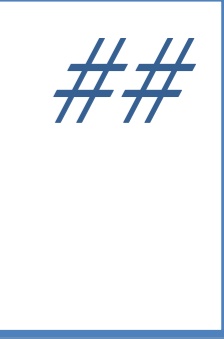


ASSESSING THE IMPACTS OF OFGEM'S TCR ON LARGE NON-DOMESTIC CONSUMER BILLS: USING DATA ANALYTICS TO CREATE CLARITY IN THE ELECTRICITY MARKET



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1. AIM

To develop a model for quantifying the impact of Ofgem's network charging reform project (TCR) on the Non-domestic consumer bill. The target is to provide insights to large industrial consumers on what a possible post-TCR market might look, and how these changes are reflected in their costs. More specifically, this paper investigates Ofgem's proposals regarding TGR tariff and DUoS residual tariffs.

2. BACKGROUND

Ofgem launched the Targeted Charging Review Significant Code Review (TCR- SCR) in 2017. TCR-SCR aims to review and reform the network charging arrangements associated with the recovery of fixed costs of both the transmission and distribution networks [1].

Several key factors have driven the need for a change in the charging structure:

- The imminent penetration of large and unpredictable loads such as electric vehicles (EVs) has created a need for more efficient network utilization to limit future re-enforcement costs [2].
- the system's transition from a passive demand with large-scale and centrally dispatched power stations to a relatively flexible and distributed system with a wider variety of actors in the play

A changing system requires updated regulation in network charging.

3. METHODOLOGY

Figure 1 – Framework for Modelling Impact of Ofgem's TCR on the Consumer Bill

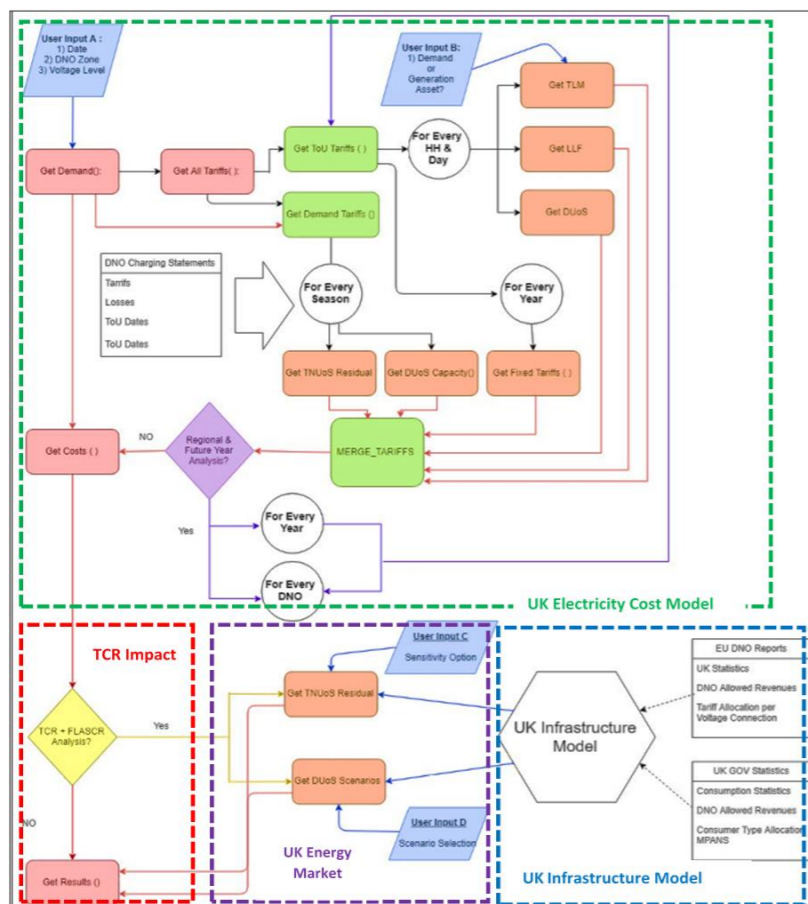
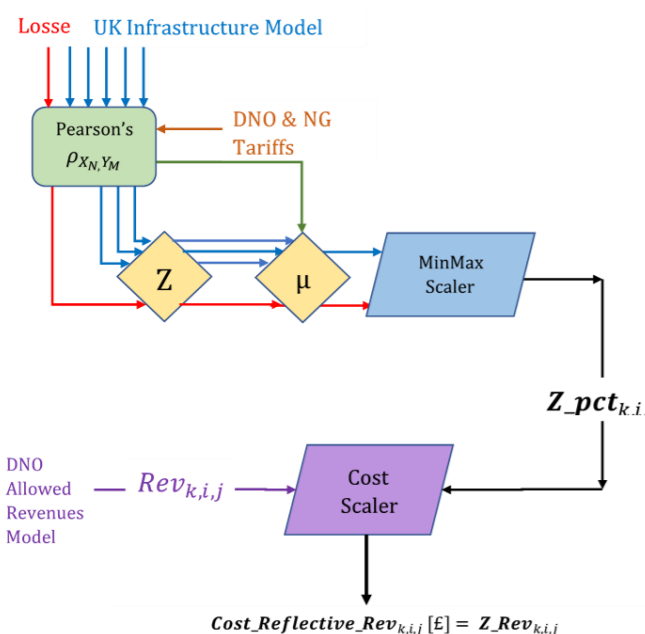


