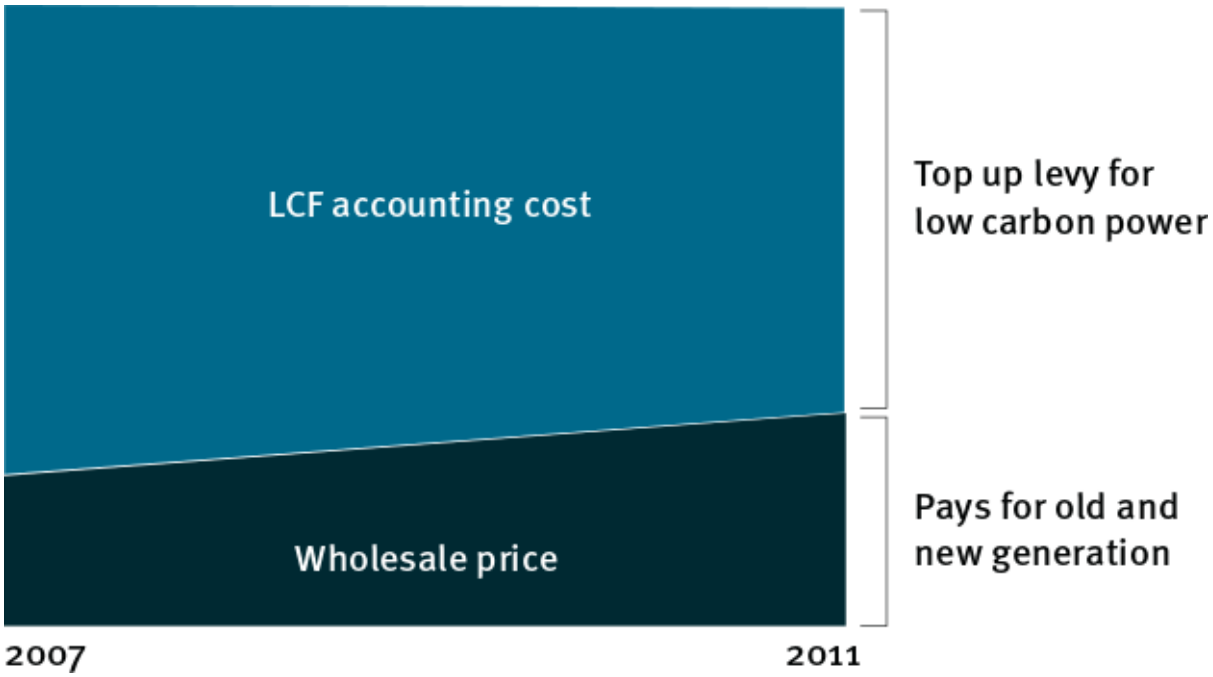
Beyond subsidy: How the next levy control framework can cut carbon at least cost

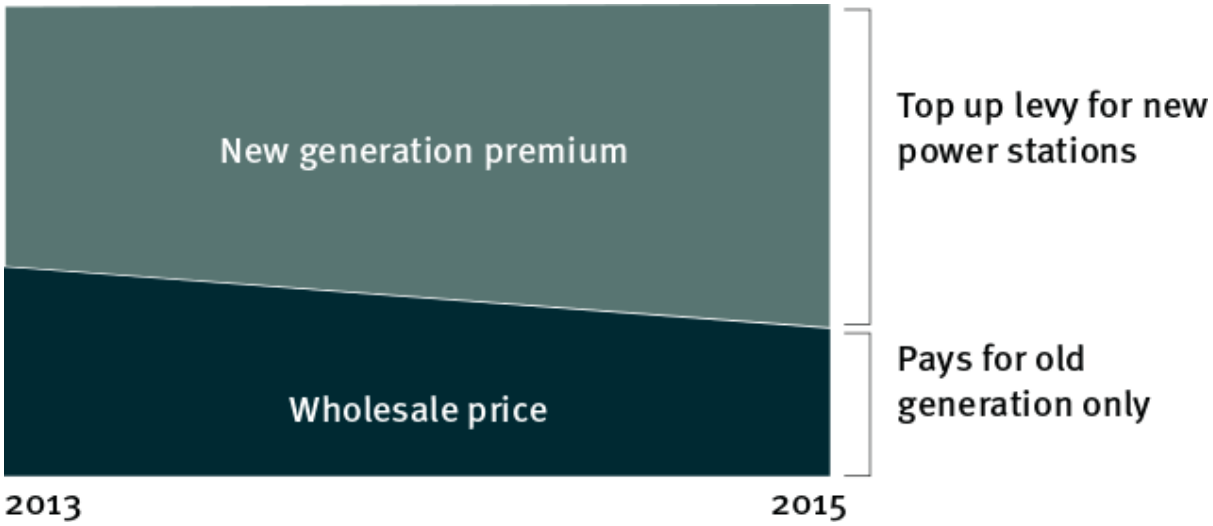
Appendix 2: How different technologies affect the LCF's accounting cost and the net innovation premium

