

## Contracting for wind generation

EPRG Working Paper 1120

Cambridge Working Paper in Economics 1143

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The UK Government's consultation on Electricity Market Reform proposed that low-carbon electricity generators should be offered long-term contracts, or Feed-in-Tariffs (FiTs), to reduce their financial risk and thus allow new entrants and new sources of finance to be tapped for the massive low-carbon generation investment needed to reach its 2020 targets - estimated to cost £75 billion up to 2020. The Government prefers a single contract type for all generation, despite the differences between nuclear (base-load, reliable and predictable) and wind (intermittent, unpredictable). Their preference is for either a Contract-for-Difference (CfD) or a premium FiT, pFiT. The CfD entitles the generator to receive (or pay) the strike price less a reference price (which could be negative, requiring the generator to make a payment), but the generator must sell the power for whatever price can be secured in the market place. The pFiT is an agreed fixed payment per MWh generated that supplements the generator's sales in the market. The pFiT is similar to the current Renewable Obligation Certificates, ROCs, where an on-shore wind generator receives one ROC/MWh that they can sell in the ROC market, as well as selling their power. Suppliers are required to secure ROCs in proportion to sales, or pay a buy-out price that would be returned to generators, amplifying the value of these ROCs. In contrast, a classic FiT gives the generator a fixed amount per MWh regardless of the market price and ensures automatic dispatch without the need to secure a buyer.

If a small independent on-shore wind developer is given a two-sided CfD, then he faces some market risk as the reference price is likely to be the day-ahead average price. The developer is unlikely to be able to sell at the reference price because of the special characteristics of wind – intermittency and poor predictability ahead of dispatch. The paper attempts to estimate the size of the penalty for these factors, given the current design of the wholesale market and especially of the Balancing Mechanism, and how this penalty might be reduced by better contract (and market) design.

The developer can either sell his output to a large vertically integrated utility, normally at a discount, or sell a specified volume forward at the contract price, but be exposed to imbalance charges when selling (or buying) the surplus (or short-fall). The day-ahead half-hourly price may differ from the reference price - the basis risk. The market price using current spot prices and patterns of wind output is estimated at 98-105% of the reference price. However, towards 2020 wind output will tend to depress spot prices and make the correlation negative, giving realized values on average only 94% of the reference price, with considerable variability.

Exposure to imbalance charges depends on the reliability of wind forecasts, which evidence suggests has a Mean Average Deviation of 10-12% of capacity from 4-24 hours ahead when contracts need to be signed. The estimated imbalance charges are again very volatile and might be in the range £2-5/MWh. These compare with perhaps £8/MWh for the cost of contracting with a large utility, and a balancing cost (not charge) of £2-3/MWh (at high levels of wind). If most entrants choose to self-contract, the annual extra costs of using CfDs rather than fixed FiTs might rise to £70 m/yr for on-shore wind alone and perhaps twice that including off-shore wind. The higher risks associated with pFiTs could raise the cost of capital by as much as 1½% p.a. If we build an additional 12 GW of on-shore wind by 2020 and if the cost were as low as £1,000/kW, the investment cost would be £12 billion and the capital cost saving would rise to £180 million/yr by 2020 when comparing a fixed FiT with a pFiT. The more expensive off-shore wind would considerably increase this amount.

The obvious answer to the risk in the markets and the barriers to entry and/or the limited capacity of the Big Six is to offer wind farms fixed price FiTs on the standard Continental model. This would require two institutions – one to design and negotiate the FiTs (and also any CfDs that continue to make sense, e.g. for nuclear power) and another to be the counterparty to the wind FiTs with the ability to sell or dispatch that wind. The logical institution for the latter would be the System Operator, who might offer a voluntary centrally dispatched single price pool model to handle all the wind, all the balancing services and any other plant that is flexible and which would like to avoid trading and scheduling costs. This institution would have the legal power to charge consumers for the extra cost of honouring the contracts, just as Ofgem can pass through the regulated costs of transmission and distribution and recover the cost of the ROC scheme.

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Publication	July 2011
Financial Support	ESRC RES-189-25-0155