

Market-wide Half-Hourly Settlement: Strategic Outline Case

Business Case

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Overview:

Market-wide half-hourly settlement can play a key role as the energy sector decarbonises and we move towards a smarter, more flexible energy system. It can expose energy suppliers to the true cost of supply and put incentives on them to help their customers shift their consumption to times when electricity is cheaper to generate or transport, enabling significant benefits for consumers and the energy system as a whole.

This Strategic Outline Case is the first of three iterations of the Business Case, which we will use to support our final decision on market-wide half-hourly settlement and set out the arrangements for implementation. We will develop the Business Case over time, leading up to our decision on market-wide half-hourly settlement by the second half of 2019.

This first iteration examines the strategic rationale for market-wide half-hourly settlement, exploring the interactions with other related projects that look to ensure that consumers benefit from the energy system transition and achieve positive outcomes from the retail market. It also represents our first steps towards analysing the economic costs and benefits of market-wide half-hourly settlement, and assessing the drivers on key players to manage, finance and deliver the move to market-wide half-hourly settlement successfully.

This document, and future Business Case iterations, will be of interest to those wanting to understand why, and how, electricity settlement arrangements may change in the future, including anyone currently participating in, or considering participating in, the GB electricity market, as well as stakeholders such as consumer groups and industry bodies.

Context

The move to market-wide half-hourly electricity settlement is one initiative within a set of reforms to facilitate the energy system transition, ensuring consumers benefit from changes and improving their experiences of using energy.

In July 2017, Ofgem and government published a plan to move towards a smarter, more flexible energy system, including moving to market-wide half-hourly settlement through a Significant Code Review. The plan could help deliver significant benefits for consumers in the coming decades. Projects on electricity network access reform and the Targeted Charging Review are looking at making better use of capacity and fairly allocating network costs. We have also begun to develop the framework for the next RII0-2 price control, which will determine the allowed revenues for system and network companies over the next price control period and want to ensure that these companies deliver value for money through smarter, innovative approaches.

On the retail side, the Switching Programme is looking to transform the switching arrangements to deliver faster, more reliable switching. Our Future Retail Regulation work has been moving towards a more principles-based approach to regulating the retail market. We are also examining the future of the supply market arrangements to consider whether the current 'supplier hub' model is still fit for purpose.

Market-wide half-hourly settlement is enabled by the rollout of smart metering, and builds on recent changes to mandate half-hourly settlement for medium to large non-domestic consumers and facilitate cost-effective half-hourly settlement for domestic and smaller non-domestic consumers on an elective basis.

These initiatives have the potential to transform both the energy system and the energy retail market and help consumers benefit from new services and business models coming into the sector. This Strategic Outline Case brings together this context to examine the strategic rationale for introducing market-wide half-hourly settlement and the interactions with these other projects.

Associated documents

Ofgem, Open letter on market-wide half-hourly settlement: intention to launch a Significant Code Review (June 2016) <https://www.ofgem.gov.uk/publications-and-updates/open-letter-market-wide-half-hourly-settlement-intention-launch-significant-code-review>

Ofgem, Consultation on market-wide half-hourly settlement: aims and timetable for reform (November 2016) <https://www.ofgem.gov.uk/publications-and-updates/consultation-market-wide-half-hourly-settlement-aims-and-timetable-reform>

Ofgem, Electricity Settlement Reform Significant Code Review: Launch Statement, revised timetable, and request for applications for membership of the Target Operating Model Design Working Group (July 2017) <https://www.ofgem.gov.uk/publications-and-updates/electricity-settlement-reform-significant-code-review-launch-statement-revised-timetable-and-request-applications-membership-target-operating-model-design-working-group>

Ofgem and BEIS, Upgrading our Energy System – smart systems and flexibility plan (July 2017) <https://www.ofgem.gov.uk/publications-and-updates/upgrading-our-energy-system-smart-systems-and-flexibility-plan>

Ofgem, Our strategy for regulating the future energy system (August 2017) <https://www.ofgem.gov.uk/publications-and-updates/our-strategy-regulating-future-energy-system>

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Executive Summary

Settlement reconciles discrepancies between a supplier's contractual purchases of electricity and the demand of its customers. Generators and suppliers trade electricity in the wholesale market in half-hourly periods. Currently, most customers are settled on a 'non half-hourly' basis, as they do not have meters that can record consumption or export in each half-hour period. They are settled using estimates of when they use electricity, based on a profile of the average consumer (within a given Profile Class).

Smart meters can record the amount of energy consumed or exported within every half hour of the day. This provides an opportunity to make the settlement process more accurate and timely, and act as a tool for new products and services which can deliver positive outcomes for consumers through lower bills, reduced environmental impacts, enhanced security of supply and a better quality of service.

We are taking forward market-wide half-hourly settlement (HHS) to facilitate a smarter, more flexible¹ energy system and to empower consumers to take an active role in the energy system transition as the sector decarbonises. We want to use smart metering and the settlement arrangements to link suppliers' costs with the consumption of their customer base, exposing the true cost of supply in any given half-hour period. This will put incentives on suppliers and other parties to help consumers to manage their energy use and encourage them to develop new tariffs and innovations.

The move to market-wide HHS is part of a wider set of reforms looking to facilitate the energy system transition and to improve outcomes for consumers. Market-wide HHS has an important role to play as an enabler for flexibility and facilitator of new and innovative business models. A smarter, more flexible energy system could have significant benefits for consumers, with savings estimated to be between £17-40 billion by 2050.²

In July 2017, we launched the Electricity Settlement Reform Significant Code Review (SCR) to design, assess and implement market-wide HHS. We are running the SCR as an Ofgem-led end-to-end process that will conclude with our decisions on code changes towards the end of the process. The work to reach the point where we can take a decision on market-wide HHS falls in three areas:

- Target Operating Model: designing the arrangements for market-wide HHS. ELEXON, the code administrator for the Balancing and Settlement Code, is leading a Design Working Group to deliver a recommended Target Operating Model to Ofgem. Ofgem will take the final decision on this, supported by a

¹ Flexibility in this context means 'modifying generation and/or consumption patterns in reaction to an external signal (such as a change in price) to provide a service within the energy system'. The energy industry has typically provided flexibility on the 'supply-side', but new ways of providing flexibility are emerging on the 'demand-side' such as storage and demand side response. These can help the UK deliver against its carbon commitments, while providing reliable and secure supply at minimum cost.