Introduction

The Levy Control Framework (LCF) is designed to limit spending on low carbon power, which is paid for by a levy on consumer bills. It is currently calculated by assessing the total amount of money above the wholesale price of electricity which is levied to support higher cost low carbon generation. At the time the LCF was set, new gas power stations could be built solely on the basis of the wholesale price. The diagram shows how the levy was envisaged when it was developed:

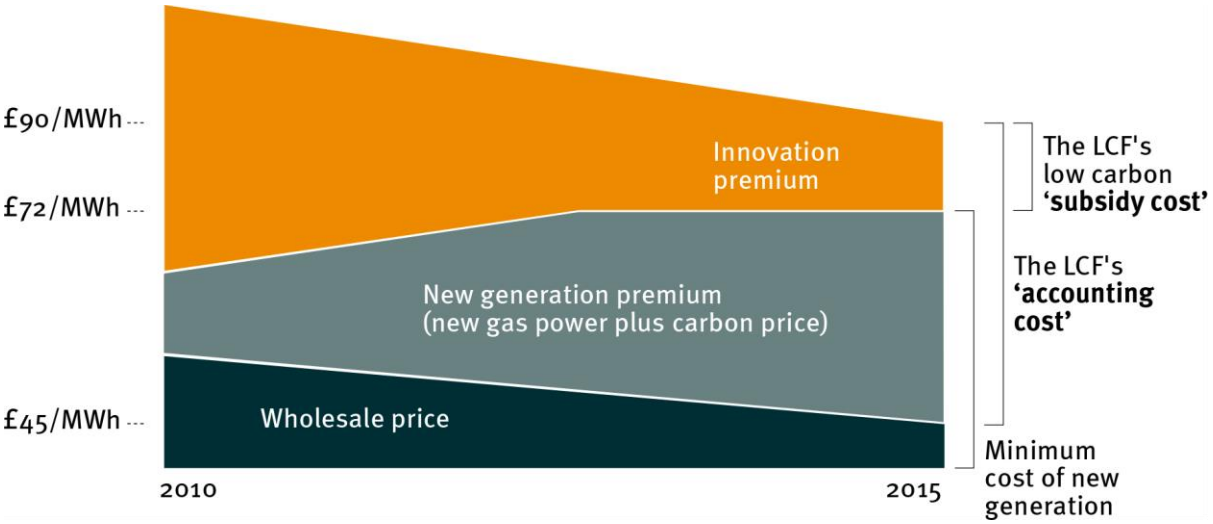


However, since the LCF was developed, the wholesale price has fallen significantly, meaning that developers of all forms of new power generation, both high and low carbon, cannot build new power plants without an additional payment, which we have called the **new generation premium**. For high carbon power, this payment is made via the capacity market, as shown below:



Because the wholesale price has fallen in cost, this now means that, for low carbon generation, the LCF now must cover both the new generation cost, which is the price at which any generation could be built, and an **innovation premium** to cover the additional cost of low carbon generation. This is shown on the diagram below as the LCF's **accounting cost**, which covers both the new generation premium, and the additional innovation premium, which is paid to new technologies so they can come down in cost and compete with older, more emissions-intensive forms of generation.

