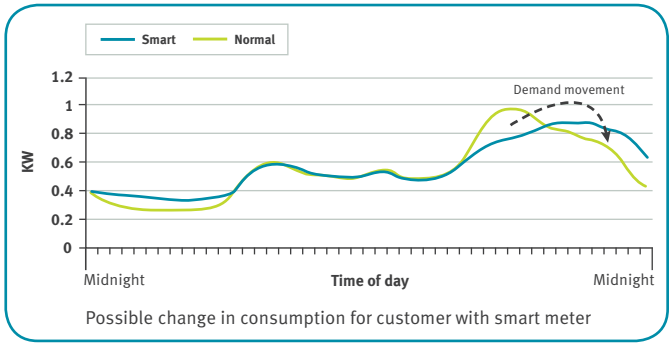
Smarter settlement – making the most of tariff innovation

The energy industry is undergoing generational change as we transition to a low carbon economy. Challenging government targets will mean working at a relentless pace, building new generation plant, investing in the transmission and distribution networks and improving consumer information.

As the first of many changes, smart meters are expected to deliver benefits for consumers and energy suppliers alike. Consumers will have better information to allow them to actively manage their energy consumption, and suppliers will be able to communicate with meters remotely and take advantage of process efficiencies that this provides. Many of the expected benefits rely on consumers reducing their overall electricity consumption or shifting their usage to different times of the day, to flatten out Great Britain's demand profile, and reduce the need for 'peak only' generation plant.



Possible change in consumption for customer with smart meter

Consumers will be incentivised to change behaviour by new innovative tariffs and clear and immediate indications of the cost of the energy they are using, via an 'in home display'. The tariffs they sign up to can provide price signals based on the time of day – these are often referred to as 'time of use' and 'critical peak pricing' tariffs.

Within the electricity market, for suppliers to obtain the full benefit of their actions in changing demand patterns, their customers modified usage needs to be settled in the wholesale market – allowing for the supplier to accurately pay for the electricity actually used. The settlement arrangements need to be able to reflect changes in individual consumer's demand in the aggregated consumption of their electricity suppliers. Here we explore what can be done under the current industry arrangements, and how to build on them as we move to a smart enabled world.

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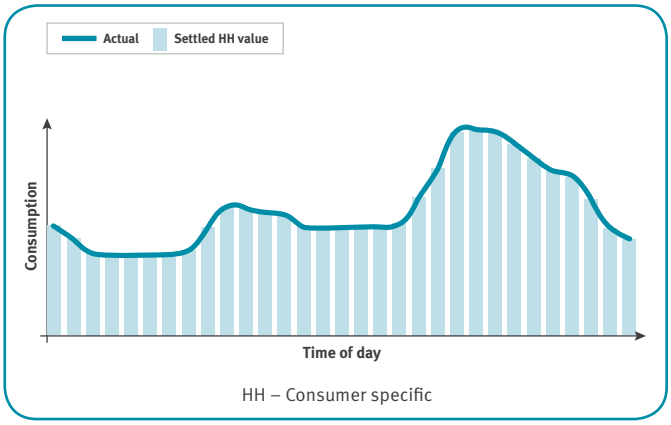
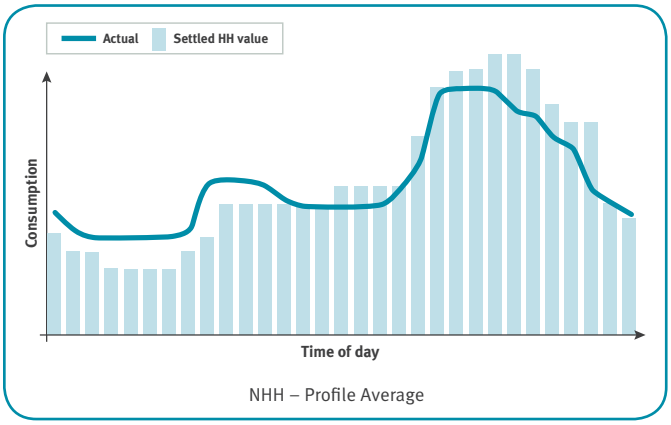
What is done today in Settlement with these 'incentivising' tariffs?



HH – Consumer specific



NHH – Profile Average

Using Half-hourly Consumption Data

The clearest way to evidence consumer behaviour is to record meter data at a resolution that directly shows any change. As settlement is done by the half-hour, the ideal resolution for metered data is half-hourly.

