Smarter Tariffs – Smarter Comparisons

Executive summary

January 2023

Authors

This independent report was produced for BEIS by:

Jane Wilson & Joshua Cooper (Hildebrand Technology)

Dr Richard Carmichael (Imperial College London/Imperial Consultants)

Andrew Lever, Manu Ravishankar & Oliver Richards (Carbon Trust)

Tom Anderson & Gabriela Shutter (davies + mckerr)

Lyndsey Baker (Vital Energi)

We would like to thank BEIS for feedback during the project and comments on the report.

Any enquiries regarding this publication should be sent to us at: smartmetering@beis.gov.uk

Contents

Glossary

Table 1: Glossary of terms for this report

Term	Definition
AI	Artificial Intelligence
CPP	Critical Peak Pricing – references flat rate tariffs with some periods where prices change for certain days of very high demand
DoI	Diffusion of Innovation
DCT	Digital Comparison Tools
EAC	Estimated Annual Consumption. Used by Price Comparison Websites to make quotations if actual consumption data not provided. Data comes from ECOES.
ECOES	ECOES (the Electricity Central Online Enquiry Service) is a service funded by electricity suppliers and distributors and governed under the Master Registration Agreement (MRA). ECOES was designed to assist Suppliers in the customer transfer process by allowing the triangulation of data; it is also used to provide benefit to MRA parties and other industry stakeholders.
E7	Economy 7 (type of tariff)
E10	Economy 10 (type of tariff)
EV	Electric Vehicle
HaaS	Heating as a Service
HH	Half Hourly
Half hourly settlement	Currently elective, market-wide half hourly settlement will be implemented in 2025. A full description of electricity settlement reform is available on Ofgem's web site.
LCT	Low Carbon Technology. Includes electric vehicles, heat pumps, solar PV.
Legacy Time of Use tariffs	Economy 7 and Economy 10 are examples of legacy Time of Use tariffs
MaaS	Mobility as a Service
MHHS	Market-wide half-hourly Settlement

NEA	National Energy Action is a fuel poverty charity that works to eradicate fuel poverty and campaigns for greater investment in energy efficiency to help those who are poor or vulnerable gain affordable heat. nea.org.uk
OTEC	Operational Change Required and Technical Complexity
PCW	Price Comparison Website
RD&D	Research, development and demonstration
REGO	Renewable Energy Guarantees of Origin
SECAS	Smart Energy Code Administrator and Secretariat
STSC	Smarter Tariffs – Smarter Comparisons
TCR	Targeted Charging Review
TDCV	Typical Domestic Consumption Value
TIL	Tariff Information Label
TOU	Time of use (tariff)
VPP	Virtual Power Plant

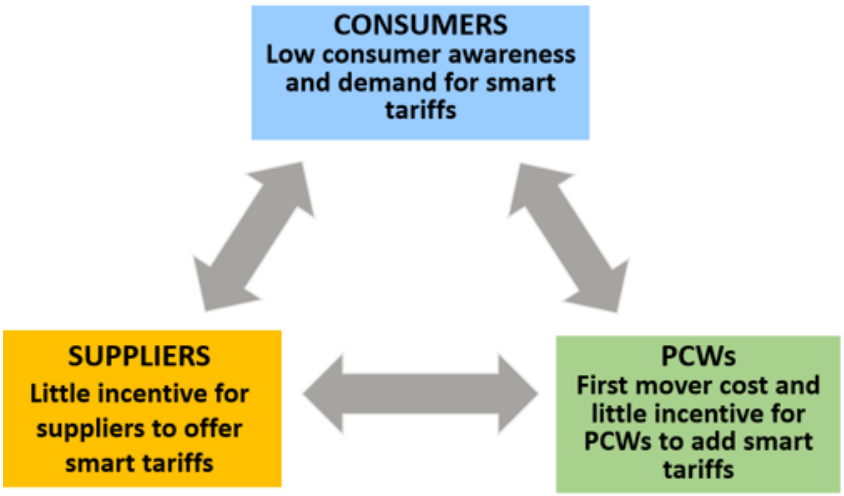
Executive Summary

Introduction

As part of the UK's legally-binding net zero target[1], the government has a clear objective to transition to low-carbon, affordable and fair energy for all. A smart and flexible energy system is essential for integrating high volumes of low carbon power, heat, and transport. Flexibility in household electricity consumption will make an important contribution, especially as the electrification of transport and heating proceeds. Much will depend on consumer engagement with smart tariffs and technologies that enable and reward them to shift electricity demand. This will require supporting more informed consumer choices that could drive industry innovation and the smart meter rollout offers important opportunities to be seized.