Importantly, this now means that genuine subsidy is the cost of low carbon power that is above the cost of the alternative form of power, which is a CCGT (a combined cycle gas turbine power plant) facing a carbon price consistent with meeting the UK's carbon reduction goals. The diagram below shows this:

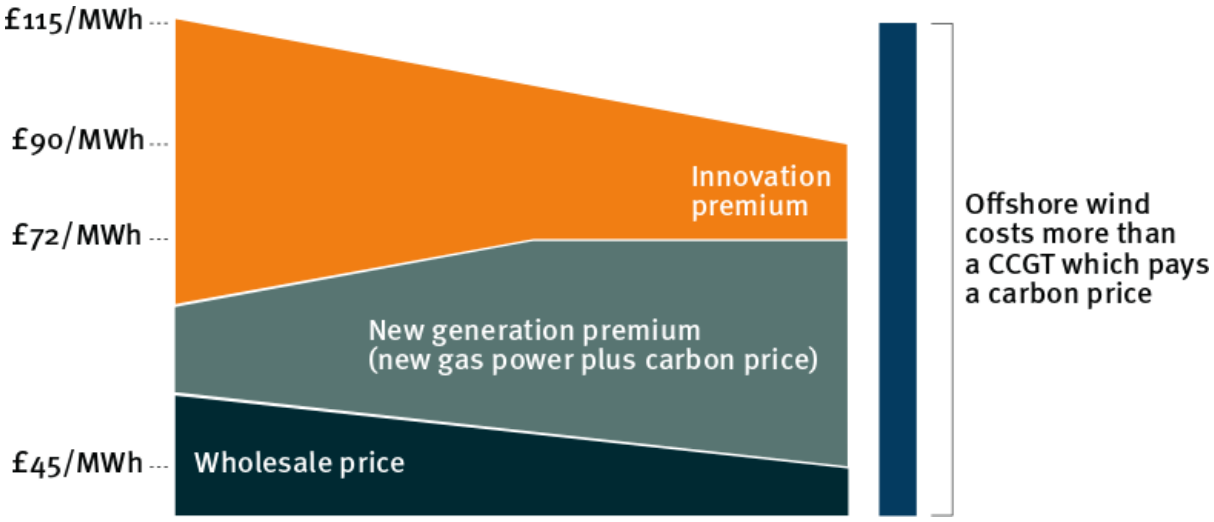


How different technologies affect the LCF's cost

In *Beyond subsidy: how the next levy control framework can cut carbon at least cost*, we show how a wider mix of technologies can bring down the total net cost of subsidy for low carbon power. To understand how this occurs, the following examples show three different low carbon options, which differ in how they interact with the cost of generation and the cost of the LCF.

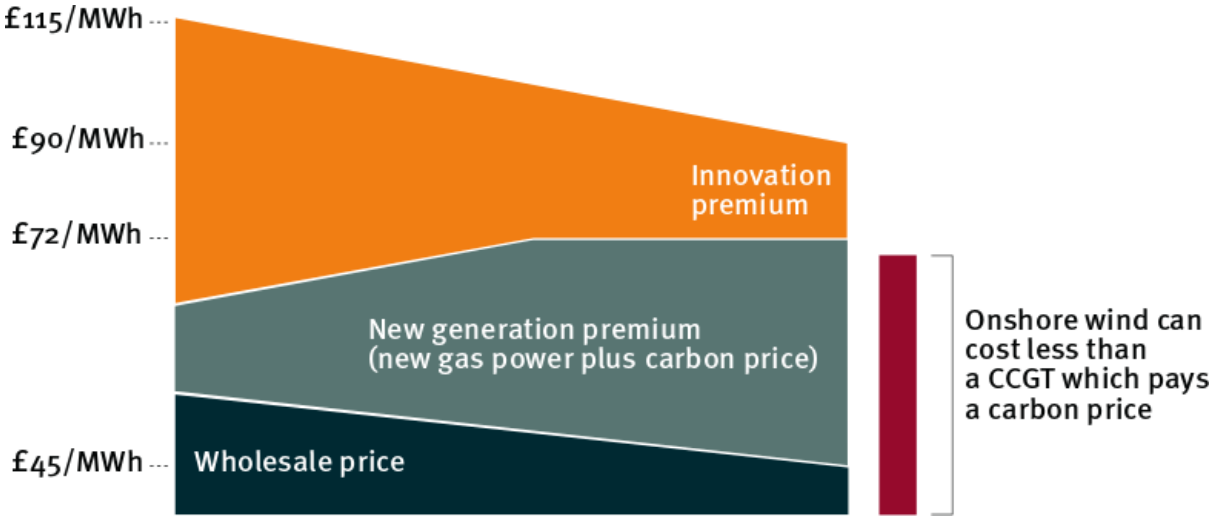
Example 1: Offshore wind, a subsidised low carbon power source

