

Effect of Prediction Errors on Peer-to-Peer Electricity Market Profits

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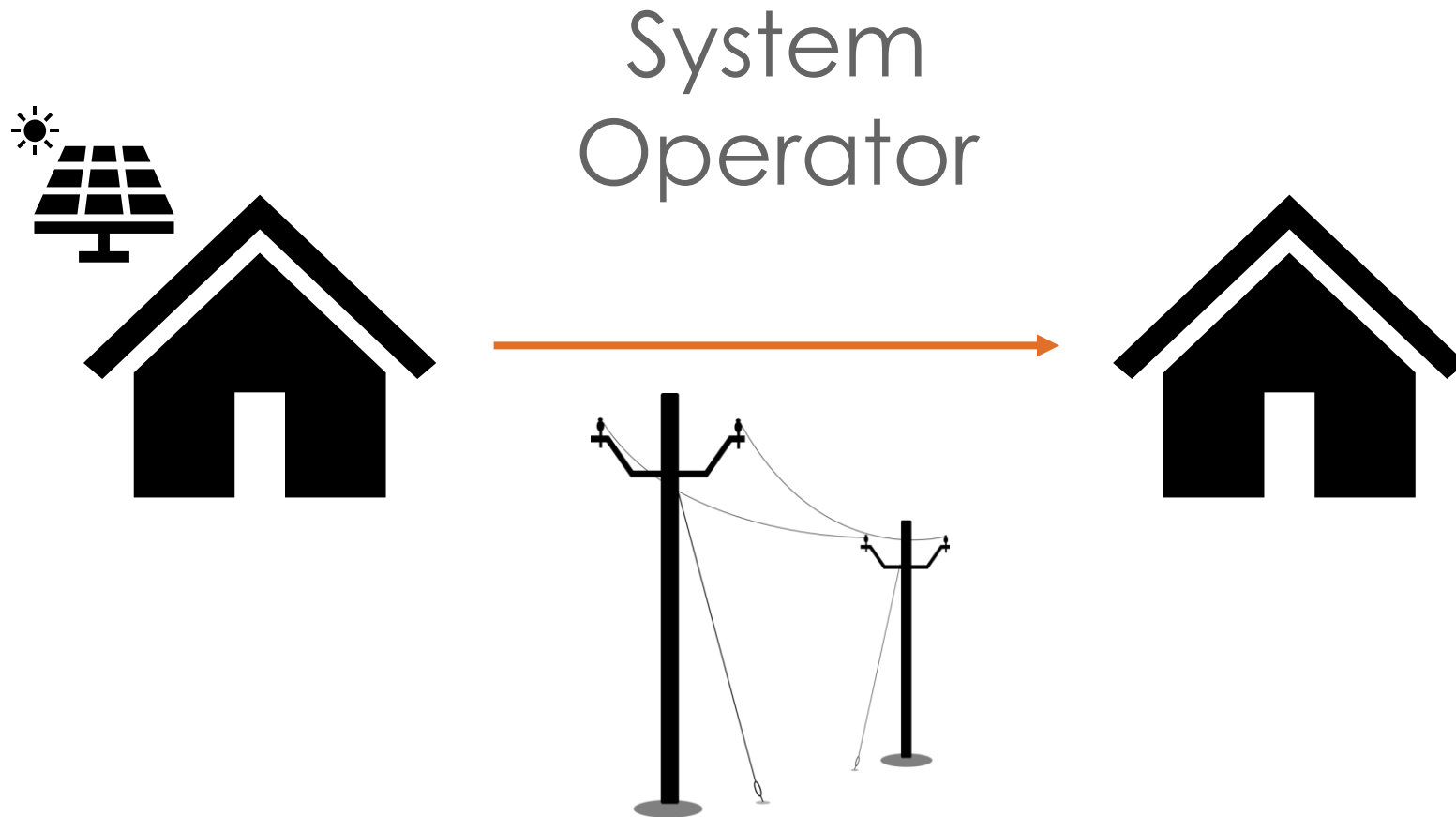
Effect of Prediction Errors on *Peer-to-Peer* Electricity Market Profits