² As noted in the joint Ofgem/Government Smart Systems and Flexibility Plan (July 2017): https://www.ofgem.gov.uk/system/files/docs/2017/07/upgrading_our_energy_system_-_smart_systems_and_flexibility_plan.pdf

Design Advisory Board to provide strategic advice on the products delivered by the Design Working Group.

- Policy development: developing our position on key policy issues to enable market-wide HHS. We will lead on this, in consultation with stakeholders, and we will take the final decision on these issues.
- Business Case: setting out the costs and benefits of options to deliver market-wide HHS, as well as the strategic case for reform and how to best manage and deliver the necessary changes. To develop the Business Case, we are following HM Treasury's Five Case Model approach³ to major projects, which breaks down each iteration of the Business Case into five individual cases – the strategic, economic, commercial, financial, and management cases. We intend to develop the Business Case in three iterations, updating the information and analysis in each individual case at each iteration.

We expect to take a final decision on market-wide HHS, supported by the Full Business Case and the final Target Operating Model, by the second half of 2019, with changes to the relevant industry codes⁴ and implementation to follow.

This Strategic Outline Case is the first iteration of the Business Case, looking primarily at the strategic drivers for market-wide HHS. HHS is expected to:

- 1) Facilitate decarbonisation and a smarter, more flexible energy system
- 2) Enable consumers to benefit from the energy system transition
- 3) Capitalise on smart metering infrastructure and previous work on HHS
- 4) Enable new and innovative business models

Chapter 2 examines the strategic drivers for market-wide HHS, assessing the case for changing the existing settlement arrangements and outlining the Project Objectives. Chapter 3 introduces the economic case for market-wide HHS, outlining our intended analytical approach and the work we have done on this so far. Chapters 4, 5 and 6 set out our initial thinking on the commercial, financial and management cases, exploring how best to manage and deliver reformed settlement arrangements.

This Strategic Outline Case will be followed by two future iterations – the Outline Business Case, which we expect to publish in mid-2018, and the Full Business Case, which we expect to support the decision on market-wide HHS by the second half of 2019. These will develop iteratively alongside the design of the Target Operating Model and policy development on key issues.

If you have any comments or feedback on this Business Case, please contact the team at half-hourlysettlement@ofgem.gov.uk.

³ The Five Case Model is a methodology for producing business cases for spending proposals. See Green Book guidance: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/469317/green_book_guidance_public_sector_business_cases_2015_update.pdf

⁴ Industry codes are multilateral contracts setting out the market rules applicable between market participants. Market-wide HHS may affect several codes depending on the scope of the changes needed.

1. Introduction

Introducing the Business Case

- 1.1. We are using the Five Case Model⁵ to develop and maintain a Business Case throughout the life of the project. This Business Case will be used as an aid to the decision-making process, as well as a tool for communicating with our stakeholders about the arrangements for designing and implementing market-wide HHS.
- 1.2. We will build up the information and detail in the Business Case iteratively, constructing the Business Case in three stages:
 - the **Strategic Outline Case (SOC)**: this document, which focuses primarily on the strategic case. It sets out our rationale for seeking to reform the existing settlement arrangements and the strategic fit of the project with other concurrent large change projects. It also introduces elements of the other four cases.
 - the **Outline Business Case (OBC)**: this will present the results of an economic cost-benefit analysis of the impact of introducing market-wide HHS. This high-level analysis will indicate a preferred way forward, with the Target Operating Model (TOM) unconfirmed at this stage. More detail will be added to the commercial, financial and management cases and we may update the strategic case. We aim to publish this iteration in mid-2018.
 - the **Full Business Case (FBC)**: this will outline a detailed costing of specific options for introducing market-wide HHS to complement the final TOM. It will use the commercial, financial and management cases to set out arrangements for implementation. We aim to publish this iteration by the second half of 2019 alongside the final TOM and a decision on market-wide HHS.
- 1.3. Each iteration of the Business Case will be broken down into five sections:
 - The **strategic case**: the strategic context for the project and our case for change. This will include the rationale for intervention and an explanation of the outcomes we are seeking to achieve.
 - The **economic case**: an economic assessment of the impact (costs and benefits) of options for moving to market-wide HHS.
 - The **commercial case**: the drivers on market participants to procure and implement new systems and changes to their own systems in line with the requirements of our planned reforms.
 - The **financial case**: the resources that all stakeholders, including industry and ourselves, will need to deliver the project.

⁵ See footnote 3.

- The **management case**: the actions that will be required, and by whom, to ensure successful delivery of the reforms.
- 1.4. In this SOC, we have focused primarily on developing the strategic case. We have explained our rationale for seeking to reform the existing settlement arrangements and set out the strategic fit of the project with other concurrent large change projects.
 - 1.5. We have used the economic case to set out our intended approach to the economic analysis and to document the work we have done on this to date. The commercial, financial and management cases are outlined at a higher level, with further detail to be added in future iterations of the Business Case.
 - 1.6. Following chapters on each of the five sections highlighted above, this document then outlines our next steps for developing our Business Case.

2. Strategic case

Chapter Summary

The strategic case sets out the case for changing the settlement arrangements and explains the strategic fit of the project with other concurrent large change projects. It also outlines the project's objectives, intended benefits, risks, constraints and dependencies.

The case for change

Existing arrangements

- 2.1. Energy suppliers purchase their electricity in advance based on their forecasted estimates of what they expect their customers to use in each half-hour period. The difference in each half-hour period between the volumes of energy purchased by suppliers through their contracts to cover their requirements and the volumes their customers are assumed to have used are identified, reconciled, and paid for through the settlement system.
- 2.2. Consumers have traditionally been settled against an estimated profile of their consumption in each half-hour period, with eight different estimated profiles used (called Profile Classes⁶). Domestic and smaller non-domestic consumers are in Profile Classes 1 to 4 while medium to large non-domestic consumers are split across Profile Classes 5 to 8. Estimated, non-half hourly arrangements have operated for domestic and small non-domestic consumers since full market opening of the GB electricity supply market to competition on 1 April 1998. Arrangements for cost-effectively settling domestic and small non-domestic consumers on a half-hourly basis (using actual half-hourly consumption data, rather than estimates) were put in place in the first half of 2017, on an elective (voluntary) basis. For medium to large non-domestic consumers, HHS has been in place since 1 April 2017, with the non-half hourly arrangements that preceded this having operated since 1 April 1994.
- 2.3. Smart meters are currently being rolled out to Profile Class 1-4 consumers, which will enable actual consumption in each half-hourly period to be recorded. However, until smart meters and HHS are in place, suppliers will continue to forecast the energy requirements needed to meet their customers' consumption based on estimates and standard non-half hourly load profiles rather than based on their customers' actual usage data.

