East River Tunnel: This project involves the reconstruction of two East River Tunnel tubes in New York. The scope of the project includes full demolition of existing tunnel systems; repairs to concrete spalls, cracks and leaks of tunnel liners; construction of bench walls with new cable conduits configuration and associated utilities replacement; ballast track replacement with direct fixation track system; and signal, traction power, water standpipe and drainage systems replacement.

East River Tunnel – Existing



Frederick Douglass tunnel with electrified trains



Renewing rail infrastructure and support systems

Collectively, these will involve many projects for the upgrade of various critical rail infrastructure items, such as electrical systems, construction of elevated platforms, upgraded or new signalling systems, new interlocking systems and new catenary systems for various portions of our existing passenger rail lines in New Jersey, Pennsylvania and Maryland. Taken together, they will allow for higher speeds, improve overall system reliability and overall better customer experience.

Fleet renewal: Amtrak's fleet projects include new high-speed NextGen Acela trains, the Amtrak Airo programme, its long-distance fleet replacement, as well as new facilities to accommodate the maintenance of the new trainsets.

Replacement of Acela trainsets: This programme includes the acquisition and commissioning of 28 new next-generation high-speed Acela trainsets resulting in a 40% increase from our current fleet and an increase of 75% total seat capacity.



Amtrak Airo: This programme includes the acquisition and commissioning of 83 new hybrid battery and fuel-powered trainsets (plus options) that will replace our existing Amfleet I cars, Metroliner cab cars and Talgo equipment, which have been in operation for 40 to 50 years and are at the end of their useful service lives. The new trainsets will improve the overall customer experience with enhanced accessibility; improved fuel efficiencies and 90% lower particulate emissions in diesel operations; and more contemporary food service in the café car, including self-service options, spacious seating and more.

Long distance fleet: This programme will re-equip a fleet that provides vital train services from coast to coast. It will allow Amtrak to introduce an updated product that meets current and future market expectations, improves customer experience, reimagines onboard accessibility and mobility, improves operational efficiency, and bolsters resiliency and ridership.

New and improved rail facilities: This programme includes the design and construction of facilities to support the overall needs of fleets and trainset maintenance, maintenance of way and other facility-based operations. Initial sites slated for projects will include six major Level 1 sites in the Northeast and Seattle; maintenance and inspection tracks; service and cleaning with pit facilities; service and cleaning tracks facilities; and 15 smaller Level 2 sites.

Major stations: This set of capital projects includes the expansion/modernisation of our major stations, including Washington Union Station, Chicago Union Station, New York Penn Station, Baltimore Penn Station and Philadelphia's Gray 30th Street Station. A few key details about the improvements to our two busiest stations include the following:



New York Penn Station: Expanding the capacity of this station to double passenger train services between New York and New Jersey from 24 to 48 trains per hour, or more during peak hours. Additional investments and improvements aim to transform the busiest train station in the Western Hemisphere into a modern, world-class facility.

Washington Union Station: Expanding and modernising this 117-year-old station, which is Amtrak's second busiest station, in partnership with this project's sponsor, the Union Station Redevelopment Corporation, includes both major capital improvements work and addressing near-term needs, including the relocation of an existing power substation, the construction of new digital technology functions and the replacement of existing Amtrak Police Department and employee facilities.



Washington Union station expansion

Can you speak briefly about how Amtrak's project and procurement officials are reacting to this slate of new projects – whether it has been with excitement, with a bit of concern over the magnitude of the tasks ahead or a bit of both?

Jim Short: Excitement, absolutely! This is a very exciting time for Amtrak to be able to increase ridership to record levels, improve the customer experience and replace/rehabilitate fleet and infrastructure all at the same time. We recognise the challenges associated with the magnitude of the tasks ahead, but we have planned and executed accordingly by creating a new capital delivery organisation at Amtrak by building on an existing team of highly qualified project management and procurement professionals, then increasing our staff levels to meet the demand, engaging industry resources with alternative project delivery mechanisms and coordinating with our federal, state and local partners.

