

Summary of Time of Use discussion and consideration

28 Feb. 18



1. Introduction

A Time of Use (ToU) electricity tariff is different to a traditional flat rate tariff in the sense it has different prices at different time periods during the day. Similar tariffs are available today to business users where the prices they pay for electricity are more reflective of the time they use it. Further, UK households also have options of off-peak electricity through for example a tariff known as Economy 7. However this requires two separate analogue meters to give you 2 different rates, one for daytime and one for nighttime.

The concept of ToU is developed to encourage domestic customers to use more energy at times when national demand is lowest (off peak times) and costs are subsequently cheaper. This naturally implies that customers can lower their bills and the pressure on the grid can be reduced. However this is true only if a customer is already using power at the off peak times or is able to change their energy use patterns.

Suppliers provide customers with a flat rate tariff, however the cost to the supplier are made up of variable costs which change within the day/month/year, some of the variable costs are shown below: These costs are split into two groups and shown below in Figure 1.

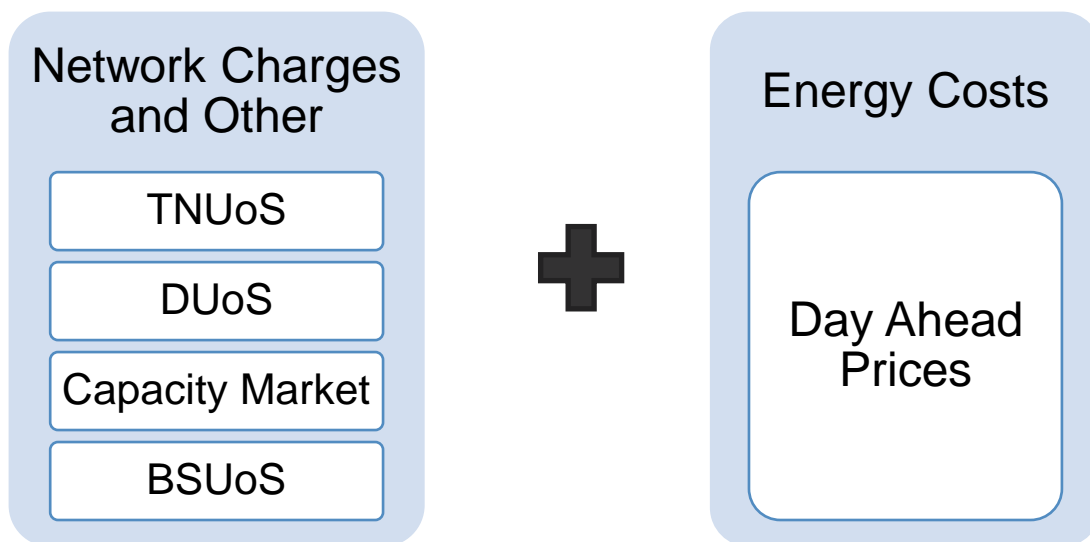


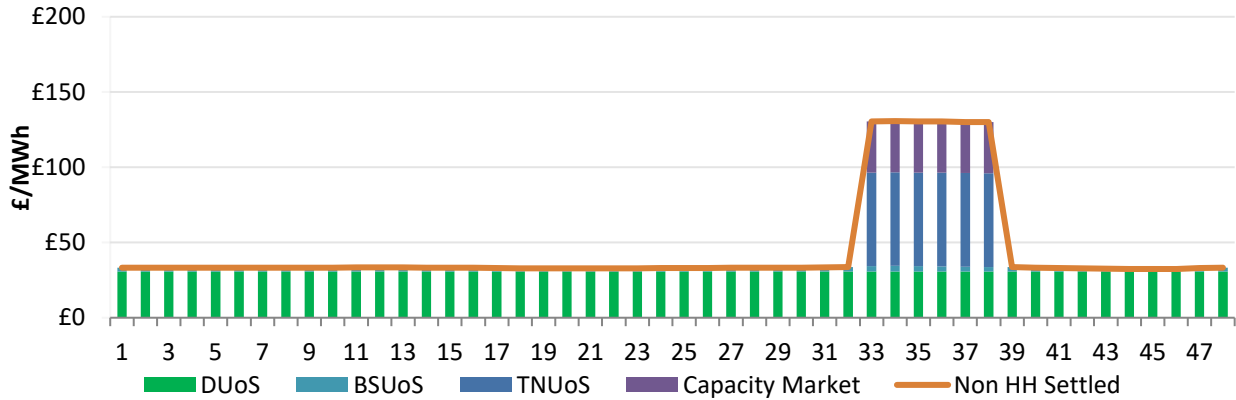
Figure 1: Network charges, BSUoS, and Capacity Market together with the wholesale cost of electricity are some elements of a domestic customer's bill that are influenced by the time in which electricity is used.