- Using half-hourly metered data allows changes in consumer behaviour to be fully reflected in settlement;
- Across the GB electricity market there are currently 110,000 half-hourly meters. These are typically installed at large commercial and industrial premises. Half-hourly meters measure around 150 TWh of consumption annually, which is just under 50% of national consumption; and
- Smart meters can record consumption half-hourly. Using this resolution of data in settlement is not prescribed in the domestic sector.

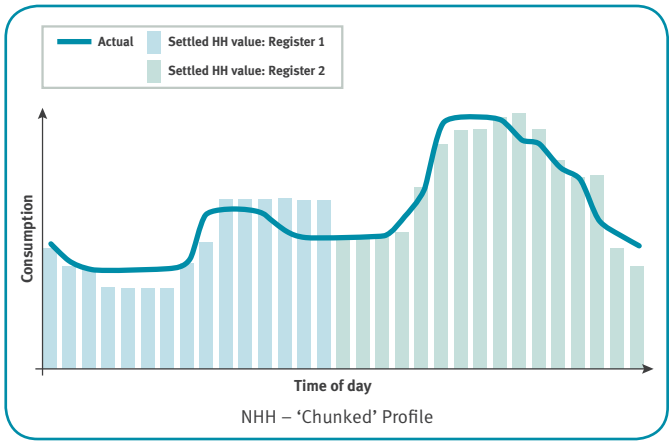
Using 'Non-half-hourly' Consumption Data

Today, the vast majority of consumers (and virtually all domestic consumers) are currently metered and settled using spot meter reads taken over extended periods – these typically range from quarterly through to annually – such data is termed 'non-half-hourly'.

- Across the GB electricity market there are over 29 million non-half-hourly metering systems that annually record 167 TWh of consumption. The domestic market comprises over 27 million metering systems and 115 TWh of consumption.

In this non-half-hourly sector, profiling techniques are used to convert the known volume of electricity between two spot meter reads – the 'meter advance'– into half-hourly values. While profiles reflect variations like regional temperatures, an identical consumption pattern is assigned to all consumers that use that profile. And while this is an accurate representation of the average consumption shape, it doesn't reflect variances in individual consumption shapes.

- Using non-half-hourly data reflects gross consumer volumes but does not reflect individual consumption shapes. Half-hourly data would reflect individual shapes.



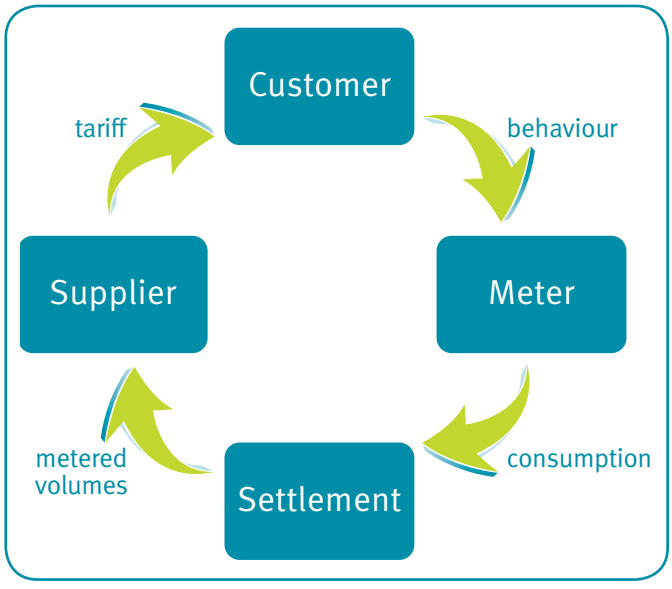
NHH – 'Chunked' Profile

What about meters with multiple registers?

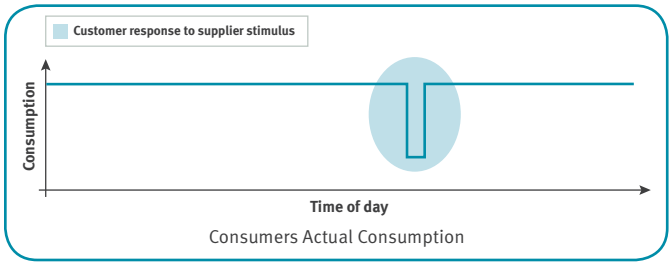
Some meters in Great Britain have multiple registers which record consumption at different times of the day or week, and so it's possible to distinguish the energy consumed at different times. A good example of this is 'Economy 7' metering with a normal (day time) register and low (night time) register. This gives a more accurate reflection of the consumption shape than using a single register, but the level of accuracy is still constrained by the interval between meter readings, typically a number of months.