⁶ More information about Profile Classes can be found on ELEXON's website: <https://www.elexon.co.uk/knowledgebase/profile-classes/>

Problems with the status quo

- 2.4. Because the existing settlement arrangements rely on estimation, with consumers settled according to an assumed profile of their use, suppliers are not exposed to any variation in consumption patterns and are not exposed to the true cost of supplying their customers across the course of a day. There is therefore no incentive on them to help their customers to manage their consumption or to innovate by offering smart tariffs and other products to help shift consumers' consumption away from peak periods.
- 2.5. Suppliers may opt to introduce HHS and new products through elective HHS, but, without exposing suppliers to the cost of supply of their customers in each half-hour period, we are unlikely to see these products develop to an extent that will bring significant system-level benefits.
- 2.6. Increases in intermittent generation, rising electricity demand and the development of new technologies will further increase the need for flexibility to ensure we make the best use of the energy system and avoid unnecessary increases in consumer bills. Part of this involves managing consumption to ease pressures on the grid, utilising the potential new products and innovation that can be introduced through market-wide HHS. Without this, there would likely need to be significant and costly investment in the network and in generation assets to manage peak demand, and the costs of integrating low carbon, intermittent generation would be higher.⁷
- 2.7. The current settlement arrangements also do not capitalise on the opportunities presented by smart metering, in terms of efficiency. Without smart meters, market participants forecast their purchasing requirements based on profile data rather than half-hourly consumption. Market participants are also uncertain about their liabilities to each other because of the length of time taken to fully reconcile settlement volumes (up to 14 months). This can mean market participants have to hold sufficient credit cover to meet their liabilities for a long time. The costs of this may also be passed to consumers.

Opportunities for change

- 2.8. Smart and advanced meters can record consumers' actual usage in each half-hour period, so the smart meter rollout presents an opportunity to introduce HHS on a market-wide basis. This can then facilitate a number of benefits to consumers:
 - promote innovation and competition in the energy market

⁷ Further information on the link between system flexibility and the costs of intermittency can be found in UKERC's report 'The Costs and Impacts of Intermittency II': <http://www.ukerc.ac.uk/programmes/technology-and-policy-assessment/the-costs-and-impacts-of-intermittency-ii.html>

- help create the right environment for more demand-side response (DSR), leading to a more efficient energy system
- help suppliers forecast demand more accurately, strengthening competition and reducing costs
- make the settlement process faster and more efficient, reducing barriers to entry to the energy market.

Strategic fit

Facilitating decarbonisation and a smarter, more flexible energy system

- 2.9. The energy system is undergoing fundamental change, driven largely by the need to decarbonise our energy supplies and by technological innovation. The electricity generation mix is becoming cleaner, but increasingly intermittent and more decentralised. The decarbonisation agenda will continue to be a major driver of change, with further increases in renewable generation presenting both challenges and opportunities for the energy system. Electricity demand is also projected to increase, largely due to electrification of heat and transport.
- 2.10. Integrating low-carbon and intermittent generation into the energy system and managing the expected increase in demand in a way that minimises costs to current and future energy consumers will require the regulatory and market arrangements to evolve. In August 2017, we set out our regulatory strategy for the future energy system.⁸ This described how we would facilitate changes to the regulatory and market arrangements to help consumers benefit from the energy transition.
- 2.11. HHS has an important role to play in this strategy by acting as an enabler for flexibility, ensuring that suppliers and other parties are exposed to price signals and are able to pass these signals through to consumers and reward them for changing consumption patterns. The combination of smart metering and HHS enables energy providers to innovate and offer consumers new smart products for managing their demand and, for consumers, the ability to offer DSR and lower their energy bills as a result. Utilising DSR and making the best use of existing infrastructure could have significant benefits for all consumers, minimising the need for future network and generation investment. Projected savings from a smarter, more flexible energy system have been estimated at £17-40 billion by 2050⁹, and HHS plays an important role in enabling a proportion of these projected savings. The move to a smarter, more flexible energy system is set to take place within the government's wider aspirations

⁸ 'Our strategy for regulating the future energy system' (August 2017):

<https://www.ofgem.gov.uk/publications-and-updates/our-strategy-regulating-future-energy-system>

⁹ As noted in the joint Ofgem/Government Smart Systems and Flexibility Plan (July 2017):

https://www.ofgem.gov.uk/system/files/docs/2017/07/upgrading_our_energy_system_-_smart_systems_and_flexibility_plan.pdf

to decarbonise across all sectors of the economy by delivering cleaner economic growth.

- 2.12. Consumers can play a key role in this transition to a smarter, more flexible energy system by offering DSR and adapting their consumption patterns to times of the day when electricity is less expensive to produce and transport. Smart tariffs such as time-of-use (ToU) tariffs, enabled by HHS, can provide the signal that consumers or third parties will need to help change consumption patterns. Innovations and technological advances such as smart appliances, electric vehicles and smart charging,¹⁰ and batteries may also enable consumers to further adapt their consumption in response to price signals. HHS can help to facilitate the adoption of these new technologies, and enable significant benefits over time as the cost of these technologies falls and they become more accessible to more consumers.
- 2.13. HHS is part of a programme of work to move towards a smarter, more flexible energy system, with a set of concurrent projects looking at the signals for flexibility and investment and the charges for use of the network. Moving to market-wide HHS is one of a number of actions set out in the **joint Ofgem/Government Smart Systems and Flexibility Plan**¹¹ as a key enabler underpinning the development of a smart, flexible energy system. The Plan is an important part of the Government's Industrial Strategy and the Clean Growth Strategy¹² and a core component of Ofgem's future-facing work to enable the energy system transition.
- 2.14. We are considering the most appropriate options for **network access arrangements and forward-looking network charges**¹³ to ensure that users have effective signals about how their actions can either create costs or benefits for the networks, to help maximise the use of existing network capacity and avoid unnecessary reinforcement. While we are still developing the access and charging options, building on those set out in our November 2017 working paper, at this stage it seems likely that all options for households and small businesses will rely on the capability that HHS could provide. HHS would provide the underlying market arrangements for network users to receive and respond to signals about how to alter their behaviour to support more efficient use and development of the network.

