sandbag

Financing Deep Decarbonisation in Industry

Using Contracts for Difference against the carbon price **June 2015**

In a nutshell

Deep emissions reductions in the European power sector are already occurring, but deep emissions reductions in industrial sectors have not incentivised and the sector has been largely sheltered from the carbon price to date. Investing in technologies to deliver deep decarbonisation for industry, such as Carbon Capture & Storage (CCS), requires funding to support the high capital and operating costs. The EU Emissions Trading Scheme (ETS) carbon price (even after the Market Stability Reserve reform) will not be raised sufficiently or become bankable enough to make financing such investments likely in the EU. A combination of additional Member State and EU support will be needed, well beyond the proposed Modernisation and NER 400 funds. A supporting policy should be explored based on Contracts For Difference (CFD), similar to the UK's electricity CFDs, but pegged to the carbon price rather than the wholesale electricity price. ETS auction revenues offer a possible funding source.

About Sandbag

Sandbag is a UK-based not-for-profit think tank conducting research and campaigning for environmentally effective climate policies.

Our research focus includes reform of the EU Emissions Trading Scheme, the EU 2020 and 2030 climate & energy packages, Carbon Capture Utilisation & Storage, and the phase-out of old coal in Europe. The International Centre for Climate Governance ranks us as a top global climate think tank.

For more information visit our website at www.sandbag.org.uk or email us at info@sandbag.org.uk

What is a Contract For Difference?

A CFD is a private law contract between a recipient – in the case of UK power CFDs, an electricity generator - and an underwriter – in the UK this is a government-owned company, the Low Carbon Contracts Company Ltd (LCCC). A CFD guarantees the generator is paid, over a predetermined number of years, the difference between the 'reference price'– the average market price for electricity – and the 'strike price' – a price for electricity generated that reflects the cost of investing in a particular technology. This allows projects based on less mature technologies to gain a foothold in the market until such time as the technology becomes cost-competitive and no longer require a CFD. Funding for the contracts is raised from a statutory levy on all UK-based licensed electricity suppliers.[1] In the UK, Contracts for Difference were introduced in the Energy Act 2013 as the main means of securing investment in low-carbon power technologies. They have been vital for winning investment in the largest offshore wind industry on the planet, for example, and the UK now has more offshore wind power installed than the rest of the world combined.[2]

Qualifying offshore wind projects in 2015/2016 can receive a CFD worth £155/MWh.[3] With a current wholesale electricity price of approximately £45/MWh, the project would receive the difference, i.e. £110/MWh. A CFD of £155/MWh equates to £300/tCO_2 abated, as the current carbon intensity of the UK grid is around 500kgCO_2/MWh.[4] That high price is justified on the basis of providing a much-needed incentive for investment in indigenous, low carbon sources of energy with the potential for significant cost reductions over time.

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[1] *https://emrsettlement.co.uk/about-emr/contracts-for-difference/ Accessed on June 5 2015*

[2] *http://www.renewableuk.com/en/renewable-energy/wind-energy/offshore-wind/index.cfm*

[3] *This value is index linked so that it rises with inflation. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/404405/Contract_for_Difference_Final_Allocation_Framework_for_the_October_2014_Allocation_Round.pdf*

[4] *More information on UK carbon intensity from the Committee on Climate Change https://www.theccc.org.uk/charts-data/ukemissions-by-sector/power/*

By tying the amount the generator is paid to the market electricity price, the generator is guaranteed stability of income, but the consumer does not overpay in the event of electricity prices rising over time. Detailed rules about saving consumers money in the event of a project being re-financed after construction are also included in the contract as well as penalties for failing to deliver on a contract once signed. Strike prices are index linked over the time of the contract.

How are CFDs awarded?

To be eligible for support under the existing CFD framework, generators must meet the government's minimum size and low carbon technology criteria, receive no other sources of government funding (for example, from Renewables Obligation payments), and have necessary planning consents and connection agreements with National Grid.[5] CFDs typically have a 15-year term, although this has varied for nuclear and tidal generation contracts.