Investigating and analysing these costs, could lead to alternative tariff designs, or ToU tariffs, that could be either static or dynamic in nature. For the purposes of this document, a specific tariff is not designed or selected. Rather we show on a half hourly basis¹ where costs for NHH domestic customers are charged to suppliers. It is then ultimately up to the supplier to choose how to pass it through to the customer. For example, not every supplier will want to give a different price for each separate half hour.

¹ Even though NHH customers by definition are not settled by HH, the costs are charged to suppliers on a HH by HH basis (Currently these charges are applied to the 'profiled' HH shape).

2. Network Charges for NHH domestic customer

In Graph 1 below; DUoS, BSUoS, TNUoS and Capacity Market are positioned where they are charged to suppliers for NHH customers. The orange line is the sum of all elements .The graph demonstrates there is limited within-day movement for anything other than TNUoS and Capacity Market.

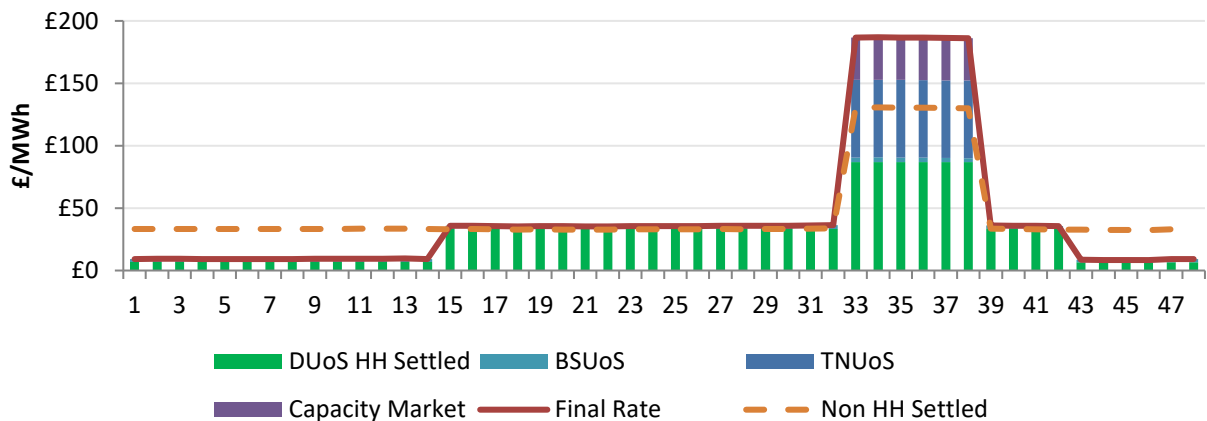


Graph 1: Cost stack for domestic customer NHH settled

Source: Refer "References" section

3. Network Charges for potential HH domestic customer

Assuming equivalent charges for the same cost elements as NHH domestic customer above, however using HH settled domestic DUoS, which has a Red/Amber/Green time banding, the bars in Graph 2 represents cost elements for a potential HH settled domestic customer.



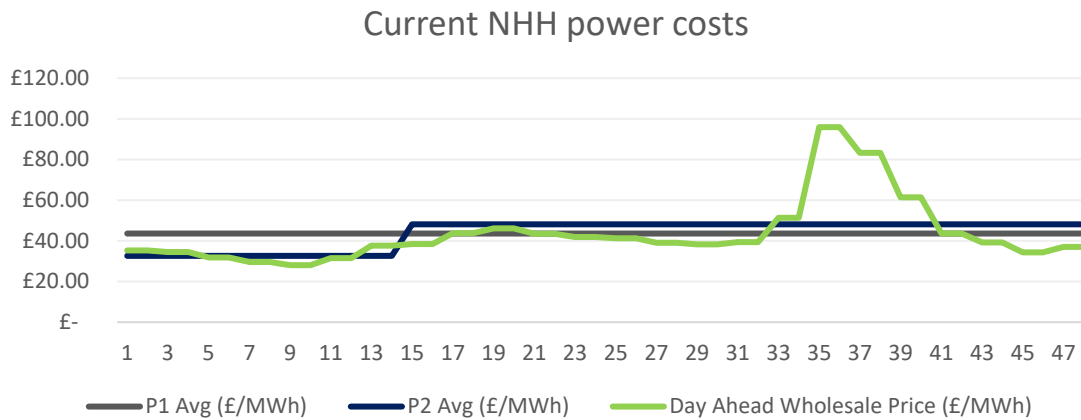
Graph 2: Potential cost stack for domestic customer HH settled

