Mitigating Costs And Delays In The Energy Transition

By **Christopher Ryan and Jesse Sherrett** (October 11, 2023)

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On Sept. 26, the International Energy Agency published an update to its net-zero road map, which concluded that reaching carbon neutrality, or net-zero, by 2050 and limiting global warming to 1.5°C still remain possible — but that international cooperation and increased momentum is needed in many areas.

The IEA's executive director, Fatih Birol, commented in an interview that "despite the scale of the challenges, I feel more optimistic than I felt two years ago," highlighting that "clean energy investments in the last two years have seen a staggering 40% increase."

Nevertheless, the IEA's update emphasized that still greater investment is needed — and that reaching net zero by 2050 "hinges on mobilizing a significant increase in investment, especially in emerging and developing economies."

While calls for greater investment are common in reports advocating for energy transition, the costs of this process have not yet been calculated. Attempts to quantify the costs of reaching net-zero by 2050 have produced varied results.

For example, in 2019, Morgan Stanley estimated the worldwide costs to achieve net-zero to be $50 trillion — which includes approximately $14 trillion in cumulative investments in renewable energy, $20 trillion for hydrogen fuel production and $2.7 trillion for biofuels such as ethanol. In 2022, McKinsey & Co. Inc. estimated that worldwide spending on physical assets to achieve net-zero by 2050 would reach approximately $275 trillion in the aggregate.

Whatever the ultimate figure turns out to be, the vast majority of these costs will be spent on construction projects, as the energy transition is, in large measure, an aggregation of thousands of construction projects to build new energy infrastructure such as wind farms, solar fields, nuclear power plants and hydrogen plants.

The energy transition also will necessitate new means to store and distribute the energy generated from these sources, which itself will require additional construction projects and operations to mine metals such as lithium and cobalt.

The transition therefore creates tremendous opportunities for owners and contractors in these spaces. It also creates significant risks for both groups alike. As anyone with experience of large-scale infrastructure construction projects knows, such projects are rarely completed on time and on budget.

Instead, they are often subject to significant delays and cost overruns. This is particularly the case on large energy transition projects, where cost overruns and delays have, on average, been more acute than on traditional fossil fuel-based projects.

For example, data shows that the average cost overrun for upstream oil and gas projects is approximately 28%, and schedules are delayed by approximately 20%. Refinery and

petrochemical projects have average cost overruns of approximately 32% and schedule delays of approximately 23%.

By contrast, studies by the University of Delaware and the U.S. Department of Energy have found that offshore wind projects experience average delays of one to two years. The track record of hydroelectric power projects is even worse, with data showing average cost overruns of 96% and delays of approximately 44%.

The experience of nuclear power projects in the U.S. and Europe over the past half century is a particularly cautionary tale in this regard. In the U.S., the last nuclear power plant built was Watts Bar Unit 2 in Tennessee. Construction on that project began in 1973.

The plant, however, only started producing electricity in May 2016. The original budget for the project was $825 million for both reactors, and the eventual cost of Watts Bar Unit 2 was $4.7 billion.

In Europe, the case of Unit 3 at the Olkiluoto Nuclear Power Plant in Finland is also instructive. Construction on the unit began in 2005, and it was projected to be operational by 2010.

The unit, however, did not start producing electricity until March 2022, which reflected a project delay of 12 years, and resulted in an overall cost overrun of $7.73 billion, which was 3.4 times the original budget.

Other energy transition projects have faced similar, albeit less acute, problems arising out of new technologies, novel designs and regulatory issues. Many of these projects end up in litigation or arbitration, which usually compounds the delays and cost overruns.

These data points highlight how difficult it will be to meet the stated goal of achieving carbon neutrality by 2050 and within whatever budget is ultimately set. It is imperative, therefore, that the projects driving the energy transition be structured and managed in ways that address the leading cases of delays and cost overruns.