Because the burden of investment in low carbon energy generation is passed on to consumers, the Levy Control Framework has been established to cap the maximum total projected cost to consumers of CFDs, the Renewables Obligation (RO) and Feed-in Tariffs at £7.6 billion (2011/12 prices) in 2020/21 (DECC, 2013). The cap for the 2015/16 financial year stands at £4.3 bn.

A maximum strike price is set on a per technology basis, taking into account the particular costs associated with investing in each low carbon technology. The strike price for each project is then determined by bilateral agreement (for less established technologies), or a competitive bidding process for established technologies. The benchmark strike price for individual technologies is adjusted annually to reflect anticipated changes in investment costs and has already fallen significantly.[6] For example, solar photovoltaic energy sources has seen a large reduction in strike price (from £120 in 2013 to below £80/MWh in 2015)[7] while the strike price of wave and tidal energy generation demonstration projects will remain at £305 per MWh – almost double the level of the technologies with the second highest strike price.

As the government extends CFD allocations to Nuclear and CCS projects, the strike price for these technologies will take into account the long term costs of storing waste products. Because the Nuclear and CCS sectors currently contain too few players to form a competitive market for CFDs, contracts are currently allocated through negotiated bilateral agreement, but we believe that if the concept of CCS was broadened to include any technology that permanently stored CO_2, a competitive market and lower strike prices would naturally follow.

Finally, although the generation of low-carbon power is the major reason for setting up CFDs, it's not the only reason - energy independence, diversity of supply, and the benefits of being at the cutting edge of important technologies. These same benefits apply to CFDs for deep decarbonisation in industry.

How are CFDs relevant to deep industrial decarbonisation?

Protected as industry is from the (currently very low) ETS carbon price, investment in decarbonisation of European industry has been slow, beyond efficiency improvements. Nonetheless, the reality of climate change requires that emissions from industry be tackled. Declining caps and allocations under the ETS will require a rapid reduction in industrial emissions in future. Because CO_2 is an intrinsic by-product of many industrial processes (e.g. conventional

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[5] *Redmond, G. 2014. The levy control framework (LCF) & contracts for difference (CFD) allocation – what it means for the low-carbon generation mix. DECC (presentation).*
http://www.cornwallenergy.com/cms/data/files/Downloads/EMR_event_140924/2-Gareth-Redmond.pdf

[6] *Department of Energy & Climate Change (DECC). 2013. Investing in renewable technologies – CFD contract terms and strike prices.*
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263937/Final_Document_-_Investing_in_renewable_technologies_-_CFD_contract_terms_and_strike_prices_UPDATED_6_DEC.pdf

[7] *February 2015 CFD allocation round one*
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/407465/Breakdown_information_on_CFD_auctions.pdf

cement production creates around 1 tonne of CO2 for each tonne of product), deep decarbonisation technologies, including CCS and CCU, can unlock investment and allow for increased industrial production in Europe.

A CFD for tonnes of CO_2 abated, pegged to the carbon price, would provide a policy mechanism to stimulate investment in industrial decarbonisation. Currently, an installation in the EU Emissions Trading Scheme that began sequestering CO2 would benefit through the avoidance of emissions, and so would currently avoid costs to the value of €7.50 per tonne of CO2 sequestered. A CFD would, in effect, guarantee a higher carbon price. For example, if the CFD were agreed at €100 a tonne, the installation would be paid €92.50 per tonne sequestered, to top up the carbon price.

This provides a stable long-term horizon for investment in technologies such as CCS, but also means that as the EUETS price increases, the price the CFD has to pay to the installation reduces. Without a CFD, companies have little incentive to invest in CCS since the ETS provides a stick not a carrot and there is a severe lack of confidence in the future level of the carbon price. This absence of an investment cue, means investors and the wider public are at risk of being saddled with high-carbon stranded assets.

