

## The Declining Value of Peak Forward Contracts

By Sebastian Schwenen and Karsten Neuhoff\*

The declining prices quoted for peak forward contracts in Germany reveal a declining value that conventional peak forward contracts provide to generation and load for hedging price risk. This also implies that traditional peak forward contracts are less effective in signaling and contributing to generation adequacy and points to the need to assess a potential role for other contract types. Given the limited attention paid to the role of contracting in the German debate on electricity market design, we discuss why the value of contracts declined over the last years, and ask how market design and commercial contract structures can go hand in hand in supporting forward contracting.

On the EEX, much of the recent decline in peak prices is due to surplus generation capacity and high output of renewables, foremost wind and solar generation. As a consequence of decreasing price levels, peaking gas-fired units face low or even negative profitability. In Germany, a debate started on whether such low profitability signals overcapacities or whether peak capacity, that after all is needed to satisfy weather-dependent residual load, should instead be further incentivized via capacity mechanisms. However, this debate is blurred by the fact that the intermittency in RES generation changed the daily price profile, and that load and generation patterns differ across regions. Average prices for peak and off-peak products are, therefore, no longer the appropriate indicators to assess profitability and adequacy of peaking capacities.

### Declining Margins for Peaking Units

German power prices declined with lower CO<sub>2</sub> prices, lower power demand and increasing volumes of solar and wind in the system. In 2012, average day-ahead peak prices at times were below estimates of variable costs of CCGT units. As Figure 1 shows, subsequent to March 2012 the monthly average of hourly day-ahead peak spreads for CCGT remained close to zero or negative throughout the year.

However, the units do not necessarily need to operate on all peaking hours. Instead, generators could opt to only sell power at days and periods when spot prices exceed variable generation costs. The solid line in Figure 1 illustrates the revenue from power sales minus variable costs that would be achieved in this case. In periods of large surplus capacity the net-revenue still remains close to zero.

Figure 1 illustrates, that with the large increase of wind and particularly solar generation capacity, the difference between the net revenue – as suggested by a monthly spark spread – and the revenue that can be achieved when operating the plants only in periods when spot prices exceed variable generation costs is growing.

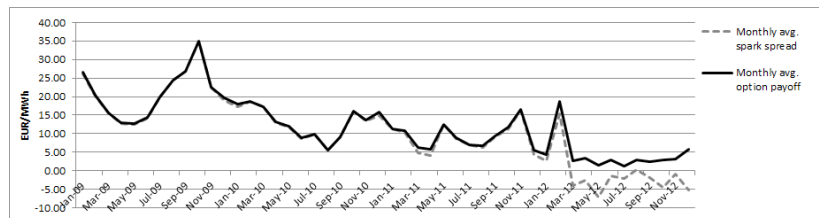


Figure 1: German Day-ahead Spark spread (with fuel plus ETS costs) vs. Option Payoff for CCGT Units (with heat rate of 7,000 BTU/KWh).

### Single Pricing Zone Hides Regional Needs

A second aspect to be considered when interpreting information in peak prices is regional generation and load patterns that vary across Germany. Most investments in wind generation have occurred in the northern parts of Germany, while several nuclear power stations have been phased out in the south of Germany, leading to concerns about regional supply adequacy.

This is, however, not reflected in power prices – instead the entire country is part of one pricing zone and peak contracts cover the entire zone. Hence they can only depict information on scarcity across the entire country, but do not respond to potential generation adequacy concerns in parts of the country. Instead, regulators are requiring transmission operators to contract additional generation capacity at the regional level, and transmission operators adjust generation schedules using re-dispatch. Re-dispatch costs and associated revenues are not reflected in peak prices. Furthermore, local re-dispatch can create local market power, and result in the famous inc-dec games that were observed in the Californian and the UK market.

Thus peak contracts do not provide sufficient information on regional supply adequacy. Potential difficulties to meet local capacity needs (or rather to retain capacity on the system where needed), therefore, need to be primarily addressed through better alignment of pricing zones with transmission capacity. If a single German power price, and derived forward products, do not signal scarcity be-

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cause there is no scarcity at the aggregate level, but scarcity exists at a regional level, then the power market design also does not provide incentives to invest and maintain plants so as to mitigate scarcity right where it occurs.

### Implications for Forward Contracting

About 95% of demand in Germany is covered by forward contracts. With falling day-ahead prices also forward prices decrease as the contracts are anchored at day-ahead spot prices. Therefore negative day-ahead spreads depicted in Figure 1 also indicate that – with revenues from forward contracts alone – CCGT units would run at a loss. However, even where generation signs forward contracts, it can still decide to serve the contracts through power acquired on the spot market at times when the spot price falls below variable generation cost. Thus additional profits can be obtained, increasing the overall value of signing forward contracts. However, given the uncertainty about price profiles, this approach is associated with risks about future price developments.

CCGTs, therefore, either can sign forward contracts and rely on additional revenue or decide not to sell on forward contracts. If due to the risks about future price developments generators decrease contracting volumes and preferably sell spot, then also the overall revenue structures of generators is more opposed to volatile spot prices. Thus also investment planning and finance becomes aggravated.

Given the increasing price risks inherited to contracting, new contract types could offer advantages over traditional forward contracts and enhance (re-)investment finance. In line with the positive option payoff presented in Figure 1, option-style

contracts offer one solution. In such contracts load pays an option premium to generation, and whenever needed has access to generation at a pre-defined power price (typically variable costs of generation). However, it requires further analysis to understand the role such option contracts could play in the overall portfolio of demand. Similarly, even if innovative contract types might offer advantages, it is unclear whether or how sufficient liquidity for new contract types can emerge.

Last, also the reference price for forward contracts might change with increasing RES penetration. While in the U.S. forward sales are anchored at the real-time price, in the EU contracts hedge against the day-ahead price. However, as Figure 2 illustrates, deviations from planned to actual RES

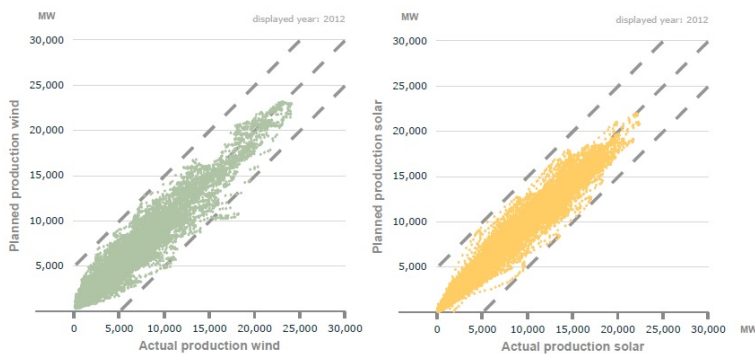


Figure 2: Actual and Planned RES Generation in the German Market in 2012.

Source: Burger (2013), “Electricity production from solar and wind in Germany in 2012”, Fraunhofer ISE.

production from wind and solar units in Germany can be significant and unexpected additional generation amount to several GW. Unexpected RES production can cause deviations from day-ahead to intra-day prices, and with contracts being settled at the day-ahead price, intra-day price risks remain unhedged. It still remains open whether day-ahead prices or intra-day prices offer the ideal reference for forward contracts.

To conclude, we identified several reasons that reduce the value provided for generation and load with traditional peak contracts as the share of wind and solar power increases in German power generation. This could trigger a change of contract design so as to better meet hedging needs. This could in turn also enhance the effectiveness of mid-term contracting in signaling and managing supply adequacy.