¹⁰ The Automated and Electric Vehicles Bill 2017 seeks to improve the consumer experience of EVs by allowing the Government to require the installation of charge points at motorway service areas and large fuel retailers and to require a set of common technical and operational standards for public charge points, ensuring they are convenient to access and work seamlessly right across the UK.

¹¹ See footnote 9.

¹² Industrial Strategy (November 2017) - (<https://www.gov.uk/government/topical-events/the-uks-industrial-strategy>) and Clean Growth Strategy (2017) - <https://www.gov.uk/government/publications/clean-growth-strategy>

¹³ Reform of electricity network access and forward-looking charges working paper (November 2017): <https://www.ofgem.gov.uk/publications-and-updates/reform-electricity-network-access-and-forward-looking-charges-working-paper>

- 2.15. The **Targeted Charging Review (TCR) Significant Code Review (SCR)**¹⁴ is considering how the 'residual' element of network charges should be set in the future for both transmission and distribution¹⁵. It aims to ensure that these network charges are recovered in a way that is fair and reduces distortions to efficient use of the network. Like the settlement arrangements, the methodologies for network charging affect the balance of incentives for suppliers and the extent to which they offer products to consumers that allow them to benefit from changes to the timing of their consumption and use of the network. The decision on the TCR will therefore influence the level of benefits that individual consumers can gain from HHS, although reduced distortions to incentives should keep overall system costs down. Some of the shortlisted options that we are considering for recovery of residual network charges rely on the half-hourly data that is generated through HHS, as well as half-hourly metering.
- 2.16. We are concurrently developing the framework for the next **RIIO-2**¹⁶ monopoly network price control which will aim to ensure regulated system and network companies deliver the value for money services that consumers want and need. This means ensuring network companies have the right incentives on them to innovate, use flexibility services, and drive value for consumers while operating safe, reliable and secure networks. HHS will enable innovation and flexibility in energy services that network companies will be incentivised to deliver. A significant peak demand shift across the electricity system, enabled by innovation resulting from HHS, would reduce the investment that network companies would need to make through the RIIO-2 price control and deliver benefits for consumers.
- 2.17. All of these projects are looking to deliver benefits for consumers in the context of an energy system and network that is changing rapidly and faces significant challenges. HHS provides the underlying price signals and data needed for a number of these initiatives to develop and to enable a smarter, more flexible energy system. They will each need to take into account the move to market-wide HHS, but equally our work on market-wide HHS will take into account developments in these other areas.

Enabling consumers to benefit from the energy system transition

- 2.18. Competition in the retail market has increased over time since it was introduced in the 1990s, but there remain problems with consumer engagement and the outcomes that some consumers are achieving from the

¹⁴ TCR SCR Launch statement (August 2017): <https://www.ofgem.gov.uk/publications-and-updates/targeted-charging-review-significant-code-review-launch>

¹⁵ The TCR will also keep some other aspects of the current charging system under review, including the non-locational 'embedded benefits'. They are differences in the transmission and system operation charging treatment of smaller generations connected to distribution networks, compared with the treatment of larger distribution-connected generation, and transmission-connected generation.

¹⁶ Open letter on the RIIO-2 Framework (July 2017) here: <https://www.ofgem.gov.uk/publications-and-updates/open-letter-riio-2-framework>

market. Domestic switching rates increased in 2017,¹⁷ showing that the markets may be working well for those who are engaged and actively switch. However, more than half of all consumers are still on default tariffs, paying higher prices than if they switched tariffs or supplier.

- 2.19. A safeguard tariff to protect PPM customers has been in place since 1 April 2017.¹⁸ We have extended it to cover vulnerable consumers in receipt of the Warm Home Discount, on 2 February 2018. The government has also published draft legislation for Parliamentary scrutiny that would give us powers¹⁹ and a duty to impose a tariff cap on domestic standard variable tariffs (SVTs) and default tariffs with some exemptions.²⁰
- 2.20. HHS is one of a number of forward-looking projects that is focused on enabling consumers to benefit from the energy system transition and improving the outcomes that consumers can achieve from the retail market as a result. Our **Future Retail Regulation**²¹ work is looking to change the way we regulate the retail market by moving to relying more on enforceable principles. This puts greater responsibility on suppliers to understand and deliver what is right and fair for their customers, and enables comprehensive consumer protection. It will also seek to future-proof our regulation and provide room for innovation. Our current focus is on reviewing those rules that relate to supplier-customer communications,²² where we see considerable opportunity for innovation, including better communication of multi-part tariff offerings.
- 2.21. The **Switching Programme**²³ is looking to radically transform the current switching arrangements and deliver faster, more reliable switching for consumers. It aims to improve customers' experience of switching, leading to greater engagement in the retail energy market by designing and implementing a new switching process that is reliable, fast and cost-effective. A better switching process will make consumers more confident in the retail market and facilitate competition and innovation, delivering better outcomes for consumers.

¹⁷ See BEIS quarterly domestic energy switching statistics: <https://www.gov.uk/government/statistical-data-sets/quarterly-domestic-energy-switching-statistics>

¹⁸ More information about the PPM safeguard tariff is on our website:

<https://www.ofgem.gov.uk/electricity/retail-market/market-review-and-reform/implementation-cma-remedies/prepayment-meter-price-cap>

¹⁹ The draft powers would apply initially until 2020 and then could be extended one year at a time until 2023.

²⁰ The Government's draft Domestic Gas and Electricity (Tariff Cap) Bill is available here:

<https://www.gov.uk/government/publications/draft-domestic-gas-and-electricity-tariff-cap-bill>. The draft suggests that these powers and the duty apply until 2020 with the potential to extend a year at a time until 2023.

²¹ <https://www.ofgem.gov.uk/gas/retail-market/market-review-and-reform/future-retail-market-regulation>

²² <https://www.ofgem.gov.uk/publications-and-updates/open-letter-reforming-our-rules-related-domestic-supplier-customer-communications>

²³ <https://www.ofgem.gov.uk/gas/retail-market/market-review-and-reform/smarter-markets-programme/switching-programme>

- 2.22. Market-wide HHS represents a similar opportunity, enabling consumers to increase their engagement with the energy market by using data from their smart meter to access innovative new products. Market-wide HHS can complement other future-looking projects by providing the right environment to encourage new market entry and further competition, increasing consumers' confidence in the market and their ability to find the best deal for them.
- 2.23. However, there is a risk that these new products and services could adversely affect consumers who are unable, or less able, to engage as a result of their circumstances, or consumers who are less willing to engage. These new products may also add complexity to the market, which consumers will need to negotiate. We are considering what protection may be needed for those consumers who cannot, or are less able to, engage actively with these developments, in particular those in vulnerable situations. We will consider how to protect consumers in a way that does not stifle the competition and innovation that market-wide HHS should bring.
- 2.24. The broader retail market context influences the benefits that can be achieved through market-wide HHS, and will continue to do so. The scope, scale, timing and duration of any price cap(s) could affect the type of tariffs available in the market and consumers' engagement. It may therefore influence the size of the benefits that market-wide HHS can be expected to deliver for the electricity system, and ultimately electricity consumers. This broader retail market context will feed into future iterations of this Business Case as we outline the case for market-wide HHS.