How can a CFD for Industry be funded?

All Member States have a large and increasing pool of finance in the form of EU ETS auction revenues. Analysts at PointCarbon estimate Member States will receive as much as €151 billion in total from auctioning from 2015-2025.[8] Such a large source allows for significant Member State support for the first industrial-scale deep decarbonisation projects in Europe.

The narrow scope of NER 300 financing resulted in the majority of its allowances for energy technology being directed towards renewables with little support for industrial decarbonisation (only one CCS project was part-funded). Its successor, NER 400, will aim to redress this imbalance by extending greater support to "low carbon innovation in industrial sectors". The number of allocations set aside for NER 400 will be increased by a third to 400 million allowances[9].

Sandbag has examined the potential impact of NER 400 allowances on emissions abatement in a scenario where all permits are used to fund industrial CCS projects over the period 2021 – 2030. Our model calculates the amount of CO_2 that can be sequestered annually, based on projected NER 400 revenues and the indicative operational costs of geological CCS. For the sake of argument we assume the typical cost of CCS to be £100/€140 per tonne of CO_2 stored, although industrial projects such as Teesside have already suggested total costs significantly below this. This figure is assumed to include capital investment costs in addition to the process of CO_2 capture, transport and storage.

At an indicative price of €140 tCO_2 stored we estimate that between 5.5 and 8.4 $MtCO_2$ can be sequestered annually (or 70 $MtCO_2$ over a 10 year period). This corresponds to annual abatement of 0.3-0.5% of annual emissions from all industrial sectors in the ETS (at 2014 emission levels).

Alternatively, in a scenario in which all revenues from NER 400 allowances are diverted exclusively to CCS in the EU iron and steel sector, just 7% of the sector's total CO_2 emissions can be stored.

These estimates show that the best-case scenario for funding of industrial CCS under NER 400 (where all allowances are granted to industrial CCS projects) produces a relatively small dent in industrial missions. Based on the low proportion of allowances actually awarded to CCS projects relative to other project types under the NER 300 scheme

[8] *Greece, other EU strugglers emerge winners from carbon reforms-data* http://uk.reuters.com/article/2015/05/07/us-eu-ets-revenue-idUKKBN0NS16220150507

[9] *NER300.com. October 2014. Successor programme to NER300, "NER400", agreed.* http://www.ner300.com/?p=363

in phase 3, the actual post-2020 investment in CCS – and consequently the amount of CO_2 stored – is likely to be significantly lower than our calculation suggests.

Given this the proposed NER400 should not be viewed as 'the answer' for incentivising deep decarbonisation in industry and that it should be seen as a supporting measure alongside dedicated Member State policies.

What would need to happen to introduce CFDs for industry?

Contracts for Difference to financially support deep industrial decarbonisation projects, including CCS, should be introduced in all EU Member States. To facilitate this the EU should:

- Create supportive state aid rules that provide guidance on policies to reward deep industrial decarbonisation;
- Include in the 2030 Climate & Energy package a recognition that additional policies are needed to support industrial decarbonisation investment;
- in implementing the 2030 Governance framework enable standardised reporting of Member State investment in industrial decarbonisation, allowing comparison of effort;
- Ensure the NER400/Modernisation Fund rules are compatible and supportive of Member State policies which can include industrial decarbonisation CFDs;
- Assist information sharing between Member States seeking to implement policies for industrial decarbonisation;
- Encourage use of receipts from ETS allowance auctions to fund industrial decarbonisation, rather than compensation payments.

Conclusion

The proposed European funding support sources (NER400 etc.) will not be enough to build a carbon capture industry at scale by 2030. To achieve the deep emission cuts needed, and to make the EU a new home for industry, Member State support mechanisms must be created for the technologies that trigger deep industrial decarbonisation. Whether through Carbon Capture & Storage & Utilisation, or through radical changes to basic processes, the Contracts For Difference model could provide the foundation industry needs to thrive in a sustainable economy.

About this briefing

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