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Report

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Workshop Summary: “The Role of Contracts for Differences (CfDs)”

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Currently, European policy makers are debating crucial market design decisions in order to create a sustainable electricity system. To develop and utilize flexibility throughout the EU, well-functioning short-term markets for electricity are becoming an increasingly important element of electricity market design. At the same time, it is important to improve the long-term hedging of electricity customers as well as wind and solar investors against electricity price risks. In addition, policy makers must create conditions that lower financing costs, create incentives for the system-friendly design of investments, and ensure stability for the project pipeline to enable investments in the value chain.

To achieve these goals, Contracts for Differences (CfDs) have already been introduced in several European countries. Although their introduction has also been discussed in Germany, political processes have postponed implementation. The current interventions in the electricity market have not only confirmed the necessity of a two-sided protection for producers and consumers, but also been the reason for the EU Commission to start discussing a European-wide introduction of CfDs.

In the following, the advantages and challenges of CfDs as well as possible design options for their implementation is discussed.

1. Goals of the introduction of Contracts for Differences

Create a stable project pipeline

The introduction of Contracts for Differences can send a clear and reliable signal regarding remuneration levels and expansion volumes to the market, such that the wind and solar industries along the value chain can expand their production capacity in line with the new expansion targets. The improved ability to plan investment volumes is created by the following reasons:

- CfDs eliminate the risk that awarded projects will be cancelled by developers if expectations of future electricity prices are revised downward.
- Projects can be realized with a lower equity ratio, as risk minimization allows for lower equity shares in project finance [Neuhoff, May & Richstein, 2022]. This allows project developers to implement additional projects and other players to participate in project development.
- Expansion volumes are not limited by (low) capacity for project take-off by PPA-buyers [PwC, 2020; Aurora, 2019; May & Neuhoff, 2019].
- Renewable energy projects are not exposed to the risks of regulatory changes such as a change in the electricity market design or changing expectations about future electricity price developments. This avoids risks that projects will be postponed or not realized if such changes make render them unprofitable.

Reduce the levelized costs of electricity

¹ We thank all the workshop participants for their helpful comments and suggestions.

If the introduction of Contracts for Differences successfully reduces regulatory risks for project developers, this reduces financing costs and, thus, lowers not just electricity generation costs but also the overall costs of the energy transition. This cost reduction can occur for the following reasons:

- By avoiding counterparty risks, project developers reduce financing costs compared to PPA deals. This leads to a reduction in electricity generation costs of about 10% [Neuhoff, May & Richstein, 2022; ARUP 2018; Aurora, 2018; PwC, 2020].
- By avoiding long-term liabilities that power purchasers incur with a PPA, a reduction in their credit rating/credit worthiness is avoided. This leads to an implicit reduction in the cost of electricity by about 20% as PPA shares grow. [May & Neuhoff, 2021].
- The cost of the system integration of renewables is reduced by incentivizing system-friendly design of installations according to the longer-term requirements of the electricity system. This reduces the need for flexibility options and, thus, the costs of the energy transition [Neuhoff, May & Richstein, 2017].
- Mechanisms like the reference yield model can be used in the context of CfD-tenders. This allows the development of sites with lower wind speeds, which are necessary to achieve expansion targets without being required to pay extremely high land rents and, thus, additional costs for projects at windy sites.
- Reduced complexity leads to lower associated costs and uncertainties, e.g., compared to PPAs, when purchasing power on the consumer side.

Reduce volatility of electricity costs

In addition to a reduction in the level of energy costs, the volatility of energy costs can also be reduced by introducing Contracts for Differences. This is for the following reasons:

- A direct pass-through of the CfD-conditions and, thus, the fixed price to households as well as (via the industrial power model) to large industrial consumers could be arranged [Neuhoff, Kröger & Richstein, 2022].
- The portfolio of renewable production under the CfD creates a reference product to which complementary flexibility and hedging products can develop.

Transparent auctions

By focusing on generation costs, bidding for Contracts for Differences reduces complexity for bidders in the renewable auctions:

- This reduces the risk of a winners' curse, i.e. that bidders who bid the lowest and win the auction subsequently end up realizing later on that they cannot complete their project at the provided remuneration.
- At the same time, the design can avoid bidders pricing in other factors (e.g., longer-term network access or site rights) in their bids. Together with reduced equity requirements due to stable revenue streams, this contributes to a level playing field between bidders and focuses competition on the competence to gain local acceptance for projects and to implement them well.

2. Central elements for the design of Contracts for Differences

The following elements should be included in the CfD-design to ensure that the potential benefits described above can be realized:

- *Long project duration of 20-30 years:* Allows for long-term financing, thus reducing project costs.
- *Indexation of costs during construction:* Important in the current inflationary environment with uncertain price development. This not only prevents projects from being stopped due to rising costs, but it also protects electricity customers from continuing to pay high prices even when construction costs fall again in the future.
- *No "additional gifts" for successful bidders:* For example, right to sites or grid connection beyond term, because this distorts competition (e.g., seen in recent Portuguese auctions with negative surcharges).
- *Avoiding risks from regulatory choices:* Avoiding revenue risks from reduced operational hours due to insufficient grid expansion or insufficient development of flexibility in the energy system.
- *Quarter-hourly reference period:* The CfD-hedge should be defined at electricity prices at the feed-in point of the renewable energy project with a quarter-hourly profile. This avoids uncertainties and risks due to regulatory developments.
- *Pass-through of terms and conditions:* For this purpose, a share of all pooled CfD-contracts is passed on to electricity customers who have bindingly registered for it. This means that the customers are also hedged against the averaged renewable energy generation profile with a quarter-hourly reference period.
- *Fair distribution of pass-through volumes:* Appropriate distribution rules of CfD-volume between industry, local residential customers close to the site, and residential customers in general are necessary to guarantee the acceptance of the instrument and the projects.
- *Passing on the "green" attribute:* It also passes on the green attribute of the electricity from the CfD pool to electricity customers, who can thus demonstrate green procurement of their energy.
- *Incentives for system-friendly plants:* The externalities of the plants on the electricity market (e.g., power generation profile, location) should be considered in the tender design (similar to reference yield model).

3. Further elements for the discussion on Contracts for Differences

There are numerous other possible design elements that could be discussed further, but could also be omitted to simplify the processes. These include:

- Adjusting the development of the reference price during the life of the project to interest rate developments. This could be done via a government bond interest rate indexation and variable risk margin.
- An adjustment of the reference price or financial compensation for a change in the achieved full load hours in case of forecast errors or a change in wind or solar conditions due to shading or climate change.
- A consideration of possible externalities outside the electricity market and secondary objectives in the tender and in the definition of the CfD. An example of this would be an adjustment of the achievable full load hours due to bird migration periods.

While the above points are focused on an introduction of Contracts for Differences in Germany, there are also some open questions regarding the European and international dimension of the instrument:

- International sourcing of renewables: Should there be joint CfD-tenders with joint acceptance of hedges with EU-neighbors?
- Feasibility in different EU member states: How can standardized CfD-tenders simplify project development and financing, and thus contribute to the achievement of renewable targets?

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