The cost of offshore wind, represented in blue below, is above the wholesale price and the new generation premium, so it requires subsidy as an innovation premium. As an immature technology, this is justified based on the expectation that offshore wind will fall in cost and will be able to compete in the future. The same argument could be made for tidal power, for example.



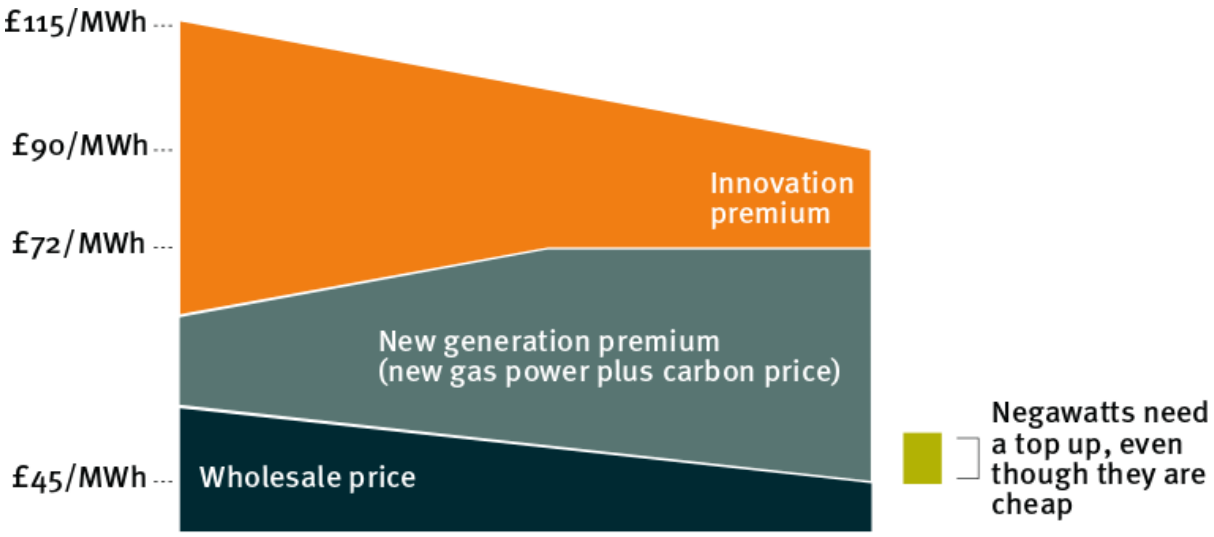
Example 2: A subsidy free onshore wind farm

The falling costs of onshore wind farms make it possible to build them at or below the cost of a CCGT plus the carbon price. This would be subsidy-free, but would still require a top up payment (the new generation premium), which falls within the LCF's accounting cost. This argument applies equally to solar farms, if their costs continue to fall to a competitive level.



