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Electricity Price for Commercial End Users in the UK

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AIM

Identify, characterise and aggregate all the components of the electricity bill to produce regional half-hourly electricity price curves and inform investment decisions on energy savings.

BACKGROUND

The increase in the electricity bills and the new opportunities to participate in the electricity market have encourage companies with activities not related to the energy industry to engage and actively participate in the electricity market. With the overarching goal of making cost-effective investments and decarbonising their operation, the first step to improve these companies' bottom line is to comprehend their electricity costs: when companies demand electricity and how the electricity price changes with the time and the space.

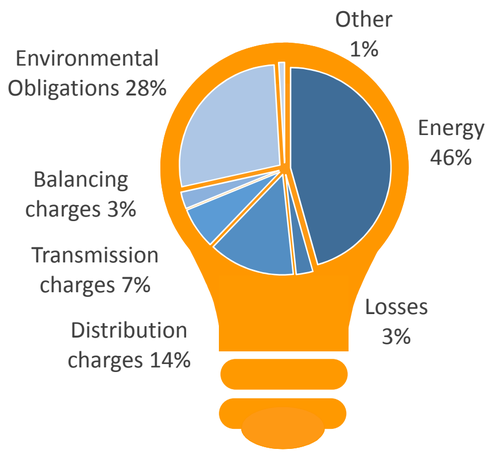

Figure 1 Division of the costs of a commercial electricity bill in 2016-17

The complexity of the electricity bill in the UK is often a barrier for companies to assess energy efficiency projects. The bills are formed by multiple components, which are charged based on different criteria, varying with the time, the space and the connection voltage level.

RESEARCH QUESTIONS

- What are the components of an electricity bill?
- What are the parameters that affect the electricity price?
- When and where do the highest electricity prices occur?

METHOD

Group	Components	Data and sources
HH Settled	Commodity BSUoS Transmission Loss Multiplier	Two year of half-hourly historical data from Elexon and National Grid
Deterministic	DUoS commodity Line Loss Factor Capacity Mechanism	Annual tariffs published by DNO companies.
Non-kWh based	DUoS capacity TNUoS	Annual tariffs from DNO companies and National Grid. Sainsbury's demand data
Constant	RO, CCL, FiT AAHEDC, CfD	Official data published by Ofgem and the Government.

Table 1: Components of the electricity bill

All the components are aggregated to create 5040 half-hourly curves: for every natural month from April 2015 to March 2020, distinguishing between weekdays and weekend days, for three connection types (High Voltage, Low Voltage Substation and Low Voltage) and 14 DNO regions.

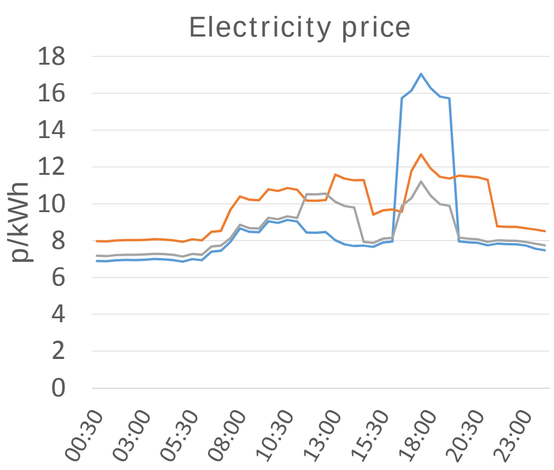

Figure 2 Half-hourly electricity price in a weekday of June in 2016-17, for a consumer connected to HV in the South East, Northern Scotland and London.