Current tariff comparison tools do not include smart tariffs or use smart meter data. This severely limits the opportunities for consumers to understand the benefits of smart time of use (TOU) tariffs and related low carbon technologies (LCTs) such as electric vehicles. With low consumer demand, there is limited incentive for suppliers to offer smart tariffs or for price comparison websites (PCWs) to develop the tools to include them in their market comparisons.

Figure 1: Low stakeholder engagement with smart tariffs and smart comparisons



The *Smarter Tariffs – Smarter Comparisons* (STSC) project – funded through BEIS's £505m Energy Innovation Portfolio[2] - aimed to **address this market failure** by delivering a prototype comparison tool[3] and related documentation that includes smart tariffs and uses

[1] The Climate Change Act 2008, 2050 Target Amendment, 2019
[2] https://www.gov.uk/guidance/funding-for-innovative-smart-energy-systems. The Energy Innovation Portfolio provided funding for energy innovation between 2015 – 2021.
[3] https://smarttariffsmartcomparison.org/

half-hourly consumption data from smart meters. The resulting open source STSC tool[4] can be adopted by a range of organisations to support consumers to make more informed decisions about adopting smart tariffs and low carbon technologies.

Methodology

The project was delivered by a consortium[5] with expertise in the key elements[6] required to implement a robust solution based on a rich understanding of both industry and consumer needs. The consortium's intention from the outset was to provide an open source tool that is ready for adoption by any interested party.

Key stakeholders included energy suppliers, PCWs and not for profit organisations that represent the needs of all consumers (including fuel poor consumers and those who face additional barriers to engaging in the energy market); learnings confirmed that there was interest and support for the project across industry.

Qualitative and quantitative consumer research was conducted throughout the project – the solution had to be designed to meet consumers' needs and evolved through several iterations in response to feedback.

Success will be defined by the range and number of organisations that adopt the tool within their own market offerings. The solution offers ***an extendible and flexible model*** designed to meet the needs of the tool adopter.

Smart tariffs

The half-hourly consumption data recorded by smart meters enables innovative smart tariffs that can price electricity differently at different times of the day, week or year. Varying pricing can reflect varying costs of supply due to fluctuation in demand and generation: for example, higher prices during peak-time consumption and lower prices, or even negative pricing, at times when wind or solar power is plentiful.

Smart tariffs come in many varieties and the project created a set of definitions and categories that can be re-used across industry. Categorisation of **smart tariffs is split into pricing and non-pricing structures;** the three dimensions that underpin pricing structures are usage, time and periodicity (how often the tariff changes). Characteristics beyond pricing are hardware dependency (require smart LCT, such as electric vehicles) and factors specific to the nature of the contract (length, dual fuel, etc.), green credentials or bundling.

Standardisation of tariffs to **facilitate sharing and presentation** meets the current industry challenge with non-smart tariffs whereby tariff sharing between suppliers and PCWs consumes

[4] Annex A available at https://www.gov.uk/government/publications/smart-meter-enabled-tariffs-comparison-project-smarter-tariffs-smarter-comparisons publication]https://bitbucket.org/LDNSFO/stsc-tsc/src/master/
[5] Vital Energi, Hildebrand Technology, davies+mckerr, Carbon Trust, Love Experience and ICON Consulting
[6] Consumer understanding and research, industry expertise, technology delivery experts

a lot of time and carries risk of inaccurate data; it is hoped that the smart tariff framework will streamline information transfer and improve accuracy.

The consumer research showed that a diverse range of consumers from across the market are receptive to smart tariffs when they understand them, but understanding is currently low, corroborating findings from previous research.

Industry response

Industry stakeholders were positive about the project and gave clear requirements for the tool. The concept of offering results based on actual consumption data was seen as a 'win win' for both industry and consumers by offering more accurate quotes, transparency and personalisation. ***Ensuring the tool was simple to use was a key success factor.***

The ability to integrate total cost of ownership for LCT investment was identified as a potential game changer for the take-up of both the technologies and their related smart tariffs. For example, showing a consumer both the upfront and ongoing costs of owning a LCT will help them make a more informed decision.