Capitalising on smart metering infrastructure and previous work on HHS

- 2.25. Energy suppliers are required to take all reasonable steps to install smart metering for all their domestic and small business customers by the end of 2020. Smart meters give consumers access to real-time information about their energy use, which will allow them to better manage their energy consumption, saving on their bills and benefitting the system. They also record the amount of electricity consumed in each half-hour period, which facilitates HHS.
- 2.26. Knowing and understanding more about their half-hourly consumption data will allow consumers to engage more directly in the energy market and to manage their consumption with the help of new technology and innovation. HHS provides a market incentive to encourage behavioural change and therefore an opportunity to 'unlock' the full benefits of smart metering, by enabling new opportunities for consumers to adapt their consumption in response to market prices. However, without HHS and the innovation it is expected to facilitate, there are limited incentives in place either on suppliers

or consumers to manage electricity demand at different points of the day and be rewarded for doing so.²⁴

- 2.27. Market-wide HHS seeks to build on the steps we have taken so far to use advanced metering to mandate HHS for medium to large non-domestic consumers²⁵ and to use smart metering to enable cost-effective HHS for domestic and smaller non-domestic consumers on an elective basis. Mandated HHS for medium to large non-domestic consumers was introduced in April 2017 through the Balancing and Settlement Code (BSC) modifications P272 and P322. Additionally, a set of industry code changes, implemented between February and June 2017, have been put in place to remove barriers to, and facilitate, elective HHS for domestic and smaller non-domestic consumers.
- 2.28. We see elective HHS as an important first step to encourage a market-led approach to HHS, facilitating innovation by early movers and providing real-world experience to inform further work. However, we have always said we expect we will need to require all suppliers to settle their customers on a half-hourly basis to realise the full benefits by exposing suppliers to the true cost of supplying their customers in every half-hour period. Otherwise, suppliers may either never use elective HHS or cherry-pick certain customers through elective HHS to help manage their requirements in the competitive market, leaving remaining customers unable to access and realise direct HHS benefits.
- 2.29. Our work on market-wide HHS takes into account the conclusions of the Competition and Markets Authority (CMA) in its final report following its energy market investigation.²⁶ The CMA considered that the lack of a robust plan for introducing market-wide HHS was an Adverse Effect on Competition (AEC) and recommended that such a plan be produced.²⁷ The CMA also recommended that Ofgem conduct a full cost-benefit analysis of the move to market-wide HHS. This will form the economic case of this Business Case as it develops.

Enabling new and innovative business models

- 2.30. The combination of smart metering and HHS provides the technology, data and incentives for the market to bring forward new smart/time-of-use products for consumers, and for consumers to engage in the energy market of the future. Through market-wide HHS we are looking to expose suppliers to

²⁴ Any incentives currently available for within day demand management, eg through time-of-use tariffs such as Economy 7, are limited.

²⁵ HHS for medium to large consumers (in Profile Classes 5-8) was introduced by the P272 Balancing and Settlement Code (BSC) change (in effect since 1 April 2017).

²⁶ The CMA's final report on the energy market investigation (July 2016) appears on its website here: <https://assets.publishing.service.gov.uk/media/5773de34e5274a0da3000113/final-report-energy-market-investigation.pdf>

²⁷ We produced this plan in November 2016 – see 'Consultation on mandatory half-hourly settlement: aims and timetable for reform': <https://www.ofgem.gov.uk/publications-and-updates/consultation-mandatory-half-hourly-settlement-aims-and-timetable-reform>

the true cost of supplying a customer in any half-hour period, to incentivise them to help their customers shift their consumption.

- 2.31. The market response to that incentive will depend on the dynamics of competition and the innovation that comes forward. New business models and service providers may emerge to provide innovative product offerings to consumers and enable them to engage more in the energy market. New entrants may provide increased competition to traditional supplier business models by offering new products and services, eg peer-to-peer energy trading between consumers, and the provision of other energy services to households.
- 2.32. HHS has the potential to transform the way that the retail market works, the types of products in the market and the business models for retail offerings.²⁸ It also has the potential to support the emergence and integration of new technology as our energy system electrifies and decarbonises, including EVs, batteries and smart appliances.
- 2.33. In this market, the role of suppliers themselves may change. The energy market has been designed with suppliers as the primary interface between the consumer and the energy system but we are currently looking at whether this 'supplier hub' model is fit for purpose as the energy system evolves. We recently published a call for evidence on **future supply market arrangements**.²⁹ We will feed developments on this into the TOM to ensure it is designed with sufficient flexibility to accommodate a potential future where the supplier may not always be the main conduit for consumers, as is the case in the current supplier hub model.
- 2.34. HHS will provide a platform for innovation, but the market dynamics now and in the future will determine exactly what that innovation looks like. Our work on the TOM for market-wide HHS will aim to ensure that HHS arrangements are compatible with a future where new business models and innovations may challenge the status quo.

²⁸ Based on experience from other jurisdictions where smart meters have been installed and settlement is based on real interval data, including parts of the US, Canada, Australia and Europe. For more information, see the CMA Energy Market Investigation Appendix 8.5 'What is the evidence from the international experience of smart meters?':

<https://assets.publishing.service.gov.uk/media/576bcb9be5274a0da900007c/appendix-8-5-evidence-of-international-experience-of-smart-meters-fr.pdf>

²⁹ Future of supply market arrangements – call for evidence (November 2017):

https://www.ofgem.gov.uk/system/files/docs/2017/11/future_supply_market_arrangements_-_call_for_evidence.pdf

Project objectives

2.35. The Project Objectives for the SCR are in Figure 1 below.³⁰ Objective 1 puts the project in the wider context of achieving organisational and government aims to support the transition to a low-carbon, smarter, more flexible energy system that delivers positive outcomes for consumers. Objectives 2 and 3 are specific to the outcomes that we are looking to achieve from changes to the settlement arrangements. These objectives align both with Ofgem’s regulatory stances³¹ and our principal objective³² to protect the interests of existing and future consumers, as well as our aim set out in our strategy for regulating the future energy system.³³ Minor edits have been made to these Project Objectives since the previously published version, for clarification. As we develop the economic case, we will assess if these objectives (in particular the measures) need any further refinement.