Studies have shown that the leading causes of delay and disputes on large-scale construction projects are: (1) changes to the original scope of work; (2) contractual interpretation issues; (3) late issuance of design information; (4) failures in contract management and administration; and (5) incomplete or ineffective designs.

These issues generally result from a lack of clarity on the scope of work, poorly formulated or insufficiently formulated designs, and poor project management.

On new energy transition projects, these problems are often exacerbated by the fact that there may be a lag between existing regulatory frameworks applicable to such projects and the new technologies and designs being implemented. This disconnect frequently leads to delays in critical regulatory approvals and changes to the contractor's scope of works through a form of ad hoc regulation.

Similarly, pricing and scheduling cutting-edge, first-of-a-kind energy transition projects is challenging given the paucity of data based on experience on similar projects. Scope changes are also common on energy transition projects because new technologies generally require more extensive design development throughout the lifecycle of the project.

While seemingly daunting, these factors can be managed, and the risks to the projects

mitigated. Indeed, contractors and owners looking to participate in the wave of projects that energy transition will bring should proactively address these factors in their project documents and through their project execution teams, to increase their ability to compete for the pool of funds that will be available.

There is no magic formula that will protect against claims for delays and additional costs. Contractors and owners, however, can take steps to protect against such claims at each stage of an energy infrastructure project.

Mitigation efforts start at the contract formation phase of major energy infrastructure projects, and continue through to project completion. The benefits of these steps are cumulative, and require careful attention at each stage of the project or risk being lost.

The project contracts are the source of each party's rights, protections and obligations. It is important, therefore, that contractors and owners draft and structure these contracts in ways that clearly define the parties' rights and responsibilities, and properly allocate risk.

For example, the contracts should define the scope of work with as much particularity and finality as possible before the contract is negotiated and executed. Although this may push back the timeline for the start of a given project, the time taken up front to define the contractor's scope of works will pay dividends later, in the form of a more realistic and achievable schedule, and through a reduced volume of claims for additional time and money by the contractor.

Similarly, the contractual machinery for change management and claims for time and money should be optimized to disincentivize conduct that can give rise to high volumes of claims backlogs — which can, in turn, lead to protracted disputes between the owner and contractor.

This includes drafting change management provisions to avoid, as much as possible, informal instructions by owners to vary the contractor's work, and to create strong incentives for the parties to resolve claims in a timely and good faith manner during the project.

Contracts should also have robust owner remedies to address poor contractor performance on distressed projects. Such remedies include the owner's right to require the contractor to accelerate its work, the owner's right to take over parts of the work either directly or through a third-party contractor or subcontractor, and, in extreme cases, termination of the contractor for convenience or default.

Finally, risk allocation between owner and contractor should specifically address the unique challenges that arise on energy transition projects, such as ad hoc regulatory changes, technological challenges, design development issues, political risks and environmental risks.

Too often, parties use form construction contracts to address risk allocation without turning their minds to these factors. This can lead to ambiguity and protracted disputes between the owner and contractor regarding responsibility for the delays and cost overruns arising out of these risk factors.

Once the contract documents are drafted, parties must ensure that the hard-won rights and obligations set out in those agreements are properly enforced and managed. Too often, rights and protections that were carefully negotiated are waived or otherwise impaired through lax project management.

Ensuring that project management teams understand each party's rights and respective obligations is critical. Also, it is important that project management teams are willing to take hard stands to enforce those rights and obligations in the face of potentially significant pressure to adopt "commercial" or "practical" solutions that — while useful in the moment — can cause a party to waive important defenses or claims if a dispute arises.

Ultimately, returns on the enormous investments in energy transition will be inextricably linked to the success of the numerous energy infrastructure projects that will be built over the coming decades.

Lawyers can play an important role in facilitating this success — by advising owners and contractors on how to set up and execute contracts to mitigate the delays and cost overruns that are, unfortunately, typical on energy infrastructure projects.

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