THE END OF THE BEGINNING: EVOLUTION OF THE FRENCH LARGE-SCALE RENEWABLE ELECTRICITY SUPPLY SUPPORT SCHEME

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Overview

Since the early 2000s, the French solar photovoltaic (PV) and wind installations have been supported by feed-in-tariffs, set by the "Regulatory Commission of Energy", the national electricity market regulator. These support schemes have proved to be quite efficient as PV and wind installed capacities have reached 7.6 and 13.6 gigawatts respectively by the end of 2017.

However, with size comes critics, and as PV and wind capacities are planned to increase by 150% by 2023, the French regulator has called for a better integration of variable renewable generation sources on electricity markets.

Indeed, the feed-in-tariffs (FITs), subsidized prices guaranteed to renewable electricity suppliers for 15 to 20 years, is recouped on consumers by the national utility, an amount that reached 15% of every households' electricity bill in 2017. The renewable support cost for French electricity consumers has been multiplied fivefold in the last decade.

Solar and wind producers are also reproached their total disconnection from market price signals. Zero marginal cost technologies disrupt the electricity merit-order, driving power prices downwards without being impacted by this effect. Year-ahead forward contract prices have been divided by 2 between 2010 and 2016 on the French power market (IEA, 2016), while solar and wind electricity have kept benefiting from off-market FITs, leading to "*missing money*" & "*negative prices*" phenomenon (Hogan, 2017).

Backed by the European Commission, the French government has designed in 2017 a new support scheme, that can be viewed as a "sliding premium", that is supposed to find a sound balance between exposing renewable producers to market price signals, while maintaining a rather low price risk to limit the financial cost of the installations.

Methods

This paper reviews the support mechanism evolution for solar PV and wind installations and assesses the effect of the RES support scheme on multiple factors associated with variable renewable electricity supply.

We present the different elements that led to this support scheme reform: from the drastic reduction of levelized cost of electricity for wind and solar (IRENA, 2018), to the short-term and long-term price impacts on wholesale power markets.

We analyse the effects of this transition from a FIT mechanism to a sliding premium on the profitability of a real-case large-scale project, using historical French wholesale power prices time series and reference solar and wind tariffs for the sliding premium calculations.

Results

We show that the design of the French *complement de remunération* does indeed sensitivize renewable electricity producers to wholesale market prices. More market signals are needed to give the right incentives for reducing variable electricity sources integration costs but should not undermine the effectiveness of support schemes.

Moreover, our study highlights the key parameter of the timestep used to reevaluate periodically the sliding premium in order to effectively sensitivize producers to market prices. We show that a shorter timestep drives the support mechanism towards a FIT scheme, while a longer timestep reflects a full feed-in premium mechanism.

Conclusions

This paper reviews the multiple issues that led to the adaptation from a FIT scheme to a market-oriented sliding-premium, and how this new regime should progressively accompany the maturation of wind and solar technologies.

We provide evidence that a "*fairer*" share of market price risk can be supported by large scale PV and wind installations in France without decreasing too much such projects profitability, although LCOE is affected by the new risk born by variable electricity producers. We show that an adequate price sensitivization enables policy makers to limit their support policy costs while maintaining a reasonable support for renewable electricity supply.

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