

Propositions

attached to the thesis

(In)flexibility In Power Markets With Supply From Variable Renewable Sources

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I

The key to the incorporation of a high share of supply from variable renewable sources into a power system lays within the system's flexibility to constantly adjust its demand and supply such that the grid remains in balance at all times.

(Disseration)

II

Besides inducing a merit order effect and changing the mean and variance of day-ahead power prices, supply from variable renewable sources also changes the probability distribution function of those prices inducing a higher (lower) frequency of extreme low (high) day-ahead power prices.

(Chapter 2)

III

In moments when the flexibility of a power market is challenged the most, moments when extreme low or high power prices occur, the negative impact of variable renewable supply on day-ahead power prices is significantly stronger than in other moments.

(Chapter 3)

IV

The introduction of supply from variable renewable sources into a power market leads to a decrease in the average forward premium present in that market.

(Chapter 4)

V

Besides the unexpected changes in power demand and variable renewable supply, the inflexibility of power suppliers (consumers) to expand and contract production (consumption) at certain moments in time can also partly explain the forward premium patterns observed in power markets.

(Chapter 5)

VI

We will not be able to fully decarbonise the power sector by only adding more supply from variable renewable sources into existing carbon intensive power markets, as this action will lead to increased power system inflexibility and rebalancing needs.

VII

In order to get a step closer towards the decarbonisation of power markets, policies which aim to increase the installed capacity of variable renewable sources should be matched by policies which aim to sustainably increase power markets' flexibility.

VIII

While today's power market flexibility is provided predominantly by polluting conventional suppliers, tomorrow's power market flexibility could be provided by a variety of assets among which EVs, utility scale storage facilities, power-to-X and demand response applications.

IX

Accurate power price signals can lead to more sustainable and flexible power markets, as these signals increase the profitability of flexibility offering assets such as storage facilities or demand response applications.

X

Although a sufficiently high carbon price diminishes the amount of CO_2 emitted through power generation, as no current power generation technology is entirely carbon free throughout its entire lifetime, a carbon price can lead us to a carbon neutral power system only if it rewards carbon absorption too.

XI

The sinuous transformation path of an idea throughout the research process requires a researcher's mind to be as fluid as the piece of research (s)he is working on.