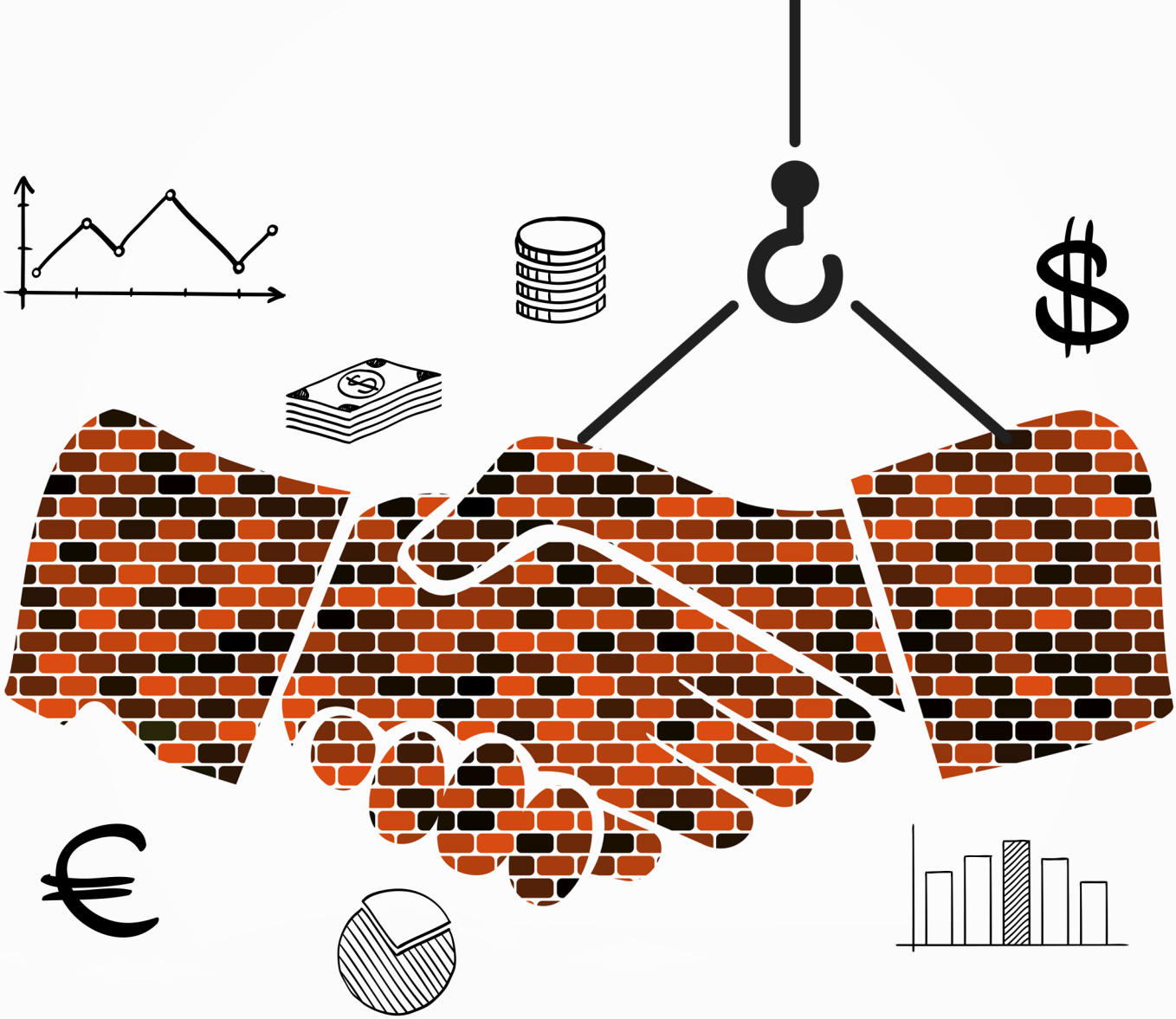

BUILDING INVESTOR TRUST IN HYDROGEN PROJECTS

Lauren Davies, Andrew Nealon, Alistair Wishart and Garrett Finch, Vinson and Elkins, explain the role of project financing in the development of low-carbon hydrogen projects.

The finance sector has a significant role to play in the global transition to net zero, with project financing being a customary means of raising funds in the energy and infrastructure sectors. This article will examine some of the key challenges associated with using a 'traditional' project finance model in the development of low-carbon hydrogen projects and will also consider some potential solutions.