No.	Project Objective	Measures
STRATEGIC ENERGY SYSTEM TRANSFORMATION OBJECTIVE		
1	To promote an electricity system that delivers the Government and Ofgem’s objectives in a cost-effective manner, minimising the overall cost to current and future consumers of moving to a low-carbon electricity system while maintaining security of supply and system efficiency by:	
A	Minimising the need for infrastructure investment.	Lower ‘peak ³⁴ ’ demand (either national or local) in comparison to what would otherwise be the case
B	Facilitating more efficient use of generation assets and network assets.	Increase in use of low-carbon assets measured against predicted baseline.
OBJECTIVE SPECIFIC TO SETTLEMENT ARRANGEMENTS		
2	To develop settlement arrangements that incentivise all retailers ³⁵ (current and future) to encourage customer behaviour (electricity demand) that contributes to a more cost-effective electricity system by:	
A	Linking future retailers’ costs to their customers’ actual consumption within the course of a day.	The proportion of customers settled in a manner that specifically links retailers’ settled costs to customers’ consumption.

³⁰ These Project Objectives have been published previously alongside our initial work to develop a list of options to assess in the economic case: <https://www.ofgem.gov.uk/publications-and-updates/project-objectives-and-assessment-options-market-wide-half-hourly-settlement-business-case>

³¹ Ofgem’s regulatory stances are set out on our website: <https://www.ofgem.gov.uk/publications-and-updates/ofgems-regulatory-stances>

³² See ‘Powers and duties of GEMA’: <https://www.ofgem.gov.uk/publications-and-updates/powers-and-duties-gema>

³³ See footnote 8. In our strategy for regulating the future energy system, our overall aim is to ensure a regulatory framework that drives innovation, supports the transformation to a low carbon energy system and delivers the sustainable, resilient, and affordable services that all consumers need.

³⁴ This includes matching demand with energy system conditions at times not classed as ‘peak’. For example, this could be incentivising consumption at times of high wind or solar PV output.

³⁵ Where ‘retailers’ includes suppliers and other relevant potential future market actors

No.	Project Objective	Measures
B	Encouraging new and disruptive business models (from current suppliers or new entrants) through settlement arrangements that facilitate competition in new areas.	Evidence of new/changing retail offerings or business models (and customer satisfaction with these) that can be specifically identified as being dependent on settlement costs that vary with customers' consumption.
3	To minimise undesirable distributional effects on consumers	

Figure 1: Project Objectives

Benefits, risks, constraints and dependencies

2.36. Market-wide HHS is expected to lead to many long-term benefits for consumers. These benefits will depend on a number of things outside the control and scope of our SCR. Below, we have considered the benefits, risks, constraints and dependencies associated with our project.

Potential benefits

- 2.37. Figure 2 overleaf identifies a number of the main short, medium and long-term benefits of market-wide HHS. It illustrates the complex chain of cause and effect that could arise as a result of the change in incentives on market players from introducing market-wide HHS, and how the benefits could be delivered. It serves to highlight the uncertainties associated with how these benefits could be achieved, with different degrees of certainty attached to different outputs/outcomes in the chain.
- 2.38. Market-wide HHS will expose suppliers to the true cost of supply of their customers in every half hour period. It is likely, although not certain, that suppliers will respond to this by providing an incentive (either through a smart tariff or other innovation) to their consumers to shift their consumption away from peak periods. When this load shifting is aggregated up across enough consumers to enable a significant demand shift across the grid, substantial benefits can be achieved through reducing the need for generation capacity to supply peak periods and avoiding expensive network reinforcements, as well as lowering the costs of operating the network. Using innovation enabled by HHS to incentivise consumers to match their consumption with periods of high generation from wind and solar PV can help to integrate this low-carbon generation into the system and lower the carbon intensity of the GB electricity generation mix.