How has Amtrak gone about obtaining the necessary qualified personnel to manage these significant projects?

Tim Cupples: We have employed a number of approaches to ensure we have the necessary qualified personnel to manage these projects, including increasing the skills of existing personnel, hiring new personnel and engaging external firms. We have developed typical project staffing models for various types of projects to inform the project team requirements in terms of structure, numbers and skill levels. For each project, we consider the optimal approach for staffing that project, which can be a mix of assigning existing personnel, hiring new people and/or engaging external firms.

For decades, Amtrak has been known for its traditional procurement approach of using a design-bid-build project delivery system, where the projects were only put out for bid after they had been fully designed and then the projects would be constructed by contractors who had no role in the design and who tendered only fixed price bids. However, to construct these new projects, Amtrak has turned to new and innovative project delivery and contracting methods. In the past few years, Amtrak has implemented new contracting approaches using more flexible and integrated project delivery methods, such as the use of design-build contracting and the use of construction manager at-risk (or CMAR) contracts. Can you tell us what was the impetus for Amtrak's move away from its traditional procurement mode and describe how Amtrak made the decision to move towards these new contracting approaches?

Tim Cupples: We have moved beyond traditional project delivery for a variety of reasons. First, given the historic level of investment under IIJA, it is a necessity to innovate to deliver our programme safely, on time and on budget. Innovative delivery methods have enabled Amtrak to put over US\$12 billion worth of work under contract in the past 15 months alone. This represents an order of magnitude increase in the value of work awarded in a typical year prior to IIJA and we simply would not have been in a position to award this volume of work in such a short time if we had relied solely on traditional design-bid-build methods. Second, many of the projects in our capital programme present unique design, construction, schedule and supply chain challenges. We are tackling those challenges by engaging contractors earlier in the design process through alternative delivery methods such as design-build and CMAR. Early contractor involvement is already yielding benefits that range from improved designs, taking into account constructability improvements, cost saving measures, etc. In addition, we are seeing schedule benefits through the release of early work packages and long-lead items while the design of other project elements continues.

How has Amtrak's move towards design-build and CMAR contracting been received in the marketplace by your preferred list of bidders and construction managers?

Raj Kuppuswamy: The market is responding favourably, and bidders are excited to see Amtrak considering other execution methods. We have seen strong competition for design-build and CMAR projects. For very large or complex projects, we see a preference in the marketplace for delivery methods that enable the owner and contractor to allocate risk to the party best able to control it.

How have these changes in procurement and project delivery approaches been received internally at Amtrak by the procurement and project management officials who are responsible to bid and manage the projects?

Martin Klein: There was definitely a learning curve, but the team has collaborated in an exceptional manner resulting in the award of over US\$12 billion worth of work under contract in the past 15 months. Collaborative efforts resulted in tailoring Amtrak's standard technical and commercial documents to support both these alternative delivery methods and large design-bid-build contracts.

Given the significant difference in management approach, has Amtrak had to provide any additional training or resources to its procurement and project management officials responsible for project oversight?

Raj Kuppuswamy: Amtrak's procurement department formed a dedicated project procurement team to focus on mega projects. Members of the team include long-term Amtrak employees with strong execution experience. We also recruited key resources experienced in executing large-scale projects with alternative delivery methods to run projects and train other team members.

Given the fact that Amtrak receives state and U.S. federal governmental support, we assume that the change to these new contracting methods has required some level of consultation with your legal and government grants teams to ensure compliance with legal and regulatory requirements. Without discussing any specific conversations you may have had with your legal counsel, can you describe briefly the process and extent of the due diligence efforts Amtrak has undertaken on that front to ensure compliance?

