LOCK-IN ALL OVER THE WORLD

How to test for carbon lock-in

2021

frontier economics

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How to test for carbon lock-in

Carbon lock-in occurs when an emissions-intense asset remains in use, even when substitutes with lower emissions and higher overall net social benefits are available. Lock-in risk is a particular concern for infrastructure associated with natural gas. Globally, we do need some natural gas investments now. Natural gas is much less emissions-intense than coal and oil, and can be a transitional fuel on the path to Net Zero. Natural gas electricity generation assets can also help provide a flexible complement to systems that include a high proportion of renewables. But other assets, such as storage, can provide this function too, and while they may be more expensive, they are not associated with carbon emissions. So how can we be sure that once gas investments have been made, we will actually phase out their use over time, in line with a path to Net Zero? The risk is that that there will be temptation to continue to use them once major costs have been sunk. Fortunately, there are ways to reduce this risk, by choosing investments carefully.

EXACTING STANDARDS WITH BLUNT INSTRUMENTS

To reduce the risk of locking in carbon-intense investment in gas assets, it might be tempting to apply blunt instruments. Blanket bans and phase-outs have been widely seen in relation to coal, and are successfully helping to drive major emissions reductions across Europe, for example in Romania and Germany. In addition, some institutions are applying strict eligibility requirements for investment or capacity markets that explicitly exclude gas. For example, the European Investment Bank intends to phase out funding for unabated fossil projects (including gas) by the end of 2021.[1]. The UK Government, in its latest Capacity Market Consultation is considering limiting eligibility for multi-year

EXEC SUMMARY

Some gas sector infrastructure investments may be helpful in the transition to Net Zero, including flexible electricity generation to support renewables. But Governments and investors are getting increasingly worried that investing in gas assets now could make it more difficult or more expensive to meet climate targets later, by "locking in" emissions-intense activities over the long term.

This briefing considers how investors and policy makers can differentiate the helpful and climate target-consistent investments from those that increase the risk that targets will be missed.

[1] https://www.eib.org/en/press/all/2019-313-eu-bank-launches-ambitious-new-climate-strategy-and-energy-lending-policy

agreements in the Capacity Market to low carbon types of capacity[2].

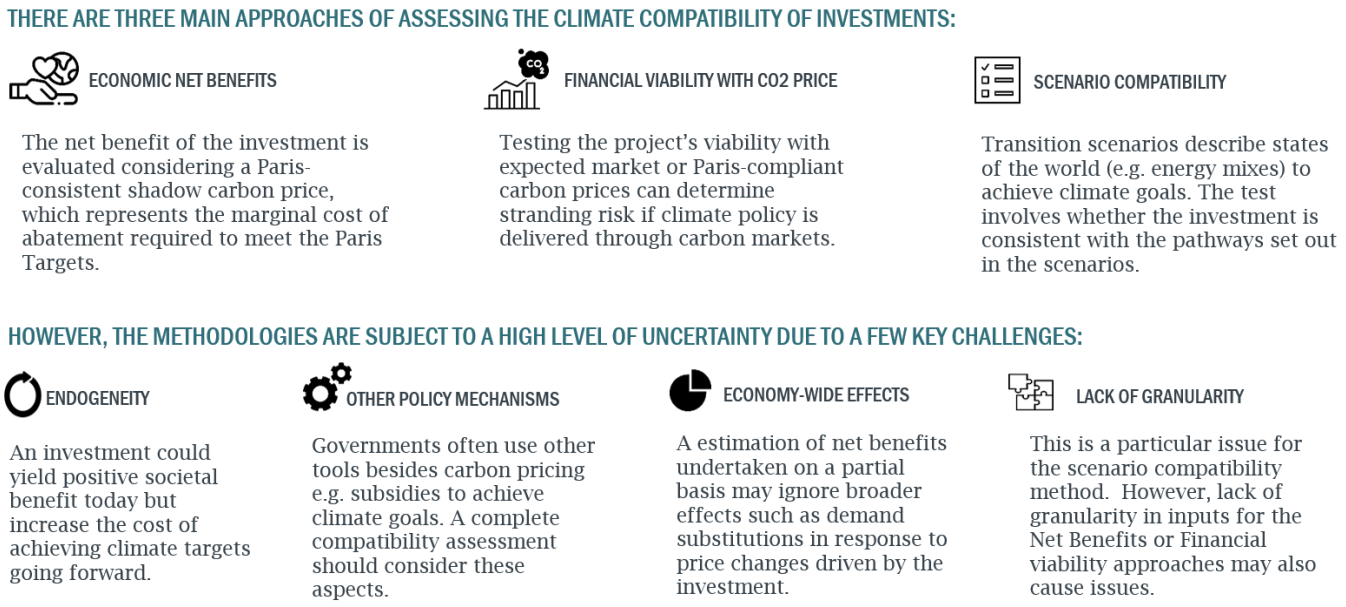
Blunt instruments can be effective if governments are clear on the final objective, like a coal closure. But if the situation is more nuanced, they could increase the costs of the energy transition. They could also increase emissions, for instance, where avoiding investment in new gas generation extends the life of coal generation. In fact, coal-to-gas switching provides around 8% of the emissions reductions needed in the IEA's Sustainable Development Scenario[3].