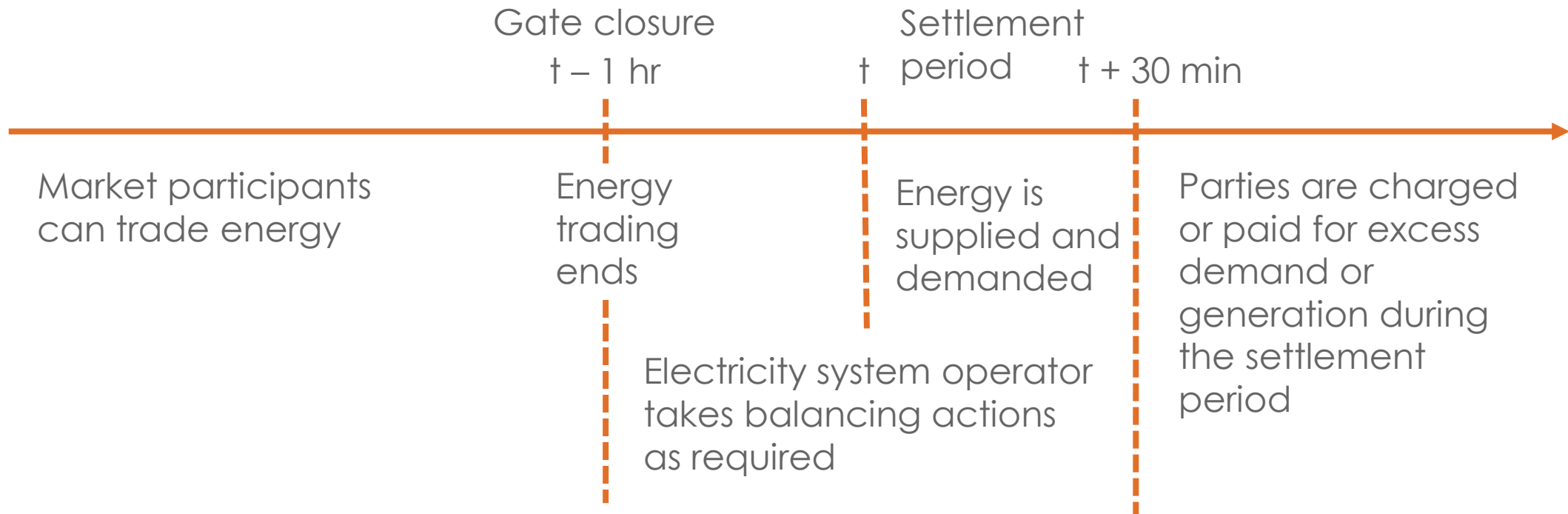
Effect of Prediction Errors on Peer-to-Peer Electricity Market *Profits*



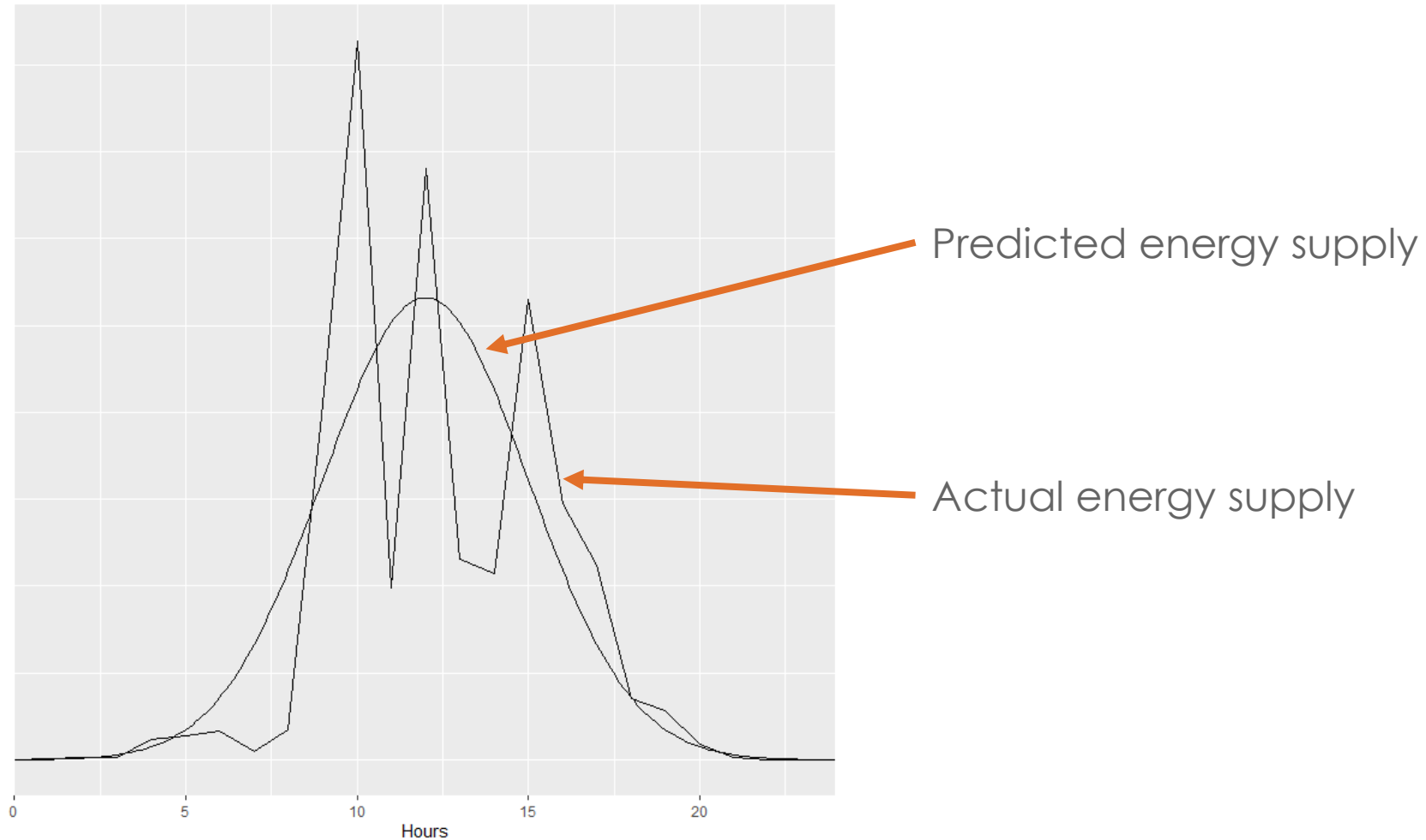
Effect of Prediction Errors on Peer-to-Peer Electricity Market Profits