Martin Klein: We often refer to these efforts as a 'team sport' because it really is. We have worked together as a team across the Law, Grants, Procurement, Capital Delivery and other departments to ensure we maintain full compliance with our regulatory requirements. This process included the updating of our General Provisions and other related contractual documents that become part of executed contracts on our projects.

While some of these projects are ongoing and some are still in the planning stage, can you tell us, preliminarily, how these new project delivery methods are working out in the field?

Tim Cupples: We are at the early stages of projects that have been awarded with alternative delivery methods and are going through preconstruction, which encompasses the planning and cost estimation phase of the projects. So far, our experience has been positive, with our contractors meeting our expectations on the basis of their cost estimates, identification and allocation of risks, and constructability improvement input.

Despite Amtrak's recent move towards design-build and CMAR project delivery approaches, do you foresee instances of projects in which Amtrak will continue to utilise the traditional design-bid-build project delivery method?

Tim Cupples: Absolutely. We select the right delivery method for a particular project based on characteristics such as the schedule, scope, complexity, value and risks. CMAR and design-build are additions to our project delivery "toolbox", but we still use traditional delivery methods where they are appropriate and will result in the best outcome. For example, for a substantial portion of our State of Good Repair portfolio projects and a couple of large infrastructure projects, design-bid-build remains the most appropriate project delivery method.

Regarding unforeseen conditions, we utilise the best information available and conduct field activities to understand the existing conditions we expect to encounter during the execution of a project.

Many of these projects are being constructed in congested areas in the Northeastern United States where there are existing railways and modifications to existing and historic facilities, such as Penn Station in New York and Union Station in Washington, D.C. Can you describe some level of the engineering and due diligence efforts that Amtrak and its contracting partners have undertaken to identify existing conditions and reduce the risk of delays and additional costs due to unforeseen conditions?

Jim Short: There are actually two parts to your question: one regarding unforeseen conditions, and the other on historic facilities. So, let me respond to each separately.

Regarding unforeseen conditions, we utilise the best information available and conduct field activities to understand the existing conditions we expect to encounter during the execution of a project. The results of those efforts are shared with the bidding community, so our bidders are as informed as possible during the proposal process. We have also improved our General Provisions to improve the risk-sharing approach for unforeseen conditions between Amtrak and our contractors.

Regarding the historic facilities, we have a very thorough process that we work in coordination with our federal, state and local partners to ensure alignment on how we will manage the construction near or involving those facilities.

Over the past few years, one of the most prominent challenges faced by project owners who are planning to undertake large capital projects has been the risk of delays, disruptions and supply chain impacts that started during the COVID-19 crisis but are still lingering to some extent. How has Amtrak dealt with the risk of delays and cost increases for major equipment and material items on these projects?

Martin Klein: We understand the lingering impacts on the supply chain and have worked as a team (primarily Procurement and Capital Delivery) to plan and schedule our projects appropriately, identify potential alternative suppliers and continue monitoring/developing mitigation plans to avoid project delays. Alternative delivery methods allow us to work collaboratively with contractors to account for escalations and material availability risks for key construction materials and major equipment.

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An interview with LNG project specialist Nina Howell

Liam Hart, a London-based construction lawyer, sat down with Nina Howell, a partner in our London energy team with more than 20 years' experience in the liquified natural gas (LNG) industry, to hear about construction opportunities related to the growth of LNG in recent years.

Could you tell me a little bit about your practice?

My practice has a particular focus on LNG, and I represent clients across the LNG chain globally, from the development of LNG import and export projects to LNG transportation, sales and trading. I also work on energy and infrastructure projects more generally, upstream joint ventures, unitisation, mergers and acquisitions and other energy-related corporate transactions. I have worked on a number of the biggest LNG projects in Europe and globally in recent years and have also spent time on secondment at two oil majors, working on LNG deals.

It is an exciting time to be an LNG lawyer. How has the LNG market developed over recent years?