What is a 'traditional' project finance model?

Project financing is a well-established method of raising long-term debt for major energy and infrastructure projects.

As a financing structure, it has been central to the development of energy and power infrastructure globally as it has certain benefits over other financing structures. Project-financed projects are structured with special purpose vehicles as borrowers, and financiers look to the cash-flow generated by the project for the repayment of their loans. From the perspective of a project's sponsors and equity investors, financial indebtedness incurred by a project company will customarily be off-balance sheet for a project's equity holders, subject to the terms of any agreed sponsor guarantees or support, and therefore may be preferable to raising debt at the corporate level. Moreover, due to the broad range of potential financiers involved in the project finance market, 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 other forms of financing. Because project assets are ring-fenced and there is limited or no recourse to the assets of the sponsors and equity investors, it is necessary to structure any project financing in a manner that mitigates (to the extent possible) the level of risk that a project company is exposed to. The level of willingness of prospective financiers to lend to a project (known as 'bankability'), is closely aligned with the risk profile of the project.

Challenges

Technology/technical

Project finance tends to gravitate towards projects where risks can be identified, mitigated and allocated in a manner that is acceptable to both lenders and the key project participants. Proven technology is particularly desirable to a project financing; if something goes wrong with the project and lenders are not able to rely on any revenue stream or a strong sponsor paying back the debt, they might not have any way of getting their loans repaid. As a result, project financing in an established sector is generally more attractive to potential financiers and equity investors because well-tested and proven technology decreases project and operational (and therefore overall transactional) risks.

Because large-scale clean hydrogen production currently relies on technologies that are still evolving and rapidly scaling up in size and complexity, project financiers will focus on mitigating technological risk. For example, the durability and degradation of electrolyser cells and their components will be a key consideration for financiers of green hydrogen projects (or hydrogen made using electricity produced from renewable or other low-carbon sources, such as nuclear) given, amongst other things, the limited track-record of electrolyser deployment at this scale. Optimising electrolyser efficiency can help push down the cost of hydrogen production. However, large improvements in efficiency will entail a trade-off with electrolyser cost. Blue hydrogen projects (when natural gas is split into hydrogen and CO_2 and the CO_2 is captured and permanently sequestered underground) are typically more expensive than grey hydrogen projects, with significant upfront CAPEX required due to the added expense of CO_2 capture and sequestration. In order for blue hydrogen projects to progress, it is critical to scale up investment in developing and deploying carbon capture, utilisation and storage (CCUS) technology to show both its effectiveness and that the risk of CO_2 leakage from geologic sequestration is negligible. As this technology matures, more projects will come to match the risk profile that banks are looking for due to the decreased technological risk and accepted mitigants of CO_2 leakage risk through perhaps contractual indemnities or insurance. For now, banks that are willing to be flexible with their project finance risk criteria may benefit from a substantial early-mover advantage.

While the total number of announced projects for clean hydrogen production is rapidly growing (annual production of clean hydrogen could reach 38 million t in 2030 if all announced projects are realised), only 4% of potential production developers have taken a final investment decision (FID). Banks have thus far not been able to provide the debt financing necessary for these two technologies to significantly scale up and, as a result, many projects are simply not going ahead.

Financiers can, however, better understand technology risk by performing a more robust diligence exercise, focusing on the adequacy and scope of construction contractor/manufacturer performance warranties and how they respond to the underperformance of electrolysers. As technology proves itself, the associated risks will diminish, and production costs will decrease accordingly. In fact, green hydrogen is currently projected to become cost competitive with grey hydrogen (or hydrogen produced by natural gas) by 2050. This downward trend of production costs, coupled with expected production increases from 0.2 million tpy in 2022 to 25 million tpy in 2030, and electrolyser capacity expected to swell from 2 GW to 242 GW in the same period, suggests a market ripe for growth.

In the meantime, many projects in this sector will require some form of support. This may take the form of sponsor support to provide additional equity in the project in limited circumstances (such as cost overruns, construction delays or underperformance) or to guarantee the repayment of the debt until completion of the project. The level of support a sponsor is able to offer will depend on the specific circumstances of the project under consideration.

Hydrogen lacks an established market

In order to secure project financing, sponsors generally need an established customer base, or creditworthy offtaker, that can demonstrate a certain revenue stream. Low-carbon hydrogen lacks a standardised market and therefore long-term offtake contracts are typically required to make projects viable. Ultimately, market and offtake risk are 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 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. While the costs of green hydrogen are higher than other hydrogen sources, government support may be required to make these projects economical. 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 lead to other opportunities for sales, resulting in project lenders becoming even more comfortable with offtake risk.

