

# Briefing Using Power Purchase Agreements to decarbonise steel

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## Introduction

The price of electricity in the UK relative to Europe and other competitor regions has been a long running concern for energy intensive industries, hindering their competitiveness and their ability to decarbonise through electrification and the use of green hydrogen.

By underwriting ten or fifteen year power purchase agreements (PPAs) between generators and industrial users, the government could provide important industries like steel with access to cheap renewable power at a fixed price.

The steel industry would be particularly suited to this kind of arrangement and could be a test case for other sectors.

This briefing also explains how PPAs could be bundled to form a 'green power pool'.

## What are PPAs?

PPAs are long term agreements, generally between a power producer and a customer, usually to buy a fixed amount of power at a pre-agreed price. PPAs are not a new approach and there are various types of agreement.

The previous government's solution to uncompetitive industrial power prices has been to reduce the network and policy elements of energy bills, without addressing the largest component: the wholesale cost of electricity.

With renewable energy consistently the cheapest form of power in the UK, PPAs with renewable energy generators could be a solution to managing power prices for sectors like steel.

Renewable power could be provided at much lower prices than on the conventional wholesale market, where prices are determined by the marginal price of gas power generation. The marginal price of gas power generation is expected to dominate the wholesale market until renewables and energy storage make up the majority of generation.

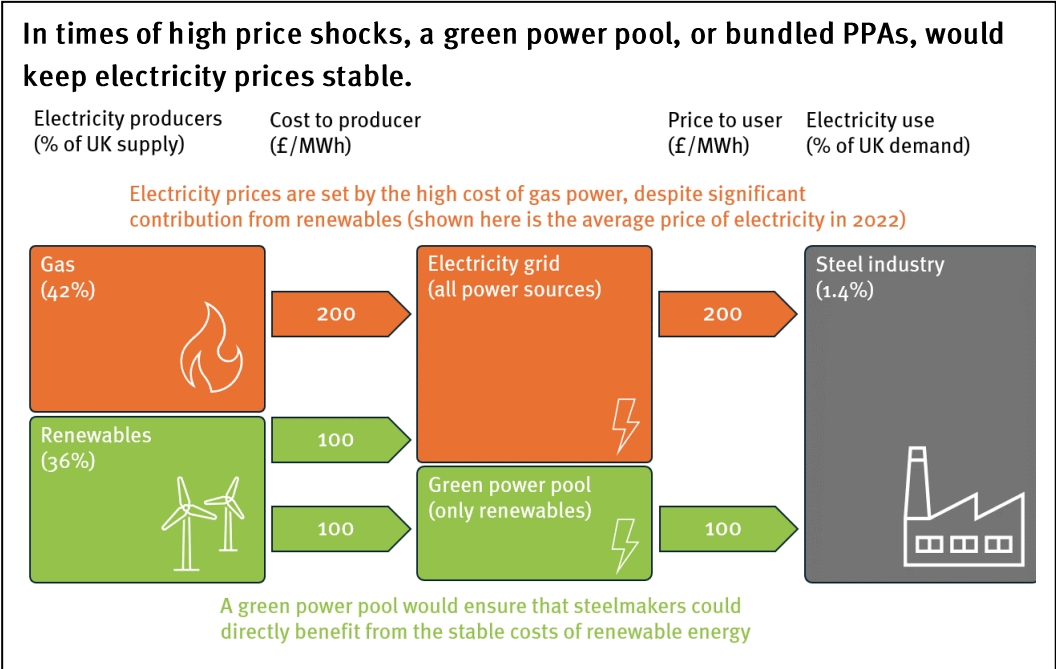
However, PPAs have been hard for energy intensive industries to access for several reasons, including high prices, driven up by less energy intensive firms entering PPAs to meet corporate sustainability goals, and difficulties entering extended contracts, with many manufacturers struggling to adequately demonstrate long term viability. Government underwriting of PPAs for the steel sector would help resolve these problems by essentially becoming the ‘buyer of last resort’.