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RESULTS

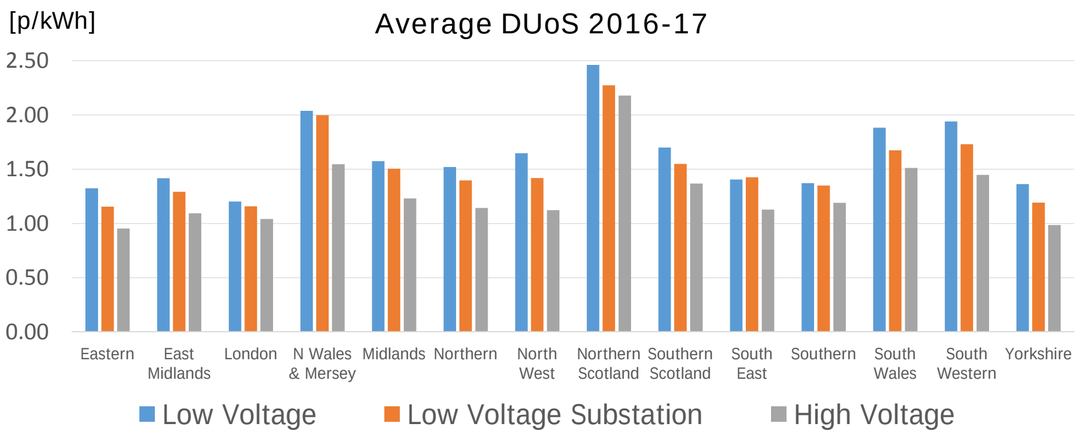

Figure 3: Average regional distribution charges in 2016-17 for three different connection types

Transmission charge tariff

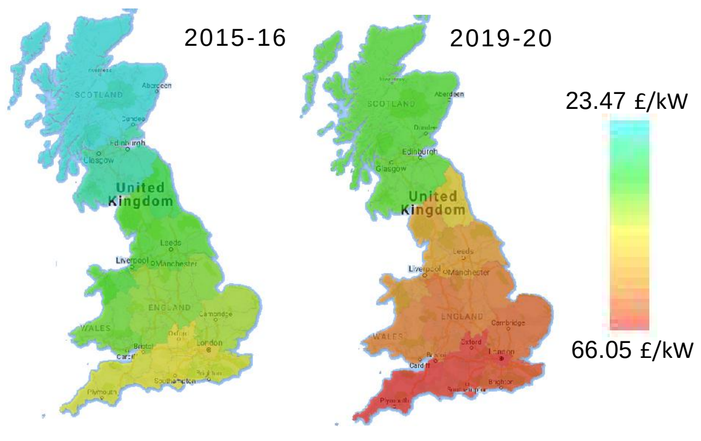

Figure 4: TNUoS tariff across the UK in 2015-16 and 2019-20.

Network charges are the main driver of the price spikes and the price differences between regions. Their relevance will increase by 19% from 2015-16 to 2019-20, increasing these temporal and spatial differences.

Annual average electricity price

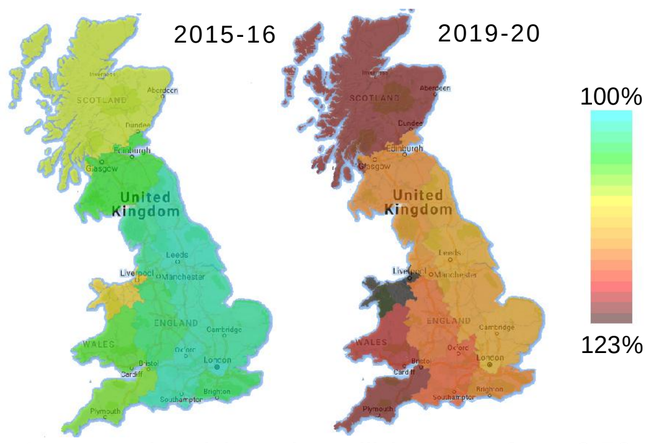

Figure 5: Regional average electricity prices in 2015-16 and 2019-20 for consumers connected to HV.

Average electricity price will increase from 9.56p/kWh to 10.69p/kWh (12%) in the 2015-2020 period. The highest increase will happen in Southern England (15%) and the lowest in Northern Scotland (9.6%).

CONCLUSIONS

Electricity price for commercial end users is expected to continue to rise and become a key concern for businesses, promoting investment in energy saving.

Properties connected to Low Voltage should offer a better financial return on investment for energy saving projects.

The difference between the highest and the lowest electricity prices will increase in the future, increasing the potential of load shifting and flexibility.

Maximum import capacity tariffs in London and Northern Scotland are high so special attention must be paid to the contracted capacity in these regions.

The regions of Northern Scotland and North Wales & Merseyside are the most expensive to run a business and therefore the most attractive to invest in energy saving measures for companies with offices across the entire country.

REFERENCES

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