

PROJECT FINANCE AND THE HYDROGEN WAVE

AS THE SIZE AND COMPLEXITY OF HYDROGEN PROJECTS GROW, PROJECT FINANCE IS LIKELY TO PLAY AN IMPORTANT ROLE IN THE EXPANSION OF THE SECTOR. BY **PETER GORMAN, WAFAA ERMILATE AND SANNE ROSENDAAL** AT **ING BANK**, AND **ALISTAIR WISHART, LOUISE FISCHEL-BOCK AND LAUREN DAVIES** AT **VINSON & ELKINS RLLP**.

Hydrogen technology is experiencing a renewed wave of interest due to the decreasing costs of producing low- or zero-carbon hydrogen and expanded applications for hydrogen in the energy sector. Although project finance has traditionally been seen as more appropriate for large-scale, long-term projects with proven technology and a clear offtake strategy, project finance lenders are engaging in hydrogen projects in both advisory and lender capacities at an earlier stage of market development than might be expected given market appetite for sustainable projects and the drive on the macro level for clean energy projects.

Introduction

Hydrogen has been touted as a potential carbon-neutral replacement for hydrocarbons for more than 50 years. Hydrogen experienced cycles of hype in the 1970s, following the oil crisis, and in the 1990s, when climate change came to the forefront of politics. However, those waves of interest did not translate into a sustainable investment trend. Now, in 2020, there is, yet again, talk of the exciting potential of a hydrogen economy, with hydrogen being viably considered as a key element in the future of affordable, sustainable and reliable energy supply.

Hydrogen is not emerging from a standing start. The hydrogen industry was already valued at US\$117.5bn in 2019. Hydrogen is used as an important industrial gas in the refining and chemical sectors – mostly in oil refining and ammonia production – with most hydrogen today being produced from fossil fuels using coal gasification or steam methane reformation processes, known as grey hydrogen.

The current wave of interest in the hydrogen industry is being driven by two significant and complementary factors. The first is on the demand side, through an expansion in the range of potential applications for hydrogen in the energy sector and wider economy. Hydrogen has the potential to be used as a replacement for natural gas in power generation, domestic heating and traditional transport fuels, and either an alternative or complement to the use of batteries, particularly in transportation.

The extent to which this potential will be realised is yet to be seen, but hydrogen is already being used to power heavy transportation and is

likely to be a key element in the decarbonisation of industrial sectors such as steelmaking and iron smelting.

The second factor is on the “production” side, involving a move away from carbon-intensive production methods towards the production of hydrogen either from traditional fossil fuels combined with carbon-capture technology, known as blue hydrogen, or through the electrolysis of water powered by renewable energy, known as green hydrogen.

Green hydrogen has historically been expensive to produce but costs are being driven down. Electrolyser production is ramping up, bringing about economies of scale and efficiency improvements, and renewable energies are getting cheaper. Carbon capture technology is also seeing efficiency improvements while commercial-scale storage projects are becoming more widely implemented. Decreasing costs, coupled with subsidies and grants for low- or zero-carbon hydrogen, mean that sponsors and investors alike have become more bullish on the growth prospects and commercial viability of both blue and green hydrogen, leading to a surge in project announcements over recent months.

Opportunities for project finance

Hydrogen project sponsors are today presented with a range of financing options, as interest picks up across lending and investment markets, and a number of hydrogen-related corporate finance, project finance and green bond financings have been announced in recent months.

Due to the higher transactional costs and longer lead times associated with project-financed transactions compared with a corporate financing, project finance is traditionally seen as more suitable for larger, more complex projects. However, as the sector grows and matures and technology risks associated with green and blue hydrogen projects decrease, project finance will



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increasingly become an important source of financing for hydrogen projects.

Project financing has certain benefits over corporate financing, in particular for the project's sponsors and equity investors. Project finance is a well-established method of raising long-term debt for major energy and infrastructure projects, based on secured lending against the cashflows generated by the project (implemented through a special purpose vehicle) on a standalone basis. Project finance as a financing structure has, over a long history, been central to the development of energy and power infrastructure globally.