Depending on the exact details of the approach taken, this could potentially reduce network charges for the industry and the need for the government to provide a discount for policy costs. Alternatively, this approach could be in conjunction with measures designed to address other aspects of bills, such as the existing [British Industry Supercharger](#).

### What is a green power pool?

As [proposed](#) by academics at UCL, a ‘green power pool’, or GPP, is essentially a bundle of standardised PPAs underwritten by the government. It is a way of creating a separate electricity market which would operate alongside the conventional wholesale electricity market but would focus only on renewables (see the illustration below).<sup>1</sup>

The advantage of a GPP over individual PPAs is that it reduces counterparty risk to any individual contract holder. It allows backup and balancing services to be procured collectively from the traditional wholesale market, with associated costs distributed evenly. The cost of these back up and balancing services could be passed onto customers as they are incurred but spread evenly across contract holders.



## Benefits of underwriting PPAs or a GPP

The UK's steel industry has historically lurched from crisis to crisis and needs to be put on a more stable footing. The most frequently given reason for lack of competitiveness and investment in the sector is power prices which are higher for UK steelmakers than for their competitors in France and Germany, as well as in other nations beyond Europe.

Providing cheaper renewable sources of power would also futureproof the industry by supporting decarbonisation. As electric arc furnaces (EAFs) do batch production, their operation can match periods of high renewables output. It could also be possible to factor the need for steel to build new renewables into the deal. This kind of arrangement could see the steel sector providing lower cost steel in return for cheaper power, cutting the cost of PPAs further.

Previous Green Alliance [analysis](#) has shown that, combined with a strong carbon price, a GPP, or equivalent scheme, would make EAFs much more cost effective than continuing the current method of steel production and could make hydrogen based steelmaking slightly more cost effective.

For the PPAs or a GPP to be impactful quickly, they are likely to rely on power from already operational renewables, some of which may already have agreements through the contracts for difference (CfD) process. But underwritten PPAs or a GPP could eventually finance additional onshore wind and solar that might not be developed under the current CfD scheme, due to capacity limits or local objections preventing their expansion, by meaningfully connecting new renewables development with culturally significant heavy industry.

## What should the government offer?

The total value of a GPP or bundle of PPAs for an electrified UK steel industry would be around £300 million per year at current steel production rates. At most, this might rise to £450 million per year, if production was running at the maximum capacity of nine million tonnes of steel per year.<sup>2</sup>

If the beneficiaries of the PPAs or GPP are operating as expected, the government as underwriter should never need to buy any power. However, it would need to be able to act as a buyer of last resort when necessary, taking on the liability for purchasing all the power included in the scheme, should the industrial sites involved go out of business. This is unlikely to be a major issue, with UK power demand increasing and the relatively low cost of power under a PPA or GPP scheme likely to mean that other buyers could easily be found.

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## Endnotes

<sup>1</sup> £200 per MWh was the average electricity price for 2022 (the peak of the gas price crises) as taken from Nordpool's UK N2EX day ahead auction prices and rounded to the nearest £10. The estimated cost of renewables is assumed to match the 2024 sixth auction round strike price for offshore wind (£73 per MWh in 2012 prices) adjusted for inflation to 2024 using the Bank of England's inflation calculator. The split of electricity generation is taken from: Department for Energy Security and Net Zero, 'Digest of UK Energy Statistics: annual data for UK, 2022', chapter 5: 'electricity'. The estimated consumption for the UK steel industry, if electrified, is explained in the next endnote.

<sup>2</sup> We base this assumption on the total production capacity (9 million tonnes, which is larger than actual current production volumes of 5.6 million tonnes), see: UK Steel, 2023, *UK steel capacities and capabilities*. Electric arc furnaces draw around 0.5 MWh per ton of produced steel, according to F Martell-Chavez, M E Marcias-Garcia and A R Izaguirre-Alegria, 2020, *IEEE Transactions on Industry Application*, vol 56, issue 6. This leads to a total estimated consumption of 4.5 TWh per year. We assume an electricity price of £100 per MWh, which is the maximum strike price available to offshore wind developers in the sixth CfD auction round, adjusted for inflation to 2024 prices using the Bank of England's inflation calculator.