Recent commentary on the state of the offtake market indicates that only a very low portion of the clean hydrogen production capacity planned by 2030 has identified offtakers, with potential offtakers reluctant to commit to long-term contracts in the face of higher than expected clean hydrogen prices and the uncertainty surrounding them. Without secure long-term offtake contracts, hydrogen project developers that nevertheless push ahead face the risk of developing an asset that ends up as a liability before the end of its anticipated economic lifetime (or 'stranded assets'), preventing the hydrogen market from gaining faster momentum. As with technological risks, project financiers who accept the risks associated with the still-developing hydrogen market and become involved at this earlier stage will be better placed to take advantage of the market in the future by developing strong industry knowledge and relationships in a market poised for growth.

Government support

Ultimately, however, the high capital requirements of hydrogen projects mean that, at least in the short-term, most are unlikely to be bankable without some form of government support. This might be a 'top-up' to revenues from the sale of hydrogen at a market price competitive with cheaper hydrogen sources or natural gas, which has been adopted in the EU, with the European Hydrogen Bank auction, and is likely to be adopted in the UK under the Low Cost Hydrogen Agreement model. Alternatively this could be a tax credit, as has been adopted under the Inflation Reduction Act in the US, which enhances return on investment for the investor by reducing tax expenses.

Many governments have announced programmes to this effect. Notably, the Japanese government released a revised Hydrogen Basic Strategy in June 2023. The strategy has four key goals:

- To generate public and private sector investment in hydrogen worth 15 trillion yen over the next 15 years.
- To increase the supply of hydrogen and ammonia in Japan from 2 million t to 3 million t by 2030, then to 20 million t by 2050.
- To expand the amount of Japanese-made water electrolysis equipment to 15 GW by 2030.
- To reduce the cost of hydrogen supply. Overall, this strategic policy is emblematic of the Kishida administration's wider attempts to promote the establishment of international hydrogen supply chains.

The EU aims to reach 10 million t of domestic renewable hydrogen production and an additional 10 million t of imported renewable hydrogen by 2030 as part of the REPowerEU Plan, and there have been substantial recent steps by the EU to make this a reality. On 20 June 2023, the European Commission (EC) published two delegated acts outlining detailed rules on the EU definition of renewable hydrogen. The acts define the production requirements for 'renewable fuels of non-biological origin' (RFNBO) (i.e., green hydrogen and derivative fuels, such as e-ammonia, e-methanol, e-kerosene and e-natural gas). They apply equally to production projects located in the EU, as well as export projects selling to the EU. Both acts are necessary for the fuels to be counted towards EU countries' renewable energy targets, and will provide regulatory certainty to investors as to what format of project will be able to produce 'RFNBO compliant' green hydrogen. Some regulatory uncertainties still remain under the delegated acts, particularly the eligibility of renewable power projects which have received operating aid or investment aid to supply power to an 'RFNBO compliant' green hydrogen project. As well as regulation, the EU is providing funding support to hydrogen projects. In November 2023, the European Hydrogen Bank launched an €800 million pilot auction of renewable hydrogen price subsidies, with an additional €2.2 billion auction planned in early 2024.

To support first movers, governments will need to keep moving forward with clear regulations and associated certification schemes. International cooperation needs to be reinforced to prevent lack of alignment between these efforts, which could lead to market fragmentation. This is even more important given that the international trade of hydrogen and hydrogen-based fuels is crucial to a net zero future. As part of its net zero emissions by 2050 goal, it is envisaged by the International Energy Agency (IEA) that more than 20% of demand for merchant hydrogen and hydrogen-based fuels will be internationally traded by 2030. Although momentum is strong, much more needs to be done. By 2030, the Hydrogen Council estimates that committed capital must increase more than twenty-fold to achieve emissions reductions necessary to meet the IEA's net zero target.

Conclusion

Low-carbon hydrogen projects have a significant role to play in the transition to net zero, and project financiers will continue to maintain a crucial role in the provision of funding for the capital costs of such projects. While the market remains under development, there may be significant opportunities available to banks that are willing to be more flexible with their risk criteria. As hydrogen and CCUS technologies continue to mature and governments continue to implement policies to facilitate the development of a merchant market for hydrogen, the project finance structure will continue as an invaluable tool in the financing of these low-carbon hydrogen projects.