Source: Refer "References" section

What we can conclude from the above is that if a supplier were to pass costs through on a half hour by half hour basis, the cost in HH33 could be £150/MWh more expensive than in HH32.

4. Energy Cost for NHH domestic customer

Using average day ahead wholesale price for Winter 2016, Graph 3 below shows the energy cost to a domestic customer Profile 1 (grey line) and Profile 2 (blue line), whereas the real energy cost to the supplier is depicted by the green line.



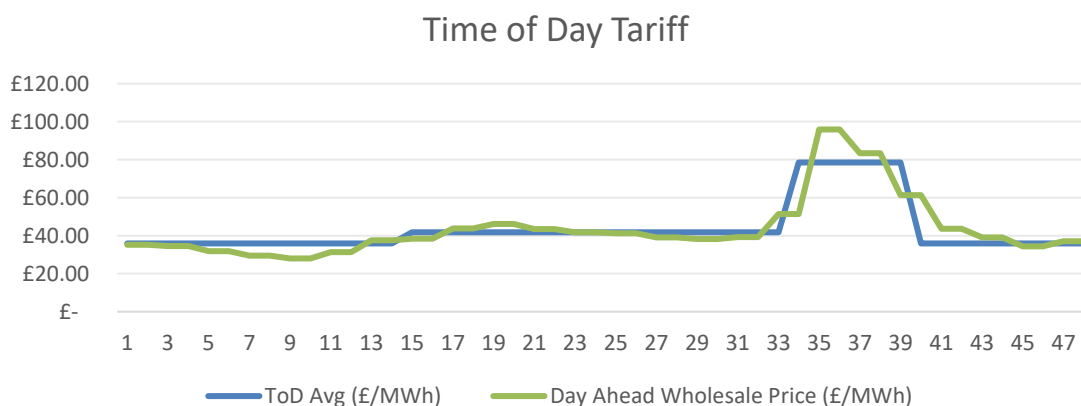
Graph 3: Domestic profiles vs Average of day ahead market prices for winter 2016

Source: Refer "References" section

5. Energy Cost for potential HH domestic customer

To demonstrate further, a supplier could shape the energy cost into a more reflective Time of Day (ToD) energy cost for domestic customer i.e. a cost that more accurately represents the wholesale market prices. The customer would therefore pay different rates for power depending on the time of day it is consumed. The times and rates could further change from day to day.

This shape has not been researched or designed in any scientific way for purposes of this paper, however an example is provided in Graph 4 below showing cost can be shifted by about £40/MWh but will vary dramatically seasonally and annually



Graph 4: Example of Time of Day tariff

Source: Refer "References" section

This Energy ToD costs together with the Network ToU costs could inform the basis for a ToU tariff design.

6. References for cost stack

- TNUoS:
<http://www2.nationalgrid.com/UK/Industry-information/System-charges/Electricity-transmission/Approval-conditions/Condition-5/> .
Prices for Winter 17, Weekday
Effective from 1 April 2017
- DUoS:
<https://www.ssepd.co.uk/Library/ChargingStatements/SHEPD/>
Prices for Winter 17, Weekday
- Capacity Market:
<https://www.emrdeliverybody.com/CM/Registers.aspx>
Prices for Winter 17, Weekday
- BSUoS:
<http://www2.nationalgrid.com/bsuos/>
Prices for Winter 2017, Weekday
- Day Ahead Market Prices:
<http://www.nordpoolspot.com/Market-data1/GB/Auction-prices/UK/Hourly/?view=table>
Averages for Winter 2016