Energy suppliers referenced a range of potential value propositions that become viable with smart meters and, where relevant, other smart hardware-enabled tariffs that: reduce the cost of ownership of LCTs; incentivise customers to shift their demand; build better understanding of consumer behaviour; and improve ability to support fuel poor and disengaged customers.

Consumer benefits of a smarter comparison tool

Using smart meter data for tariff comparison is viable, adds value for the customer and can drive engagement with tariffs, low-carbon technologies, smart meters and flexibility.

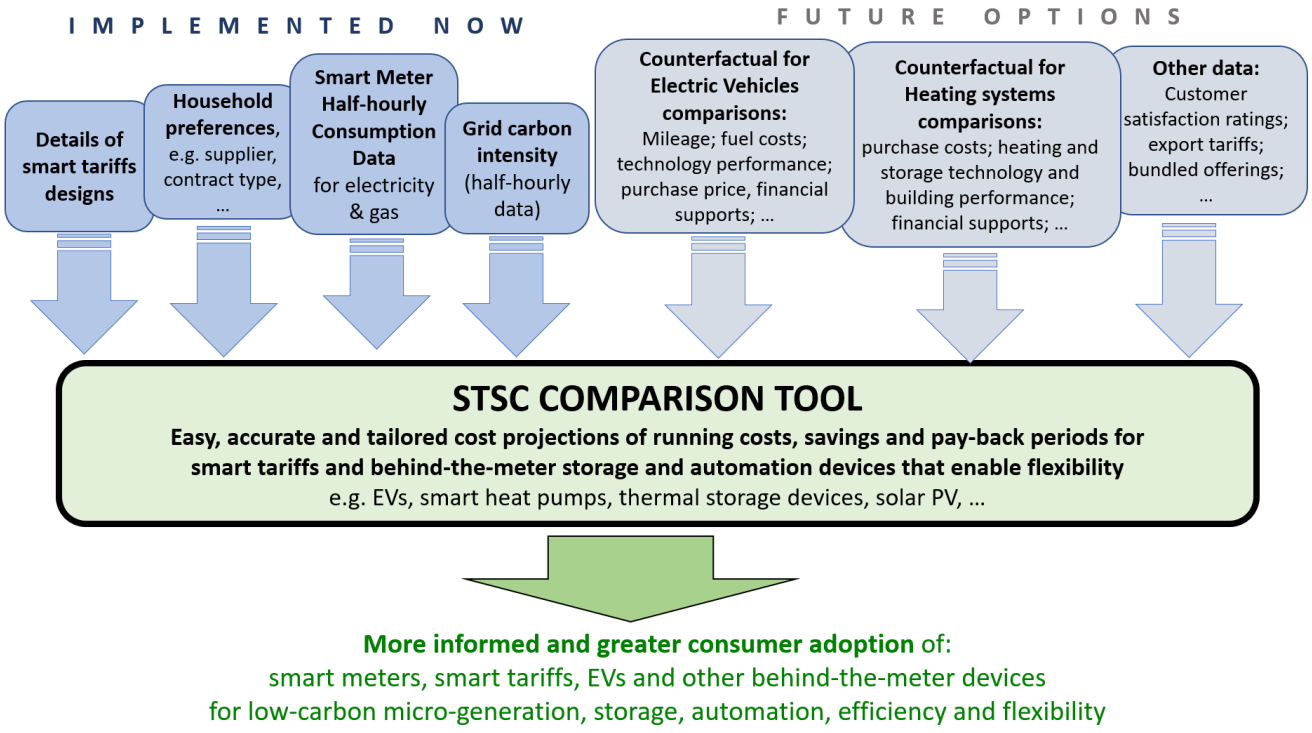
- Getting quotes is made *easier* as consumers do not need to input consumption data using previous bills or best guesses. Around half of consumers do not think it is easy to compare tariffs.[7]
- Quotes are more *accurate* and *trustworthy*. The inherent personalisation of viewing their own consumption data increased confidence in the tool and in the results. For many, seeing their own data history in half-hourly consumption periods was a revelation and led to active engagement with their results. The tool was seen as a step change in the service provided by comparison tools.
- The inclusion of half-hourly consumption data also enables consumers, often primarily concerned about costs, to *understand the potential for reducing their energy costs through smart time of use tariffs and various LCTs*, most notably electric vehicles.

