

Recommendation on the design of two-sided Contracts for Difference

The revised Electricity Market Regulation makes two-sided Contracts for Difference (CfDs) the default state aid tool to stabilise revenues for new power generation. However, it doesn't prescribe a specific design. It allows Member States to tailor CfDs to their market needs in line with the EU State Aid guideline¹. To effectively support new renewables, any CfD designs should address new market dynamics such as oversupply, negative prices and grid congestion.

Several Governments are exploring new two-sided CfD designs for upcoming onshore and offshore wind auctions. Spain, Poland, Lithuania and Denmark are considering changes for offshore wind. Germany, that still uses one-sided CfDs, is assessing a shift to a two-sided model. Governments are considering two main design options: generation-based and generation-independent schemes². Generation-based two-sided CfDs, which link payments to actual wind output, are the current standard. But there is growing interest in generation-independent designs where payments wouldn't be tied to feed-in power.

This paper assesses both designs focusing on two key goals:

- Effectively manage price and volume risks for each project
- Maintain strong incentives and a solid business case for renewable build-out given the slower grid expansion and electrification

A well-designed CfD should cut project-level risks while boosting overall system performance. It should also promote market responsiveness from wind farms and push authorities and System Operators to speed up grid development and optimal operation.

Designs of two-sided CfDs under discussion

Generation-based

In generation-based two-sided CfDs, payments depend on a wind farm's actual output. The scheme's effectiveness hinges on how the reference price is set. The reference price is the market value used to define the wind farm's capture price and respective CfD payments. It can be the hourly wholesale price, a monthly average in the bidding zone, a wind-weighted monthly average or other variants.

Using an hourly reference price significantly lowers price risk but can encourage a 'produce and forget' approach. Wind farms lack incentive to adjust output during low demand as lower output means lower CfD payments. Over time, this can weaken market integration, increase balancing needs, lead to more hours of low or negative prices and raise curtailment risks. All these can undermine wind's business case in the long term.

A balanced option is to use the wind-weighted monthly average Day-Ahead (DA) price as the reference. While not risk-free, it could improve system and market integration, keep wind projects bankable and financing costs low. It could also push wind farms to bid more responsively in the DA market and actively in parallel markets - intra-day, balancing, ancillary services - if System Operators ensure prequalification criteria suitable for wind farms.

Compared to new designs like generation-independent ones, this approach would need less time and cost to implement. This is crucial when investment decisions need to ramp up.

¹ Guidelines on State aid for climate, environmental protection and energy 2022

² Florence School of Regulation in their paper '<u>Contracts-for-difference to support renewable energy technologies</u>' gives a good analysis of CfD designs under discussion



Generation-independent

While widely used today, all generation-based CfDs expose wind farms to volume risks like weather variability and wake effects from nearby turbines. Higher-risk projects may need generation-independent CfDs to be viable. Offshore wind farms, for example, often have limited flexibility within fixed maritime zones, reducing their ability to manage such risks. Future offshore hybrid projects in offshore bidding zones could face even greater volume risks due to lack of demand in the latter and market coupling issues³.

In generation-independent two-sided CfDs, payments are not tied to actual feed-in power. Two designs are currently discussed:

- Capability-based CfDs⁴: Payments would be based on a reference value that reflects the wind farm's maximum generation potential (hourly, monthly, or yearly), considering factors like plant capacity, turbine power curves, wind speeds, and availability. The more accurately this value would reflect real capability, the more this design would reduce risk. Belgium has adopted this design for its Princess Elisabeth offshore wind zone. Other governments are exploring similar models for future offshore auctions.
- Financial CfDs⁵: The wind farm would receive fixed hourly payments, regardless of generation or weather, like capacity payments used for other technologies. In return, the owner would repay the simulated spot market revenue of a modelled reference generator, based on typical renewable output for that hour⁶. These reference profiles could be asset-specific or averaged across a fleet.

Generation-independent CfDs, especially capability-based ones, could better manage risk for both developers and System Operators. Operators could dispatch more flexibly, as wind farms no longer would chase maximum hourly feed-in just to secure higher payments. With payments tied to other values, wind farms might also consider bidding into other markets such as balancing if prequalification criteria are fit for purpose.