Europe's LNG market has experienced major disruption and fluctuations over the last few years. The COVID-19 pandemic caused a significant drop in demand for LNG in Europe between 2020 and 2022, and LNG prices fell dramatically as a result. The start of the Russia-Ukraine crisis in February 2022 and Europe's desire to reduce its dependency on Russian natural gas caused a complete U-turn in the LNG market as Europe sought to rapidly increase its LNG import capacity and European LNG prices reached record highs. This means that over the last two years there has been a significant increase in the construction of LNG facilities in Europe. In addition to the increased focus of LNG in Europe, there is also growing demand for LNG in Asia, partly supported by continued economic expansion in fast-growing Asian markets.

What type of projects are we seeing because of the increased demand for LNG?

Globally, we are seeing big increases in LNG-related production and delivery projects, including liquefaction projects (both onshore and floating), a large increase in the number of LNG carriers, and LNG receiving projects (including storage and regasification projects, both onshore and floating). The scale and complexity of these LNG projects shouldn't be underestimated. Many of these projects are highly complex, multi-billion-dollar megaprojects that will take several years to develop, and that are intended to have a working life of 30 years or more.

Is the change of administration in the USA likely to affect the LNG market?

Obviously, it is early days yet, but the consensus in the market is that we are likely to see an increase in LNG production in the USA and the incoming administration has said that it will reverse the pause on LNG exports. We are therefore expecting to see a jump in LNG exports from the USA, and there are already a number of massive LNG export projects under construction there. That is a trend that the market expects to continue in the coming years.

What is the typical form of contracting used for the construction of LNG projects?

Large-scale onshore LNG projects (liquefaction and regasification) have historically been constructed using engineering procurement and construction (EPC) contracts (often lump sum turnkey) and that continues to be the preferred structure for developers and owners, who are attracted to the single point responsibility and the idea, in theory at least, that there will be a fixed firm price for the construction work. These megaprojects are more often than not funded with some external loans, and project lenders expect to see a robust and “bankable” EPC contract.

From a contractor’s perspective, given the scale and technical complexity of LNG projects, delays in the construction stage can potentially result in significant additional costs, the size of which can potentially have an existential effect.

The sheer size of many LNG projects presents opportunities to contractors, but with that increased scale come significant accompanying risks, and if a contractor is going to sign up to EPC exposure, then it should do so with its eyes open to those risks and ensure that its position is protected as best as possible in the contract.

It could be that in coming years we see contractors try to move away from the risk exposure in EPC contracts, but I anticipate that there may be reluctance to see that happen from funders’ perspectives, given that funders have historically tried to use fixed-price EPC contracts to reduce their risk profiles on projects.

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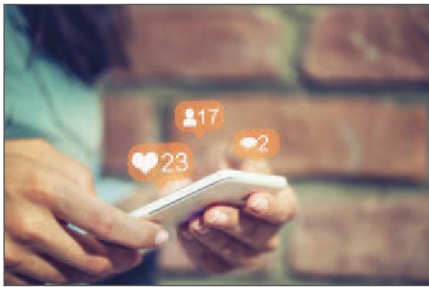
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Nina Howell visiting construction site for LNG import project

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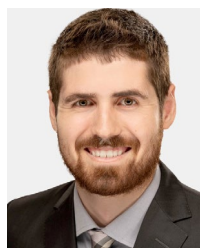
Have a **question?**

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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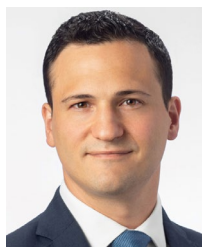
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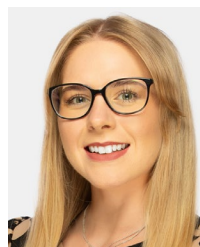
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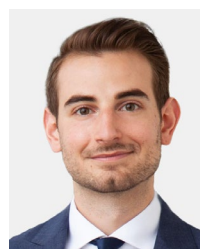
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