The need for feedback in Settlement

We need a process that enables consumer behaviour to be accurately reflected in settlement. Maximum accuracy will come from using half-hourly meter data, but non-half-hourly meters with multiple registers can still provide improved feedback.

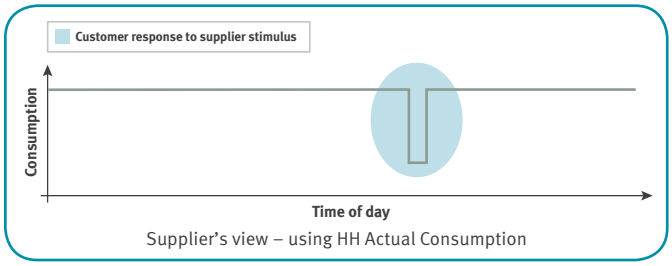


This is well demonstrated if we consider a consumer with a totally flat consumption who responds to a supplier tariff signal and reduces their consumption for a period of time.

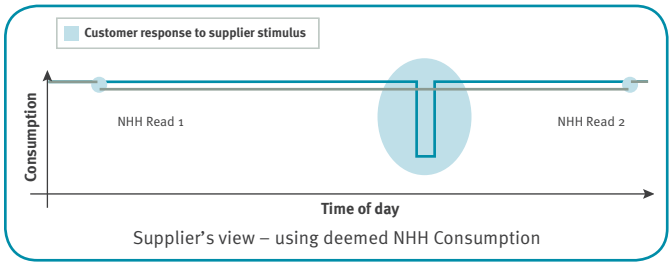


Consumers Actual Consumption

How this is reflected in settlement varies dramatically:



Supplier's view – using HH Actual Consumption



Supplier's view – using deemed NHH Consumption

As smart meters are rolled out across the country, we have the potential for more frequent meter readings, and ultimately accurate recording of the exact time of day when energy was consumed.

What does this mean for smarter settlement?

It is likely that the immediate future will see a growth in the use of non-half-hourly data from smart meters set up with multiple registers, to support the use of new time of use tariffs. We foresee a world in which tariffs and the associated meter register 'switching times' (their on and off times) will become far more dynamic. Why have a simple day and night split, when more complex and innovative patterns could be used, which help to smooth demand and reduce overall energy costs?

- **Capturing switching times:** For existing non smart meters, changing register switching times is onerous and, depending on the metering type, may require a site visit. Smart metering communications will offer a modern, quick and flexible mechanism for suppliers to reconfigure register switching times remotely. This means it will happen more often to the benefit of all. Settlement must not constrain this. By passing meter register switching times from the DataCommsCo (DCC) into settlement, we can reflect the changes to the consumers' demand, and more accurately reflect this into suppliers' energy usage.
- **Multi party agreement of switching times:** Today, the process for introducing new register switching times needs collective supplier and distribution business consultation and approval. It may seem strange that switching times have to be shared between industry parties, including direct competitors. At the moment, this consultation is needed because changing the switching times programmed into a meter can be expensive and often remain unchanged on change of supplier event. Also, distributors need to know meter readings and switching times for their Distribution Use of System (DUoS) charging.

  In a smart world, as switching times can be changed remotely, there will be no reason for an incoming supplier to retain (or even to have access to) the old supplier's switching times. Some distribution businesses have also indicated that they are considering ways of decoupling DUoS tariffs from supplier tariffs. If these changes were made it would mean that the requirement for consultation between parties could drop away.

  Suppliers would need to share the information only with the DCC, who in turn would inform settlement. This allows for much faster and less bureaucratic changes to tariffs.

We believe that changing the current settlement arrangements to exploit the opportunities for tariff innovation is relatively straightforward, and should be addressed using our existing industry change process.

Making these changes now will help the industry to achieve the benefits that smart metering can provide in the future. ELEXON firmly believes that only way our industry will achieve the challenging low carbon targets of tomorrow is by proactively embracing the lower level changes today.

We're really keen to get your views on this and other topics in the smart metering world. Please contact Justin Andrews for more information: justin.andrews@elexon.co.uk

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ELEXON delivers a range of balancing and settlement services that are critical to the successful operation of Great Britain's electricity trading arrangements. As part of our role in ensuring that residential and business electricity settlement takes place, we have expertise in procuring and managing large industry leading contracts for systems and processes, we provide assurance services that the system works and that our customers are complying. We also managed the implementation and development of one of Great Britain's largest energy industry codes, as well as dealing with the ongoing day to day governance.

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