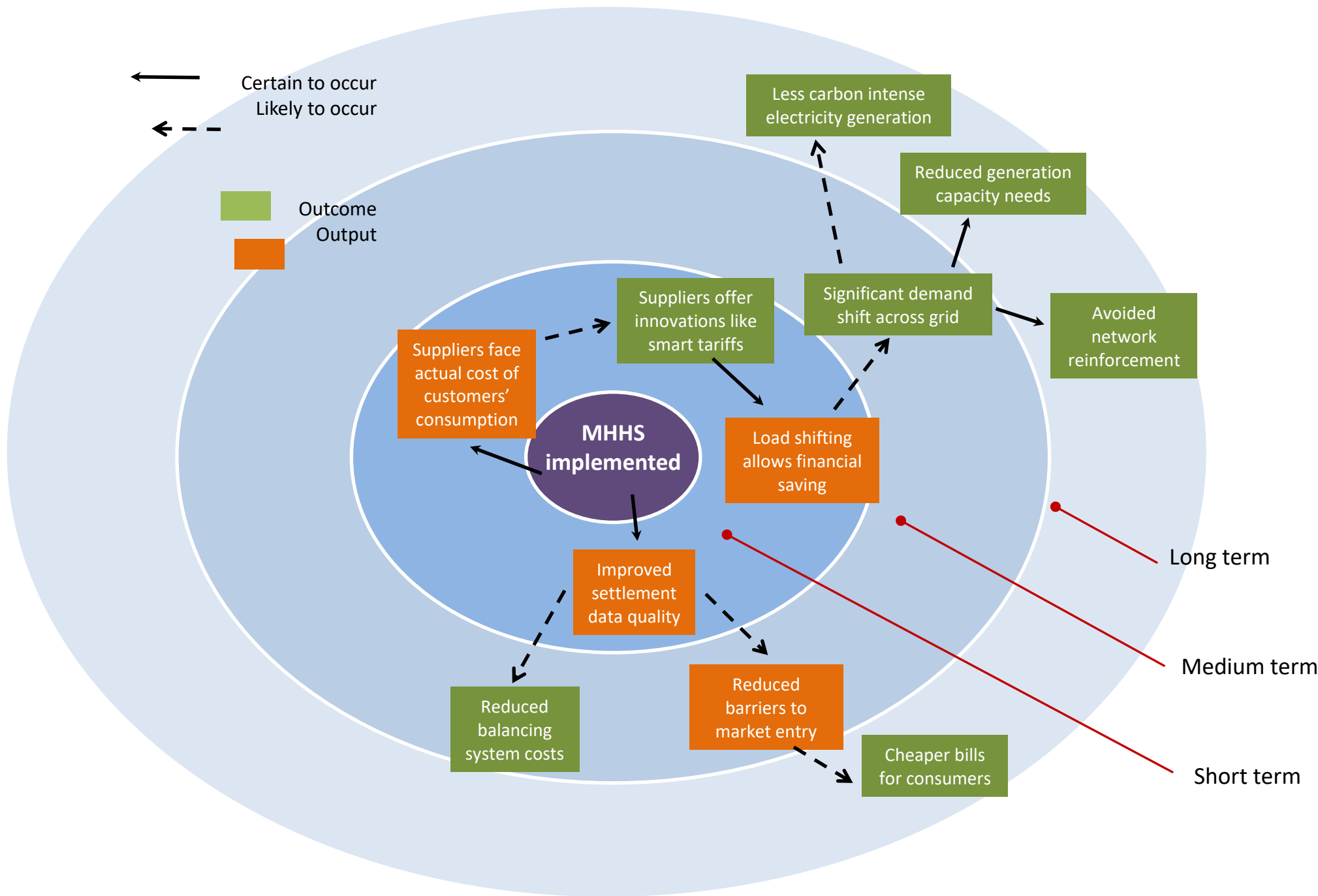


Figure 2: benefits of market-wide HHS

- 2.39. HHS can therefore provide the basis for a smarter, more flexible energy system. It can help to realise the full benefits of smart technology, and to integrate low-carbon generation as the energy system de-carbonises and electricity demand increases. It can help consumers to play a more active role in a rapidly changing energy system, facilitating increased uptake of EVs and storage technologies, increases in distributed self-generation, and supporting new opportunities such as peer-to-peer trading. Consumers engaging with these new products stand to benefit directly through savings to their bills, while consumers who are less able or willing to engage will still benefit when a significant demand shift across the grid reduces overall system costs, or prevents potential increases in future system costs.
- 2.40. There may also be more direct benefits associated with introducing market-wide HHS. The increased volume and quality of data feeding into the settlement process could allow the settlement timescales to be significantly reduced, and therefore reduce the amount of collateral required to trade in the market. The practicalities of this will be explored as part of the design work to develop the TOM.

Potential risks, constraints and dependencies

Smart metering

- 2.41. The implementation of market-wide HHS depends on the rollout of smart meters. A critical mass of smart meters will be needed to realise the full benefits of market-wide HHS. To manage consumers without a smart meter when market-wide HHS is implemented, a proportion of the energy market may need to continue to operate through some form of profiled data. In these circumstances, there may be costs to maintain the non-half hourly arrangements, which constrains the potential benefits of HHS.
- 2.42. The scale of benefits from market-wide HHS will also depend on the rules under which suppliers access their consumers' half-hourly data. In order for us to make decisions about moving to market-wide HHS, we are considering the rules relating to access to consumers' half-hourly electricity consumption data (collection and use of this data) for settlement purposes, reflected in the options paper we published in September 2017.³⁶ Separately, BEIS has committed to undertaking a comprehensive review of wider access to smart metering data as set out under the smart metering Data Access and Privacy Framework, to conclude by the end of 2018.³⁷ The benefits that can be realised through market-wide HHS will also depend on whether suppliers and other providers are able to access customers' smart meter data, with the

³⁶ See 'Project Objectives and Assessment Options for the market-wide half-hourly settlement Business Case' (September 2017): <https://www.ofgem.gov.uk/publications-and-updates/project-objectives-and-assessment-options-market-wide-half-hourly-settlement-business-case>

³⁷ See BEIS consultation on the timing of the review of the data access and privacy framework (closed September 2016): <https://www.gov.uk/government/consultations/consultation-on-the-timing-of-the-review-of-the-data-access-and-privacy-framework>

customer's consent, to establish new products and services, and the take-up rate of these offerings by consumers.

- 2.43. We will feed this policy work into the economic case (see Chapter 3) as this develops.

The market and consumer response to HHS

- 2.44. We expect market-wide HHS to facilitate the introduction of new smart tariffs and innovative products for consumers, but this is not certain to happen. This will be dictated by the response of the market, which in turn will depend on the state of competition in the market, the environment for innovation and the value of flexibility stemming from wholesale price variations. Factors outside of the control and scope of the project, such as the potential for price caps on retail tariffs, may influence the dynamics of competition in the market and therefore affect the level of benefits that can be achieved, at least in the short term.
- 2.45. The benefits of market-wide HHS will also depend on the levels of consumer demand for new products and innovation and consumers' behavioural response to them. Consumers will need to adapt to their role in this new market, and not all consumers will be willing or able to engage. New technology, such as automated smart appliances and battery storage, could provide the means for consumers to shift their consumption with less need for behavioural response, but not everyone will be able to access or afford these products.
- 2.46. We will build an understanding of the potential behavioural response of consumers into the economic analysis in future iterations of the economic case. This includes understanding the differences between different types of consumers (particularly vulnerable consumers) in their propensity to take up new products, to adopt new technology and to respond to price signals. We will continue to consider the potential impacts on consumers of market-wide HHS and whether any additional protections will be needed as a result.

Ofgem and industry resource constraints

- 2.47. We are taking forward market-wide HHS through an end-to-end SCR process.³⁸ We and stakeholders considered this to be the most appropriate way forward given the scope and scale of changes and the number of parties

³⁸ The Smart Meters Bill includes provisions that would give Ofgem the means to progress these reforms more effectively than through an SCR. If after the Bill's Parliamentary passage (and Royal Assent) these powers are available, we would expect to stop the SCR and use the new powers for the remainder of the process. Further information on the Smart Meters Bill can be found here: <https://services.parliament.uk/bills/2017-19/smartmeters.html>

involved in delivering them.³⁹ Nevertheless, the success of this approach will rely on industry engagement and input to help to design and implement the final TOM that we decide on. The TOM will take some time to deliver, as will the final implementation of market-wide HHS.