Financial indebtedness incurred by a project company will, subject to the terms of any agreed sponsor guarantees or support, customarily be off-balance sheet for the shareholders and investors. Project assets are ring-fenced and there is limited or no recourse to the assets of the sponsors and equity investors. Due to the wide range of potential project financiers, a project may be able to attract a higher level of debt, on longer tenors and offering more competitive and therefore favourable financial terms, than would be the case with a standard corporate financing.

Project finance tends to gravitate towards projects where risks can be identified, mitigated and allocated in a manner that that is acceptable to both lenders and also the key project participants. Well-tested and proven technology decreases project and operational (and therefore overall transactional) costs, making a project financing in an established sector more attractive to potential financiers and equity investors. Over the last twenty or so years, there has been an increase in project finance loans in the clean energy sector generally, largely attributable to the development of proven technology and the associated significant decrease in technology risk, coupled with the drive on a macro level for more clean energy projects.

Project finance lenders look for comfort that project revenues will support debt service, as well as the project's ongoing operating expenses, until final maturity of their loans. A key bankability consideration will therefore focus on a project's revenue stream and the coverage ratios; lenders will be reluctant to take on significant risks associated with unforeseeable variations in a project's cashflow and will want to ensure that the project's financial model demonstrates robust economic terms.

In addition to requiring comfort on project capex and opex costs generally, cashflow concerns can be addressed through long-term supply, offtake and sales arrangements and/or through demonstrating that there is a strong market that supports sales on a short-term or spot basis as applicable. The ability for a project to demonstrate this will depend on what is available and customary in the market at the applicable time.

Market and offtake risk is assessed on a project-by-project basis, but it may be easier to satisfy lender bankability requirements where

a project can demonstrate that green or blue hydrogen will simply replace an existing supply of grey hydrogen for which there are long-term, creditworthy consumers and sufficient demand, as well as demonstrating that the required offtake infrastructure is in place. Similarly, lenders may take more comfort from arrangements entered into with offtakers in industrial markets in which hydrogen demand already exists on a continuing and long-term basis. Expanding demand in other sectors (such as transport) may also lead to other opportunities for sales arrangements, resulting in project lenders becoming even more comfortable with offtake risk.

In the hydrogen project finance space to-date, there exist only a very limited number of closed transactions and these are for small-scale demonstration projects. Given the tailwinds enjoyed by this emerging sector, the scale and number of such transactions is likely to increase significantly as we see project finance lenders taking a pragmatic approach to hydrogen projects brought to the project finance market. Despite the traditional expectations for a project financing, project finance lenders are engaging in hydrogen projects in both advisory and lender capacities at an earlier stage of market development than might be expected.

Market appetite

As investors are becoming increasingly product-agnostic, both commercial banks and institutional lenders have become important sources of liquidity in the project finance debt market. Over the past few years, liquidity from commercial banks for sustainable projects has increased tremendously, with sustainability becoming a key focus for many banks, including ING Bank, and capital traditionally allocated to fossil fuels being redeployed to renewable/sustainable projects. In many ways, this represents a continuation of the role played by financing institutions in the proliferation of clean energy worldwide, having provided more than US\$200bn and US\$300bn in project finance debt to solar and wind power projects, respectively, since 2010.

The focus on sustainable investment is likely to become even more pivotal as the EU Taxonomy Regulation, which will enter into force in 2021, enhances disclosure requirements for commercial banks and institutional lenders and establishes a uniform classification system for categorising sustainable activities. In June 2019, ING Bank was given the opportunity to provide input into the Technical report on EU Taxonomy and intends on further exploring the application of the EU Taxonomy to the sustainable finance products it offers.



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Recently introduced European Central Bank guidelines regarding the inclusion of climate-related and environmental risk criteria and inclusion of associated bank policy will further accelerate the trend toward participation in financing of sustainable energy projects. As similar measures are introduced globally, international banks will want to position themselves on renewable and sustainable projects as part of their energy transition strategy.