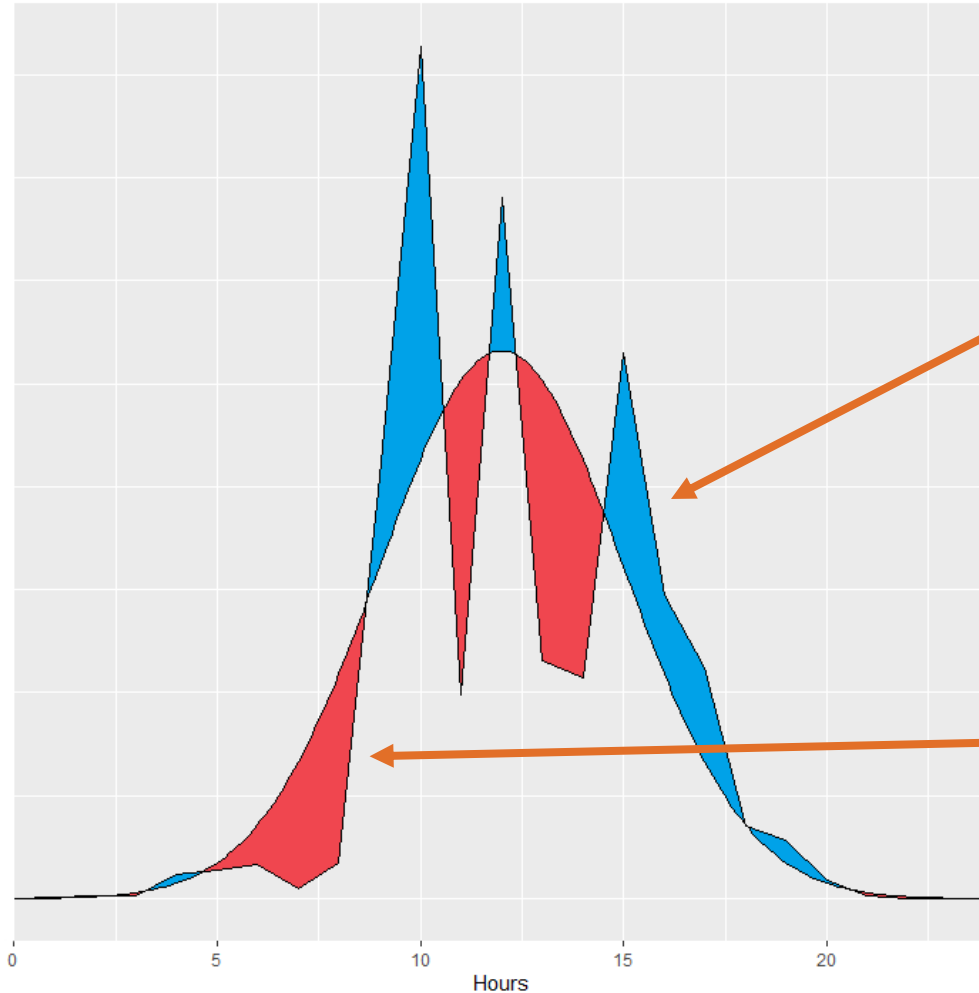
Energy Trading Timeline



Generation from a rooftop solar panel



Generation from a rooftop solar panel



System Sell Price