The generation-independent designs are still in early stages and should not be rolled out widely until thoroughly tested and proven to deliver benefits as required by the Clean Industrial State Aid Framework. To ensure two-sided CfDs attract new wind investments, Governments must carefully assess key implementation factors, allow sufficient transition time and apply them only in auctions much further down the line to allow enough time for detailed evaluation.

Important factors to assess are the following:

- Managing transition risks for new CfD models: Introducing new CfD models brings uncertainty, especially early on. Investors may see these designs as unproven or risky, making financing harder. A strong transition strategy with close monitoring and active stakeholder engagement is essential to build trust. Crucially, new CfDs must meet EU legal requirements⁷. This includes proving that state support is necessary, effective, and delivers greater benefits than existing alternatives or potential downsides. Without solid evidence of added value, these new schemes may face regulatory hurdles and lack investor support.
- Getting reference models and capability right: Accurate generation modelling would be essential for both capability-based and financial CfDs. Developing transparent, standardized methods for accurate power curves and wake effects will be complex and take time. Errors

³ WindEurope, <u>Scaling up Europe's offshore wind integration</u>, March 2025

⁴ ENTSO-E paper on Sustainable CfD design

⁵ Florence School of Regulation, 'Contracts-for-difference to support renewable energy technologies'

⁶ Same as above

⁷ Guidelines on State aid for climate, environmental protection and energy 2022

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could lead to major financial risks if actual output falls short. Also, if reference profiles track actual output too closely, they could weaken market signals and reduce the effectiveness of generation-independent CfDs. Offshore wind farms may face extra risks from external wake effects and limited location control by developers. Regulatory changes (e.g. new noise or wildlife protections) and technical failures also add uncertainty so reference models must be robust and regularly updated.

Ensuring effective grid build-out and optimisation signals: It is important to distinguish between self-curtailment caused by low market prices and that caused by grid congestion or redispatch. Capability-based CfDs could help wind farms respond better to price signals, but grid-related curtailment should remain handled through the existing market-based redispatch system. Keeping this separation would ensure CfDs will not weaken incentives for timely grid upgrades or efficient system operation. It would also maintain a level playing field with merchant or PPA-backed projects regarding compensation for forced curtailment.

General remarks

Both types of two-sided CfDs have pros and cons and can be tailored to market needs. Generationindependent CfDs may boost the bankability of higher-risk projects, but they require careful analysis of their design, benefits and impact. This evaluation should not delay wind energy investment. Governments considering this model should allow a long enough phase-in period to avoid slowing down projects that other support schemes, like generation-based CfDs, can adequately support or overall investments.

Proof of benefits: EU law⁸ requires that state aid tools clearly show their benefits outweigh any negative impact on competition and trade. Whether using generation-based CfDs with monthly reference prices or generation-independent designs, authorities must justify their positive effect also on system integration and market responsiveness by wind farms. Crucially, they should also ensure that the chosen CfD design supports renewable deployment with minimal transition costs and maximum incentives to build grids on time.

Combinations with PPAs: Another relevant aspect is the combination of two-sided CfDs and PPAs for the same project. The revised Electricity Market Regulation lets developers split project capacity between two-sided CfDs and market-based tools like PPAs. This flexibility supports a gradual shift of certain projects toward PPAs enhancing market liquidity and ensuring long-term renewable supply for consumers. To protect this balance, regulators must avoid linking CfD strike prices to PPA pricing, as this could fragment the PPA market and distort competition. A level playing field is essential; hybrid models must ensure fair treatment, preserve price signals and support long-term participation in both mechanisms.

Strike price: The strike price of a two-sided CfD should account for indexation and pre-installation cost changes, such as inflation and raw material price spikes. During operations, it should be adjusted with the relevant Consumer Price Index to reduce inflation risk and enhance investor certainty⁹.

Two-sided CfDs must be carefully designed to ensure project bankability and market competitiveness, both critical to delivering the wind capacity needed by 2030. With the European Commission set to issue CfD design guidance in 2025, there is a valuable opportunity for industry and policymakers to collaborate. Prioritising practical, well-crafted CfDs will accelerate the deployment of wind energy, strengthen Europe's competitiveness, and secure its energy future.

⁸ Guidelines on State aid for climate, environmental protection and energy 2022

⁹ WindEurope, <u>Key elements for offshore wind auction design</u>, September 2023