[7] GfK UK Social Research. (2017) Consumer Engagement in the Energy Market 2017: Report on a survey of energy consumers.

These consumer benefits all add value to smart meter data and therefore can support greater consumer engagement with the smart meter rollout. Current consumer awareness that smart meters enable access to smart products and services is very low, but the research in this project found that the availability of these made many consumers more positive about smart meters.[8]

These benefits have potential to increase engagement with energy products and services across a range of consumers. These include early adopters but also includes some disengaged consumers who could appreciate the easier, more accurate and tailored comparisons when switching via PCWs. More informed and confident consumer choice will also help fuel poor households in assessing whether energy products and services are affordable to them and also provide a better basis for a range of market offerings for many.

Figure 2: The STSC comparison tool, a platform for ongoing development[9]

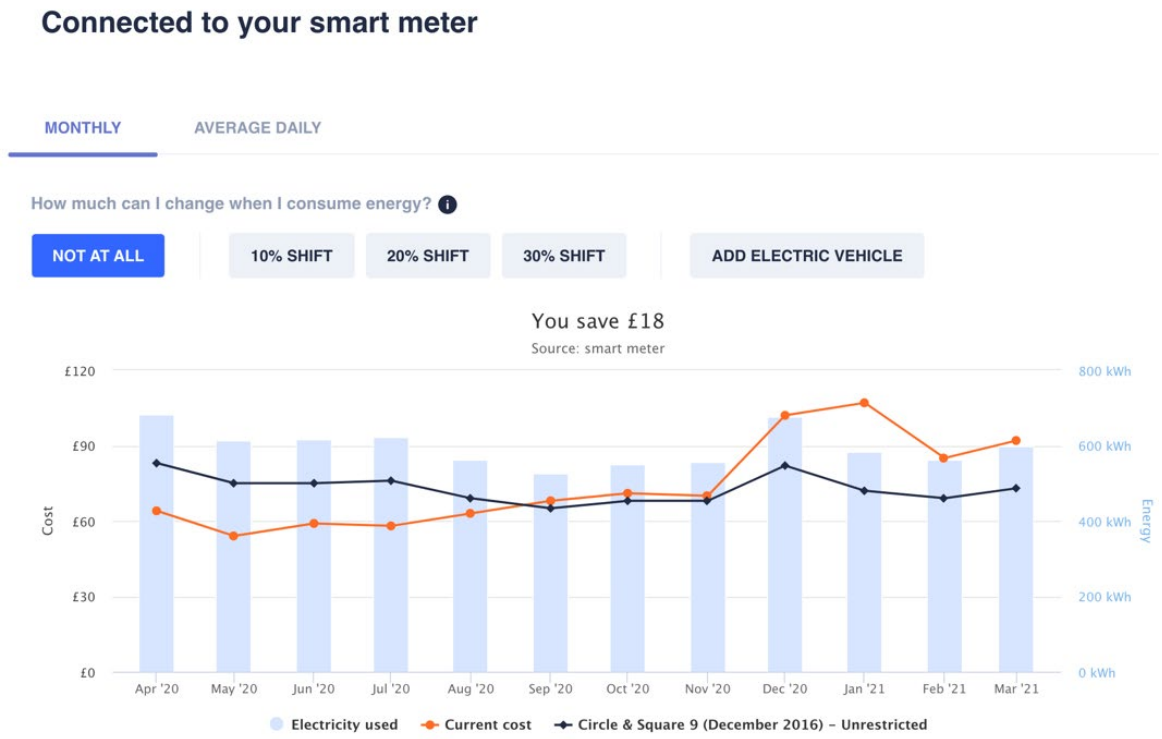


Open source solution ready for adoption

The STSC tool supports all identified[10] smart tariffs, prepay tariffs, and bundled offers and can be used to convey a total cost of ownership for consumers considering investing in LCTs. The independently tested solution was designed to meet industry's need for accurate comparison, robust data and models, scalability and innovation.

[8] See Annex B, pp.46 – 47.
[9] Adapted from Carmichael, R. (2019) *Behaviour Change, Public Engagement and Net Zero*. A report for the Committee on Climate Change.
[10] As of July 2021.