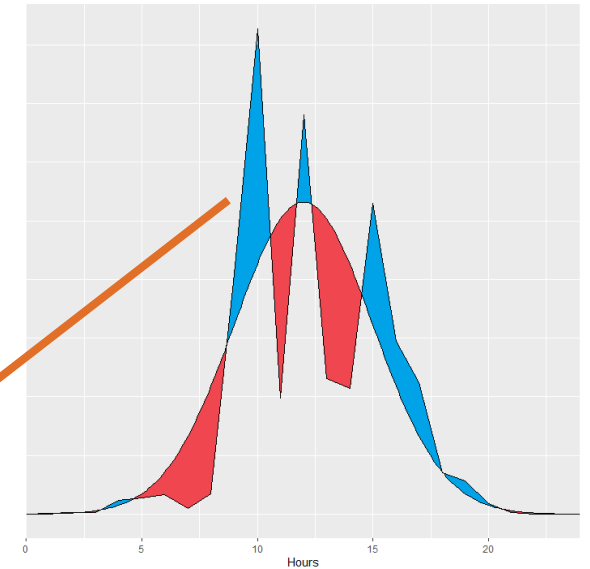
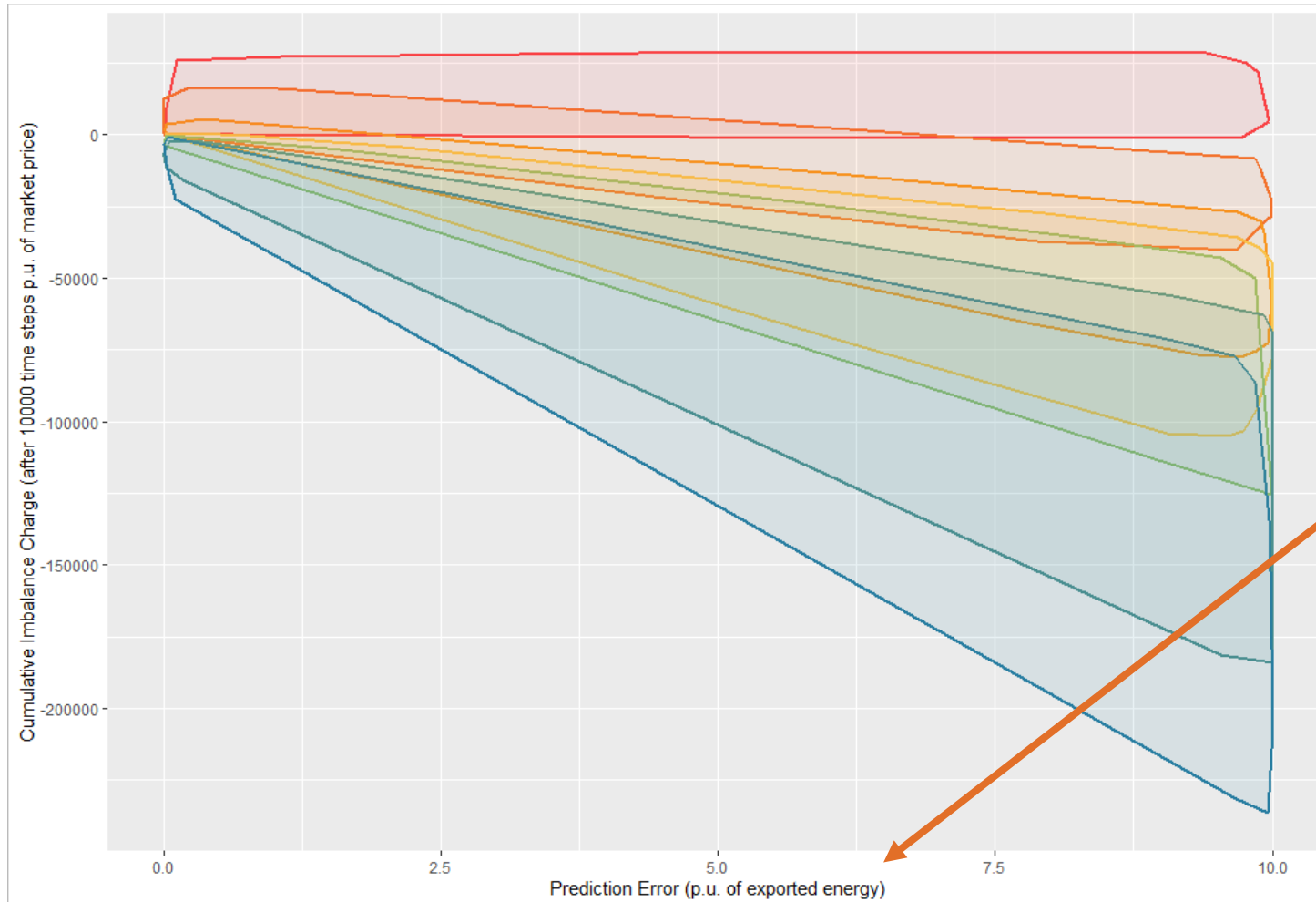
If households generate too much energy or demand too little... it depends:

- In some countries (including Great Britain) you will be paid for the excess energy.
- In some countries you must pay a penalty for the excess energy.

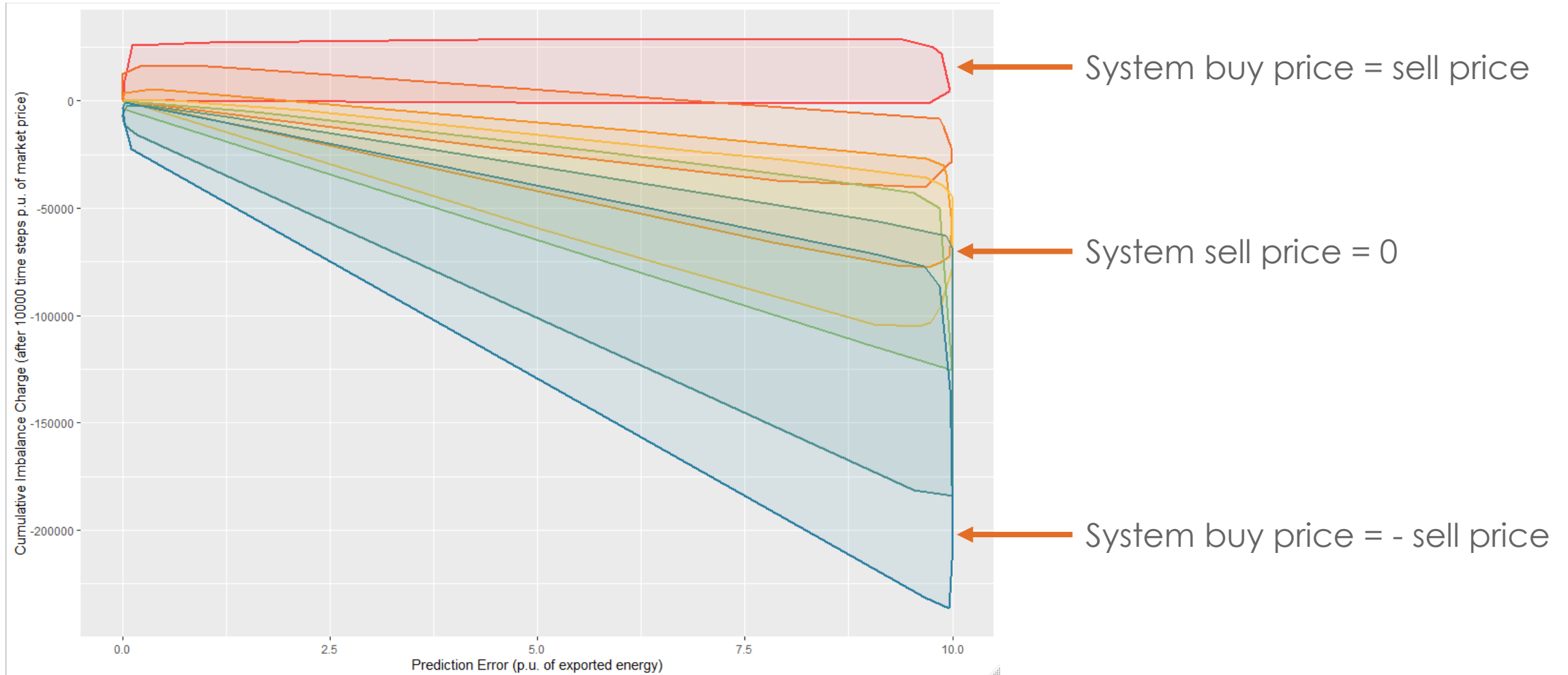
System Buy Price

Households must pay where they have not produced enough energy, or demanded too much