Example 3: a negawatt

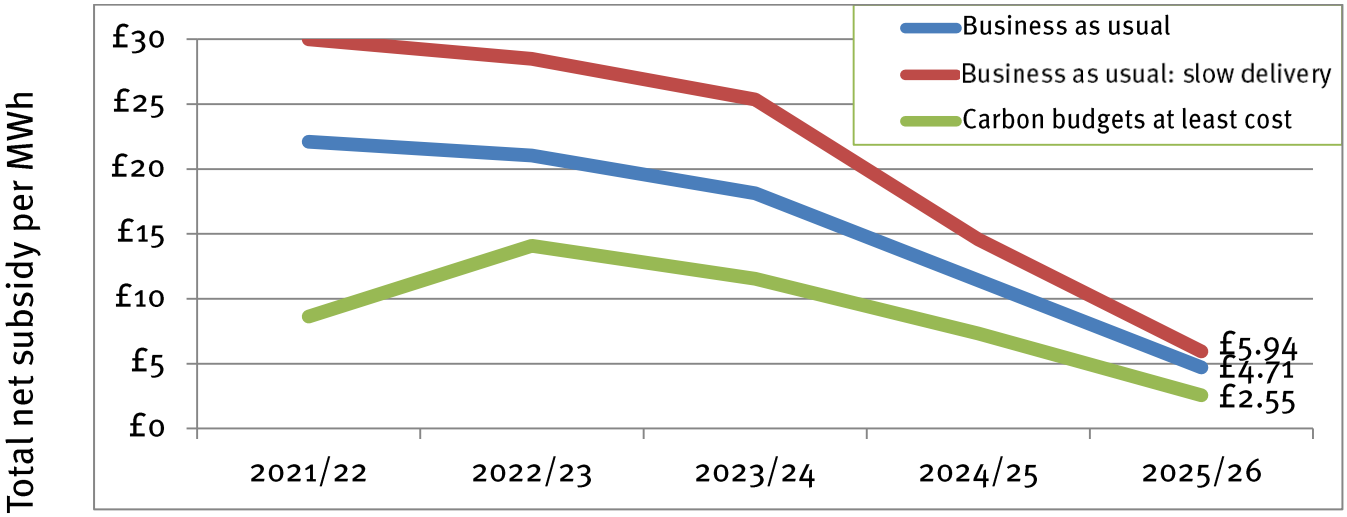
Negawatts, achieved through efficiency improvements, are the cheapest means of meeting our energy demand. For this study, it is useful to think of negawatts as if they were a form of generation, because they reduce electricity demand and thereby reduce the need for new power plants. However, negawatts differ from generation technologies in a very critical way for the purpose of the LCF: they do not receive a wholesale price payment. Because of this, their full cost must be recovered from a levy. This means that they increase the LCF's accounting cost. But, because negawatts are cheaper per MWh than a CCGT plus carbon (which receives both the wholesale price and the new generation premium top up), they do not require subsidy and it still makes sense to purchase them.



How a wider mix of technologies reduces net subsidy

Our preferred scenario, called 'meeting carbon budgets at least cost', combines subsidised and unsubsidised low carbon power with negawatts to achieve a lower net subsidy, even though the LCF's accounting cost is higher. When the total cost of subsidy is divided by the total amount of generation the cost of subsidy per unit of low carbon power is low.

In *Beyond subsidy: how the next levy control framework can cut carbon at least cost*, we model how the different amounts of generation and the different levels of subsidy (or lack thereof) affect the total net subsidy paid per MWh of generation supported by the LCF between 2021-22 and 2025-26. We find that the 'meeting carbon budgets at least cost' scenario is than for the other two.



This is because, in 'meeting carbon budgets at least cost':

- the total low carbon supply (including negawatts) is 90TWh, higher than other scenarios;
- 'subsidy free' renewables (onshore wind and solar) are used. They do not require an innovation premium payment but do supply low carbon electricity;
- negawatts are used. They require a levy payment, but do not require an innovation premium payment, and they reduce the amount of supply required, which is equivalent to generation;
- compared to the 'slow delivery' scenario in which only 1GW of offshore wind is deployed each year, maintaining deployment of offshore wind at around 2GW per year allows the technology's innovation premium to fall more rapidly. The business as usual scenario also deploys 2GW of offshore wind per year, so it also benefits from this reduction in innovation premium.