Figure 3: Example screen from the STSC tool: results chart

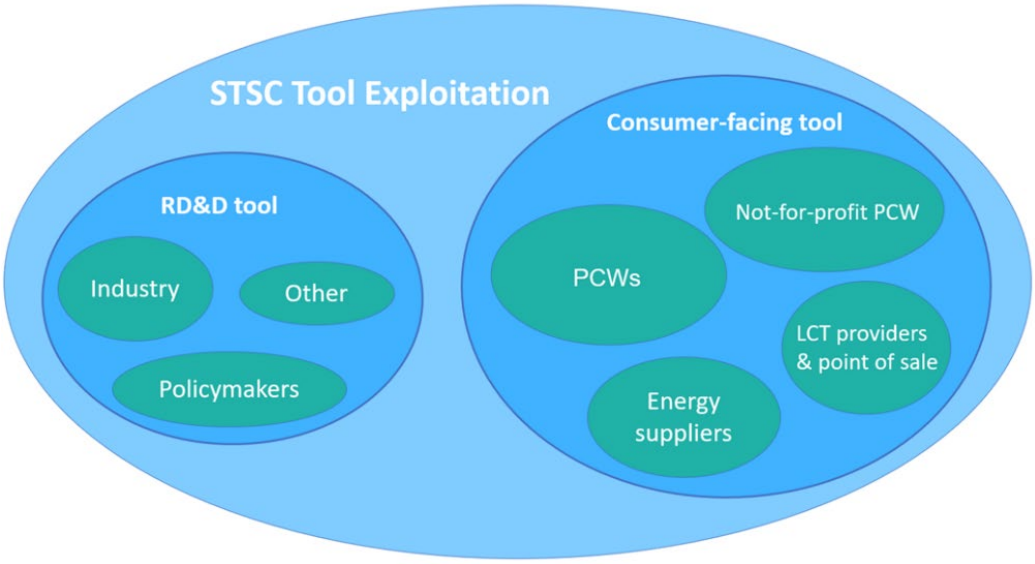


The tool's code and related documentation about the comparison model / mathematical process is published and is available online[11] for any organisation that wishes to adopt it.

Smarter comparison tools have potential not just as decision-support tools for consumers but also to support decision-making for policymakers and industry. Industry might use the STSC tool to support tariff design and the specification and price points of new products. The range of consumer-facing and R&D exploitation scenarios are shown in Fig. 4.

[11] https://observablehq.com/@joshuacooper/energy-worksheet-example?collection=@joshuacooper/smart-tariff-smart-comparison

Figure 4: An open source comparison tool with a range of exploitation opportunities



Recommendations for maximising impact

Smarter comparison tools, such as the STSC tool, have excellent potential for supporting multiple key objectives within energy decarbonisation (smart meters, time of use tariffs and demand response, and adoption of EVs and other low-carbon technologies) by communicating to the consumer the greater benefits delivered by combining these elements, often presented in isolation. Smarter comparison tools can also help to ensure that consumers and the wider energy system realise the benefits of smart metering and market-wide half hourly settlement (MHHS), which Ofgem has confirmed it will introduce by 2025[12].

The adoption of the STSC outputs could not only break the previous deadlock affecting smarter comparisons and smart tariffs (Fig. 1) but also support important positive feedback loops for accelerating the pace of change in consumer engagement and wider system change too. Behaviour change is more rapid when new technologies and services are normalised, and PCWs can play a key role in such self-reinforcing effects. Increasing demand and a widening choice of smart products and services should also reinforce each other.

The STSC project makes several recommendations for how potential benefits could be maximised by policymakers, industry and other stakeholders. Increasing the capability of the tool to incorporate a wider range of LCTs will increase impact, as would adding further tool functionality to lower barriers to consumer engagement. Some planned policy and regulatory developments should provide a more fertile context for consumer engagement with the STSC tools, notably the implementation of market-wide half-hourly settlement (MHHS), faster and more reliable switching and the introduction of standards for smart appliances.

[12] https://www.ofgem.gov.uk/publications-and-updates/electricity-retail-market-wide-half-hourly-settlement-decision-and-full-business-case

This publication is available from: https://www.gov.uk/government/publications/smart-meter-enabled-tariffs-comparison-project-smarter-tariffs-smarter-comparisons

If you need a version of this document in a more accessible format, please email alt.formats@beis.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.