Figure 2 – Framework for Modelling Ofgem's Principals



Consumer Cost Model:
HH costs for DNO region and voltage connection of the site for a predefined FY

UK Infrastructure Model:
MPANs & consumptions per voltage connection for all UK DNO regions

UK DNO Market Model:
UK DNO allowed revenues retrieved per voltage connection across UK regions

TCR Impacts:
Quantify how ND consumer costs are disrupted from Ofgem's TCR policy

Cost-Reflectivity:
This means that the higher the usage, the higher the charge. Charges based on this route are likely to reduce market distortions

Practicality:
The smallest possible deviation from the current market agreements structure

$$z_{pct_{k,i,j}} = \frac{\text{Min Max}\{z_{k,i,j}\}}{\sum_j \text{Min Max}\{z_{k,i,j}\}}$$

$$Z_{Rev_{k,i,j}} = Rev_{k,i,j} z_{pct_{k,i,j}} \left(\frac{\sum_{i,j} Rev_{k,i,j}}{\sum_{i,j} Rev_{k,i,j} z_{pct_{k,i,j}}} \right)$$

3. RESULTS:

Figure 3 – Imperial SK Costs 2018/19 Detailed Breakdown

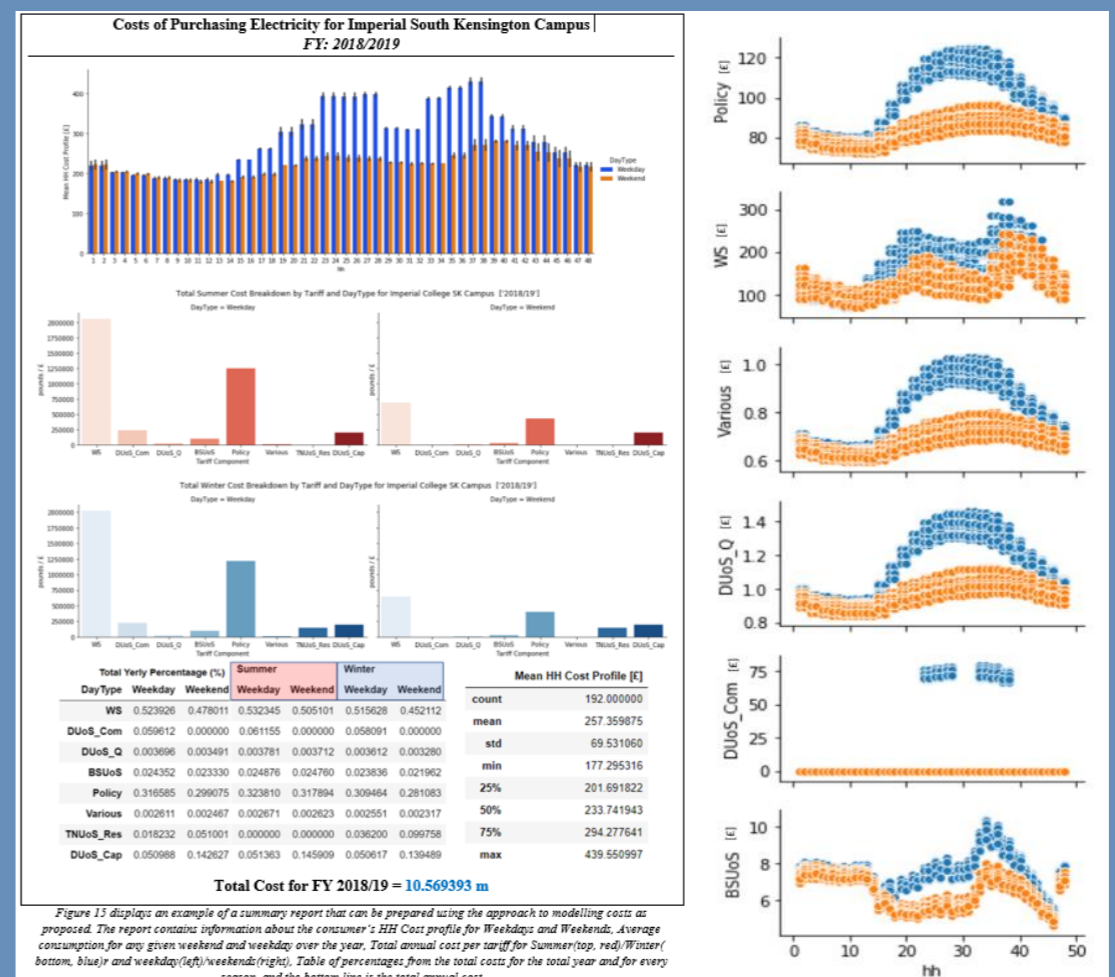


Figure 13 displays an example of a summary report that can be prepared using the approach to modelling costs as proposed. The report contains information about the consumer's HH Cost profile for Weekdays and Weekends, Average consumption for any given weekend and weekday over the year, Total annual cost per tariff for Summer/ep, red/Winter/ bottom, blue/ep and weekday/ep/weekend/ep/ep. Table of percentages from the total costs for the total year and for every season, and the bottom line is the total annual cost