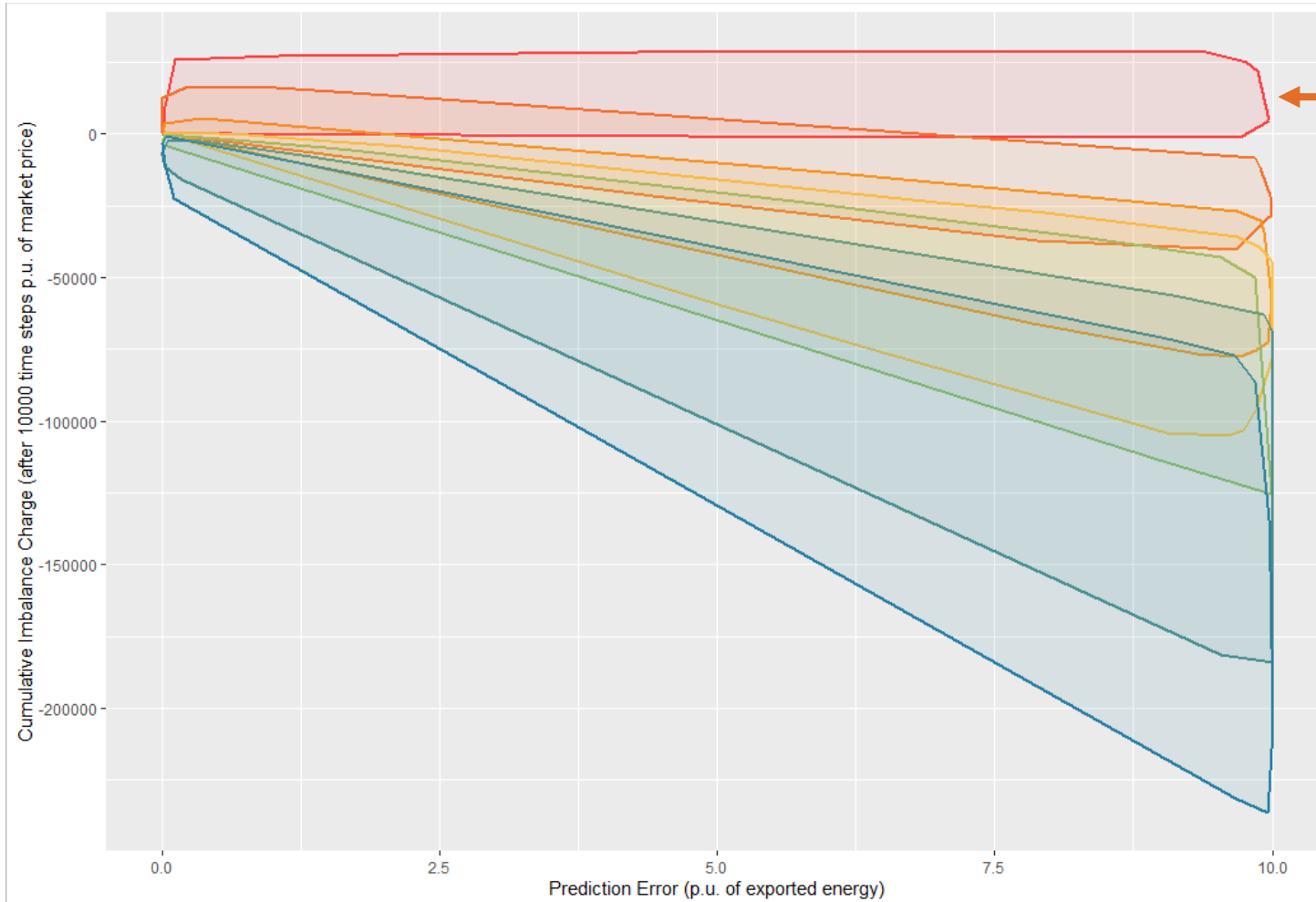
Cumulative Imbalance Charge vs Standard Deviation of Prediction Error