This has led to the emergence of financing options with the specific aim of aligning companies with climate-related goals, green bonds and loans being the most prevalent. Improvements in the sustainable markets have been rapid and, increasingly, sustainability has become a key differentiator in bank markets. As has already been seen in today's capital markets, liquidity is greatly improved for green bonds versus traditional bonds, and bank financing is expected to follow suit over the coming years.

The financial community have a huge opportunity to make an impact. Commercial banks bring with them strong structuring experience and well-resourced execution teams that can quickly familiarise themselves with the technical and market background of the project. Lending appetite and ticket size may vary from bank to bank and will be highly dependent on the financing structure and perceived risk profile. Some hydrogen project sponsors have actively sought to involve banking partners in their early-stage projects in order to familiarise them with the sector, test initial financing parameters and identify any bankability concerns. This will serve to prime the potential liquidity pool for future financings and sponsors will benefit from the establishment of bankable project structures and documentation packages and relationships with lenders who will become familiar with the underlying technologies, markets and associated risks.

Institutional loan providers are becoming increasingly active in project finance transactions in Europe, particularly if the project benefits from stable and predictable cashflows, limited technology risks and experienced sponsors. Like commercial banks, these institutions have a strong focus on sustainable transactions and it is expected that, once familiar with the construction and technology risks associated with hydrogen production and use, their ticket sizes can be larger and they will be able to consider longer tenors in general (subject to project-specific restrictions).

Subsidy/grant considerations

Consensus across industry and policymakers is that a robust support regime will be key to the uptake of emerging hydrogen technology, in particular in its early stages of development. The example of the development of wind and solar power generation markets off the back of strong subsidy support is very relevant to the hydrogen space. Green hydrogen is enjoying unprecedented

political momentum, having gained strong governmental support that has developed from general support to specific target-setting and identified sources of funding, particularly at EU and national level within the EU bloc but with similar measures being initiated in other markets.

The EU's Green Deal sets a target of at least 6GW of renewable hydrogen electrolyzers from 2020 to 2024, with production targets of up to 1MT of renewable hydrogen to decarbonise existing hydrogen production, eg in the chemical sector, and facilitating take-up of hydrogen consumption in new end-use applications such as other industrial processes and possibly in heavy-duty transport. Support for demand-side policies has also grown and the European Commission is now considering various options for incentives at the EU level, including the possibility of minimum shares or quotas of renewable hydrogen or its derivatives in specific end-use sectors.

Proposed strategies include the use of mechanisms such as contract-for-difference applied to carbon costs, which could bridge the gap between current carbon pricing and the pricing required to make hydrogen cost-competitive with conventional fossil fuels across applications identified as being strategically important. Such a structure has also been proposed to bridge the premium incurred for green hydrogen use in industries with existing hydrogen demand where it is currently met with grey hydrogen.

However, details on how such a scheme will work in practice are not yet available and the exact measurements and taxonomies that will be applied are not specified in the existing EU strategy paper. As such, a comprehensive unified system of support is not yet in place and we instead see today's projects supported by grants and subsidies extended on a case-by-case basis supported by national policies.

The development of incentive schemes for hydrogen projects will play an important role in the bankability of projects and the structuring of any project financing. For example, careful consideration will be required to ensure that project parties, including the sponsors and the project's financiers, are comfortable with the allocation of any such incentives or cost savings measures.

If incentives are primarily aimed at equity investors or a project's contractual arrangements and cost savings, then the project lenders may want to benefit indirectly from these measures. This may play out through the repayment terms, any cash sweep and/or the cash waterfall mechanics. Equally, from a political and regulatory risk perspective, project lenders are likely to focus on the anticipated duration of incentives and, if crucial to the economics of a project, may require comfort that the measures will be in place until final maturity of the debt.

