

The Importance of Understanding Electricity Price Volatility



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“People have a tendency to look for clear or simple explanations, particularly when afraid. This can cause them to attach blame to sustainable energy sources”

“Some biases are well known, such as risk aversion, and this can be exacerbated when designing plans for long terms with unknown volatility.”



Electricity prices and volatility - Power system studies often assess system costs and electricity prices, but a full discussion requires considering price volatility, i.e., how prices change over time.

Electrification and renewables - Decarbonisation depends on electrification powered by renewables like wind and solar, but their intermittency can drive large price swings if systems aren't carefully designed.

Impact on society and policy - Price volatility affects industries, consumers, and public perception, influencing climate policy support and potentially discouraging green investments.

An abstract graphic consisting of several thin, light green curved lines that sweep across the bottom half of the slide, creating a sense of movement and flow.

Perceptions of Understanding Electricity Prices

According to Dr. Tim Mullett, customers exposed to **volatile prices** will be inclined to remember the highest price they have had to pay, which is “compounded by those most extreme prices often coming at the time when they have the greatest need, e.g. for heating during unusually cold periods”.

And **domestic consumers** are not alone in their aversion to price spikes, with industrial actors’ tendency to avoid risk being exacerbated “when designing plans for long terms with unknown volatility”.

Human biases can be difficult to gauge. For example, perceived “cliff edges” may arise near numbers like €1000/MWh. We need to carefully consider how we **quantify price volatility**, based on the impact on producers and consumers.

Quantifying & Combatting Volatility

In the wake of difficulties caused by extreme electricity prices, those affected may blame new technologies such as sustainable energy sources, with Dr. Mullett pointing to the public and political response in Texas following winter storm Uri in 2021 as a recent example.

While **industrial actors** are likely to have pre-defined policies to protect them against unfavourable prices, the fact that such systems are designed by humans means that they are not immune to the aforementioned biases.

Clearly, understanding of the volatility of prices for a proposed energy system is very important. Such **predictions** can help us to design a more flexible system with appropriate buffers against price spikes (see our recent study with Future Cleantech Architects, including Thermal Energy Storage as an option for Germany).

As for quantifying this volatility - this is an art in of itself. Counting number of hours with negative prices or prices over a threshold value, looking at the **distribution of average prices** modelled over historic weather data... there are different metrics and timescales to consider for each concerned party. This is a topic that we will cover in upcoming posts, but we would be very interested to hear your opinion!