Cumulative Imbalance Charge vs Standard Deviation of Prediction Error

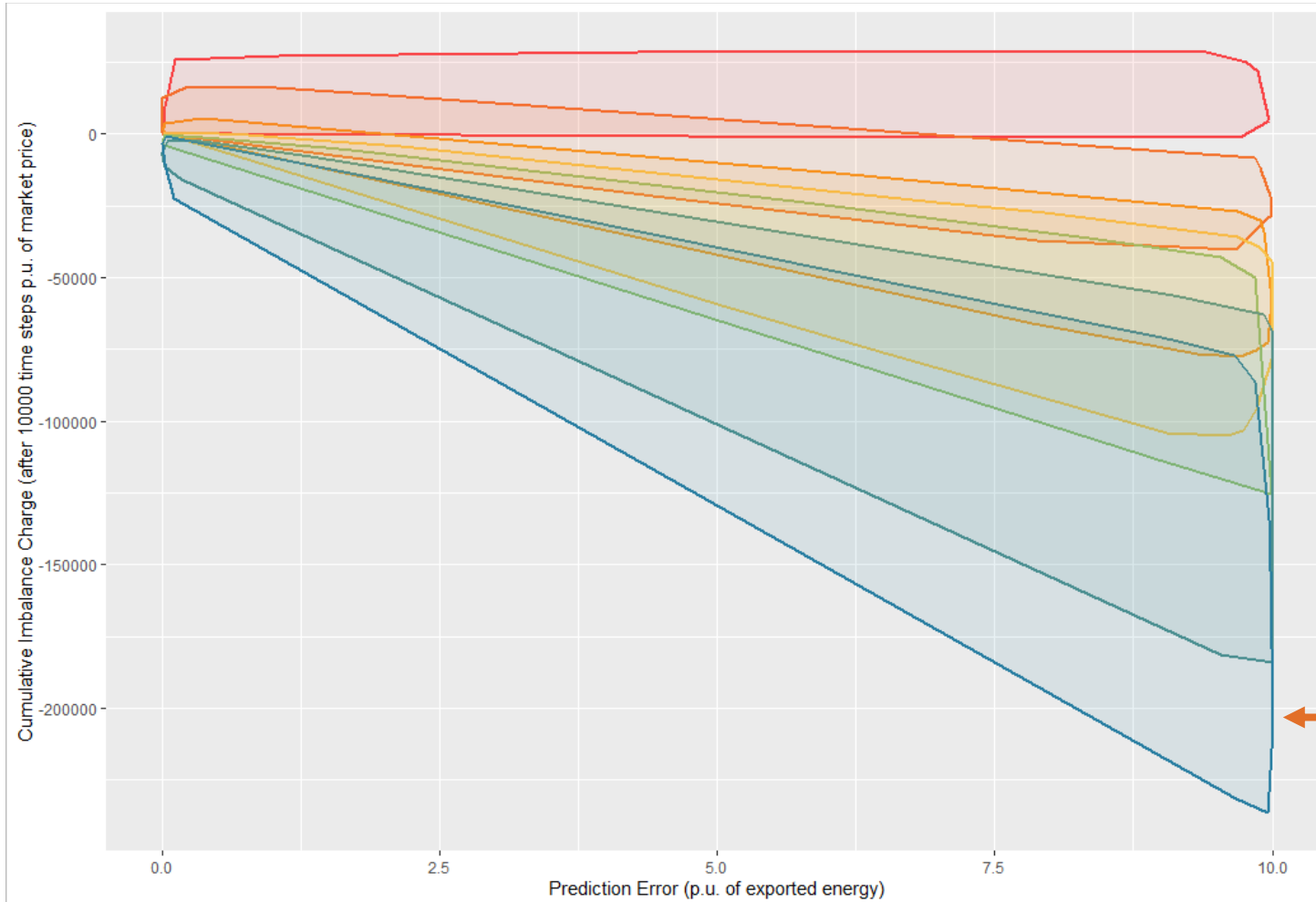


Cumulative Imbalance Charge vs Standard Deviation of Prediction Error



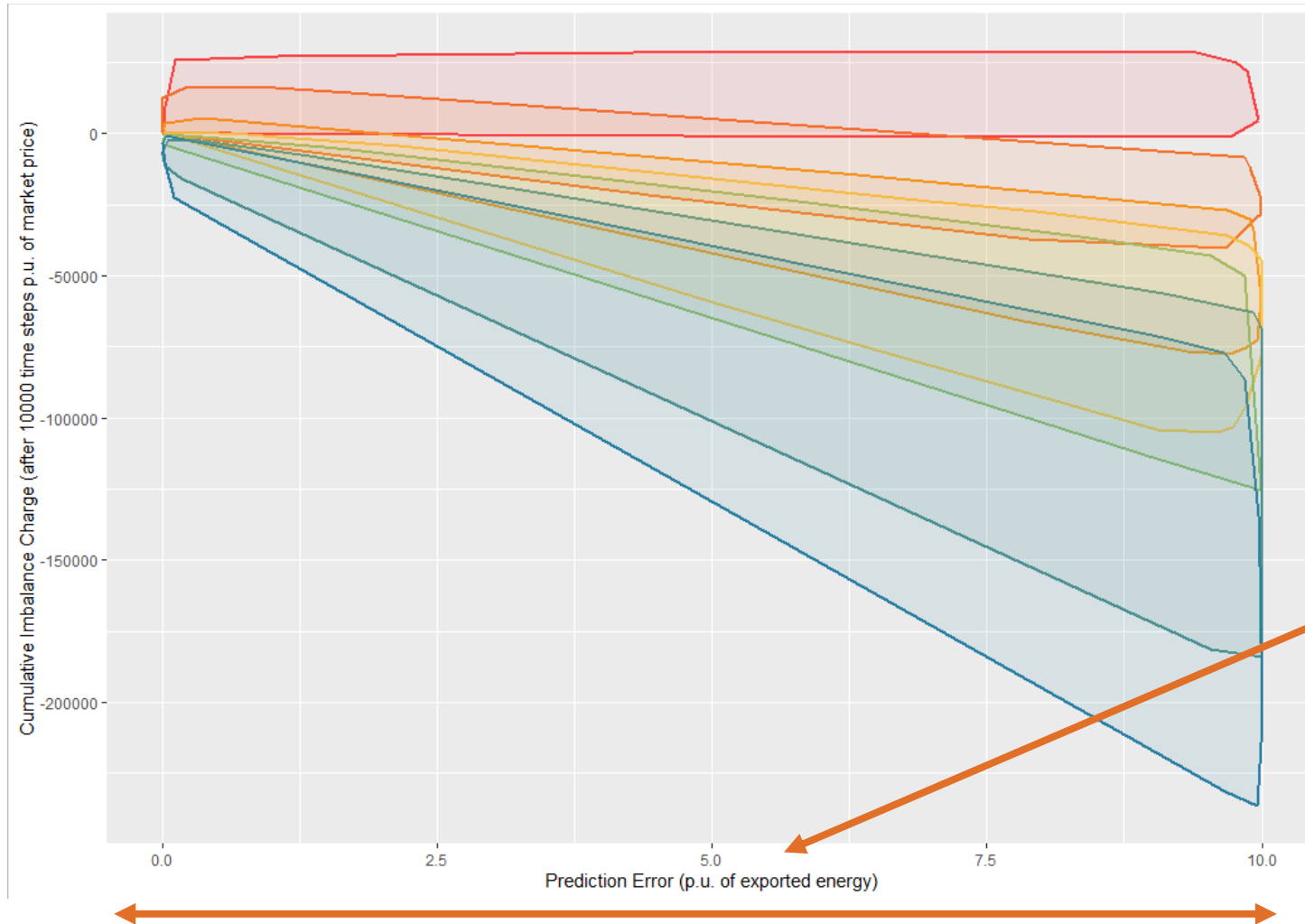
← **System buy price = sell price**
Household profit is not affected by how accurately they can predict their future supply and demand.

Cumulative Imbalance Charge vs Standard Deviation of Prediction Error



System buy price = - sell price
Households are heavily penalised for not being able to accurately predict their supply and demand of energy.

Cumulative Imbalance Charge vs Standard Deviation of Prediction Error



A households ability to predict their supply and demand depends on a lot of factors, e.g.:

- Type of loads and generation
- Storage
- Demand response

Conclusions

- In some regimes imbalance charges are not an effective incentive for households to accurately predict their supply and demand for energy (including Great Britain).
 - The system operator be negatively affected by the additional imbalance.
- In other regimes imbalance charges can significantly hurt profits in peer-to-peer electricity market profits.
 - Models of peer-to-peer market profit must take account of imbalance charges.
 - The ability of households to predict their own supply and demand is important. (Affected by storage, demand response, consumer behaviour, algorithms.)

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