Table 1 - Imperial SK Future Cost Projections

	FY	2018/19	2019/20	2020/21	2021/22	2022/23
Total Annual Cost [€m]		10.569393	12.17377	10.919381	13.862844	14.750969

Figure 4 – Post-TCR Market DUoS Commodity Tariffs

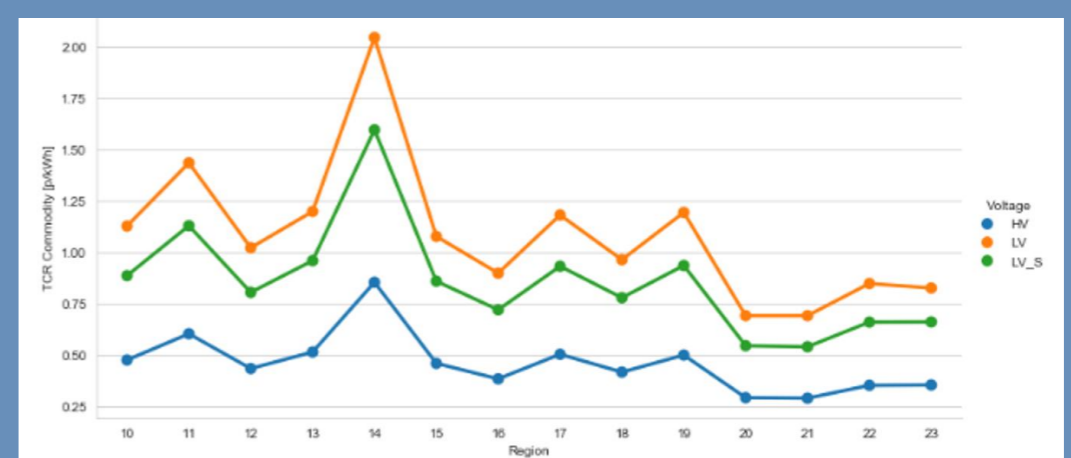
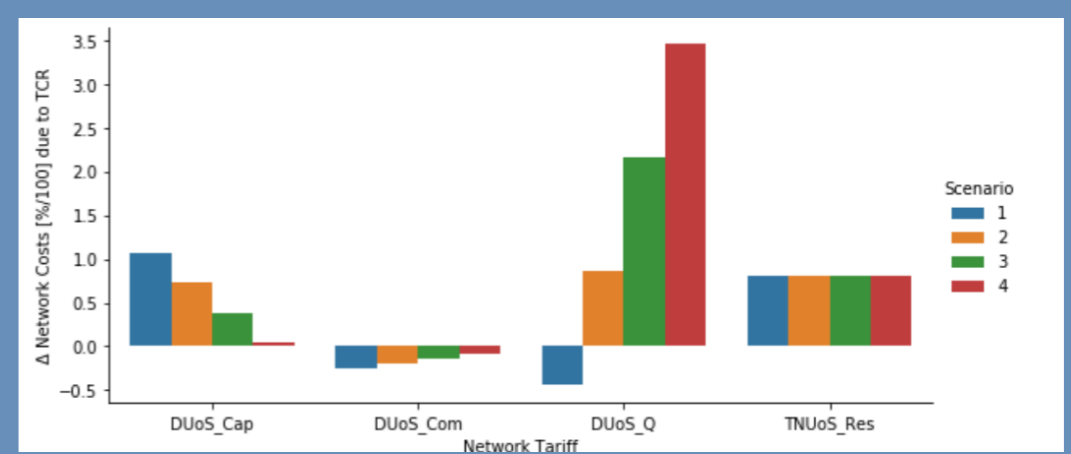


Figure 5 - TCR Impacts on Imperial SK Campus Network Costs



4. CONCLUSIONS AND RECOMMENDATIONS

- Imperial SK Campus costs show a 7% increase in annual electricity costs in a cost-reflective and practical post-TCR market. - HV & DNO Region 12
- This would likely result in an increased appetite for investments in flexible demand and battery technologies
- It is recommended to Ofgem to carefully investigate the cases where HV consumers see a decrease in costs. This could potentially reduce the appetite for time-of-the-day investments and result in TCR being counterproductive with the implemented Energy Policies over the last decade.

5. REFERENCES

- Ofgem "Distributional and wider system impacts of reform to residual charges."
- Embedded Benefits: Impact Assessment and Decision on industry proposals to change electricity transmission charging arrangements for Embedded Generators", 2018