Due diligence on small-scale projects

In the early stages of the development of the hydrogen sector, projects are likely to be on a smaller scale and are likely to focus on the supply of green or blue hydrogen to those industries with an existing demand for hydrogen. Sponsors are likely to seek shorter timelines to bring these pilot projects to market, reach financial close and begin commercial operation, and are likely to try to minimise the overall due diligence scope in order to simplify the financing process and meet shorter development timelines. Lenders, while requiring education in this emerging field, may be amenable to this approach on the basis that key risk areas are sufficiently addressed with the involvement of suitably experienced consultants/advisers and scopes of work that provide appropriately detailed analysis of these areas.

Technical due diligence is the most prominent of the risk areas presented by a relatively immature market. While the electrolyser technology underpinning green hydrogen production is well established, the scale and nature of its application envisaged in existing and proposed green hydrogen projects has few precedents. In particular, the risks surrounding cost overruns, construction completion and adequate performance during operation will be a primary focus of associated due diligence.

This may be mitigated to some extent by the provision of turn-key contracts by electrolyser manufacturers or EPC contractors. However, risk remains at the interface between the electrolyser and the transportation infrastructure required to supply the produced hydrogen to the end-user. Additionally, producing and handling high-pressure streams of both hydrogen and pure oxygen inherently poses process safety risks that require ongoing attention and a strongly embedded safety culture. The experience and track record of the operator are of key significance in this regard.

Given general governmental support for hydrogen growth policies, at this early stage of pilot projects lenders may be more willing to rely on the expertise of sponsors and technical advisers than would normally be seen in typical project financings in order to see projects finished and operational, which will open the door for future financings.

Legal due diligence will be important in order to provide an independent review of the legal and regulatory framework in which any hydrogen project is developed, along with careful structuring of contractual arrangements, project agreements, permits/licences, and other bankability issues from a legal perspective, including the security structure and enforceability.

A specific focus of legal due diligence is likely to include a review of the regulatory risk to which the project is exposed. While the overall regulatory risk is likely to be low given the strong governmental support for hydrogen growth policies, it remains the central element for the

success of these early-stage projects. Of particular focus will be any risk surrounding subsidy/grant applications and the securing of subsidies related to both the project's construction and operation phases.

Environmental and social considerations, while typically a focus of due diligence for any energy project, may be less likely to raise issues for projects of limited scale and located adjacent to existing hydrogen-using industries. The very nature of green hydrogen production puts these projects in a low-impact category where the only by-product is oxygen. It is also likely that those regions in which there is political support for hydrogen projects will also be those with robust environmental and social regulation. Elsewhere, and as the scale of these projects grows, environmental and social due diligence will have a greater importance.

Conclusion

Hydrogen's versatility and potentially broad applicability across a wide spectrum of sectors has encouraged a cross-sector approach to client engagement and to the analysis of opportunities presented by the hydrogen value chain within commercial banks and other financial institutions. This broader viewpoint has led to an appreciation of the potentially transformational role that hydrogen could play in tomorrow's energy landscape, but this enthusiasm is tempered by an appreciation of the technical and commercial challenges posed by widespread adoption of hydrogen.

As the size and complexity of hydrogen projects grow, project finance is likely to play an important role in the expansion of the sector. This will, of course, depend on market appetite for hydrogen as a replacement to traditional fossil fuels, which will be greatly impacted by the precise strategies enacted by governments and the level of regulatory incentives available. Demand still needs to be grown across applications, costs need to continue their downward trajectory, and a wide range of delivery infrastructure needs to be built.

While today only a small number of commercial-scale projects exist and fewer still project financings have closed in this emerging sector, there is growing evidence of active participation of project finance lenders in the hydrogen sector even in the early stages of its commercial development. These few commercial-scale projects will act to test the financing parameters and establish bankable project structures and documentation packages that can be relied on to expand the sector. By getting involved at an earlier stage, lenders will already have a better understanding of the industry, key players and technology and will be better placed to be able to provide timely expertise and financial support to this growing market. If the global economy transitions to hydrogen in a meaningful way, over time there will be a role for project finance right across the value chain. ■