CREATING A BETTER LITMUS TEST

Explicitly testing for carbon lock-in before making investments may be a better option. How can this be done?

Policy makers and investors in the climate space will often turn first to cost benefit analysis and scenario-based assessments. But cost benefit analysis can be misleading, if carried over insufficiently long time periods. And it can be difficult to assess whether an investment "fits" within an individual climate target scenario (Figure 1).

FIGURE 1 THE LIMITS OF CBA AND SCENARIO BASED APPROACHES TO ASSESSING LOCK-IN



Source: Frontier Economics

A better approach would be based on an understanding of the drivers of lock-in. This first requires the identification of a low carbon alternative that could provide the same services. For a gas fired power plant, this could be a hydrogen power plant, or a CCGT with CCS. Both of these low carbon options could deliver

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005672/capacity-market-cfe.pdf

[3] https://iea.blob.core.windows.net/assets/cc35f20f-7a94-44dc-a750-41c117517e93/TheRoleofGas.pdf

both the dispatchable generation and the flexible capacity needed in a low carbon electricity system. Figure 2 describes the drivers of lock-in and the tests for each.

TABLE 2 TESTS

	DRIVER OF LOCK-IN	KEY TEST QUESTIONS FOR A CCGT
Technical factors	Not all gas assets can be easily or cost-effectively converted to allow low carbon use in the future.	Short lifetime – given its expected technical lifetime, will the CCGT have retired before a set date (e.g. 2035)? Conversion costs – is it possible to use the CCGT for low-carbon purposes without incurring significant additional costs or losing significant revenue?
Economic factors	Gas investments today might look good to investors, because they are betting against future rises in carbon prices. Then once the investment is made and once the costs of the gas asset are sunk, the marginal costs of continuing to use that gas asset may be very low. This could make it harder for future low carbon options to enter the market.	Once the investment costs of the CCGT have been sunk, will it be cheaper to continue running it instead of investing in a low carbon substitute?
Market factors	If the asset has market power for example, it could make it more difficult for lower carbon options to enter the market. Contractual structures such as 'take or pay' contracts could also drive the continued use of the emitting asset.	Is the operator of the CCGT likely to have market power?
Political factors	It may be difficult to close down the activities associated with an asset, particularly if it is associated with lots of jobs or strong lobby groups.	Is the CCGT in a sector already characterised by influential lobby groups? Would it provide (directly or indirectly) a large level of employment?

Source: Frontier Economics

Investors like the EBRD are beginning to develop and apply tests for lock-in based on principles and tests such as those described above[4]. Applying these approaches has the potential to allow helpful gas investments to be made, while reducing the risk that these continue to emit as we approach Net Zero.

Applying a test which relies on bespoke analysis is clearly feasible when considering investments in specific assets. However, in some situations, a more rules-based approach will be required (e.g. in defining eligibility for long term contracts in capacity markets). The challenge for policymakers is how to use the insights from the approach described above to calibrate such rules.

[4] www.ebrd.com/documents/comms-and-bis/ebrd-paris-alignment-methodology.pdf

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