- 2.48. Implementation itself is likely to involve a transition where existing settlement arrangements will continue to operate alongside the revised arrangements. During this transition, settlement processes will continue to involve the transfer of significant amounts of money. Any interruptions to these monetary flows will need to be managed carefully to minimise any disruption to market participants. We will explore this risk with industry as we move through the TOM design phase of the project.
- 2.49. Within this time period, there are potential resource constraints which could affect the efficient delivery of the project, particularly given the number of other concurrent industry change projects such as the Switching Programme and the smart meter rollout.
- 2.50. We are working to understand and mitigate resource challenges resulting from running several concurrent change projects. We will explore this further using the commercial and financial cases, both in the following sections and in future iterations of the Business Case.

Policy interactions and external factors

- 2.51. As outlined in the Strategic Fit section above, we have a number of policy projects that interact with market-wide HHS and may influence the benefits that can be achieved. We are currently examining the way that residual charges for network use are distributed through our Targeted Charging Review. We are also examining the arrangements for network access and forward-looking network charges to ensure that network capacity is allocated and used in a way that reduces the potential costs to consumers as the energy system transforms.
- 2.52. These two projects are considering the signals that suppliers face from their customers' use of the network, with our work on market-wide HHS considering the signals placed on suppliers through exposing them to the true cost of supply in any half-hour period. The direction taken on each of these projects will affect the balance of signals that suppliers and consumers face, and potentially the scale of the benefits that can be realised through market-wide HHS.

³⁹ We consulted on this through our Significant Code Review Launch Statement. A summary of the responses we received is here: <https://www.ofgem.gov.uk/publications-and-updates/ofgem-response-feedback-significant-code-review-launch-statement>

- 2.53. Ultimately, our SCR on market-wide HHS is looking to reflect wholesale price variations and expose suppliers to the true cost of supply. The extent to which supply costs vary across half-hourly periods will drive the value that can be realised through market-wide HHS.
- 2.54. Factors outside of our control may also affect the benefits that can be achieved through market-wide HHS. For example, in its 'Clean Energy Package for All Europeans'⁴⁰, the European Commission's proposed legislation highlights the role that DSR will play in delivering the EU internal electricity market by 2025. A key part of the strategy for enabling more DSR from consumers is the use of smart meter data. Our project will need to consider the implications that EU developments may have for market-wide HHS and the benefits available for consumers in Great Britain.

⁴⁰ The 'Clean Energy for All Europeans' package and proposed legislation is available on the EU website here: <https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-consumer-centred-clean-energy-transition>

3. Economic case

Chapter Summary

The economic case outlines our intended approach to assessing the economic impact of market-wide HHS. It also sets out our work so far on defining objectives for the project and options for delivering those objectives.

Approach

- 3.1. We will use the economic case to examine the impact of moving to market-wide HHS, including the costs and benefits of different options to achieve that. This will involve an economic assessment (an Impact Assessment),⁴¹ weighing up the expected current and future costs and benefits of a decision on market-wide HHS.
- 3.2. We will develop the economic case iteratively, as we learn more about the design of the TOM, our policy issues around access to half-hourly data for settlement purposes and the question of whether or not to centralise functions currently performed by supplier agents. Each iteration of the Business Case will add more detail to the economic case:
 - This *Strategic Outline Case (SOC)* explains how we will assess the economic impact of market-wide HHS. It also sets out our work so far on defining objectives for the project and options for delivering those objectives.
 - The *Outline Business Case (OBC)* will include a high-level economic assessment of the impact of moving to market-wide HHS. It will indicate the economic basis for market-wide HHS, analysing the costs and benefits of introducing HHS on a market-wide basis as compared to an elective basis (our base case). It will not cost out specific options in detail, as this will rely on the development of the TOM and decisions taken on key policy areas. We expect to publish this iteration in mid-2018.
 - The *Full Business Case (FBC)* will detail the costing of options for market-wide HHS, identifying a preferred option, and assess different options for implementation timing and scheduling. This will inform our final decision on if, when and how to move to market-wide HHS. We expect to publish this iteration by the second half of 2019.

⁴¹ See Ofgem's Impact Assessment Guidance:
https://www.ofgem.gov.uk/system/files/docs/2016/10/impact_assessment_guidance_0.pdf

The economic analysis

- 3.3. Market-wide HHS will expose suppliers to the true cost of their customers' supply, putting incentives on them and others in the market to help consumers move their consumption to periods when electricity is cheaper. In doing so, there are potentially substantial benefits from making better use of the system and network/generation infrastructure. A recent study commissioned by BEIS⁴² showed that the UK could save £17-40 billion across the electricity system from now until 2050 by deploying flexibility technologies.
- 3.4. Market-wide HHS would help create the right environment for DSR and is an important enabler of a smarter, more flexible energy system. It could encourage new market entry and further competition, increasing consumers' confidence and engagement in the market and enabling them to save on their electricity bills by managing their consumption in response to new tariffs and innovation. We also expect more direct benefits from more accurate and granular data feeding into the settlement process.
- 3.5. This iterative economic assessment will seek to capture these benefits and compare them against the costs of implementation to build a picture of the expected impacts of market-wide HHS. Implementing market-wide HHS would involve major changes to IT systems and new IT infrastructure for many industry players, including ELEXON, suppliers and supplier agents. These costs must be carefully estimated and weighed against the expected benefits.
- 3.6. The case for market-wide HHS is complex, and challenging to predict and to quantify. We are looking to use the settlement arrangements to change the balance of incentives for those in the market, but the response of the market and the behavioural response of consumers is uncertain and will depend on factors outside the scope of this project, including those interactions set out in the strategic case (Chapter 2 of this document). Introducing a new set of incentives into the market and redefining the settlement process could have a range of potential competition effects that need to be assessed, but are unclear. For example, the new forms of tariffs and innovation resulting from market-wide HHS could lead to new business models that challenge the existing dynamics of supply competition, but it is difficult to predict how this will develop.
- 3.7. The scale of uncertainties associated with suppliers' behaviour under these new incentives, consumers' behavioural response and future system conditions makes the analysis much more complex. Given this complexity, it is likely we will identify and estimate the potential costs of implementing market-wide HHS, and then test whether benefits can be identified that justify these costs, describing the conditions under which such benefits would arise.

⁴² See: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/568982/An_analysis_of_electricity_flexibility_for_Great_Britain.pdf

This will involve quantifying the system impact of different levels of consumer load shifting resulting from innovation dependent on market-wide HHS, and testing whether the levels of load shifting needed to justify the costs can be reasonably expected. As in any impact assessment, we will compare the results against a counterfactual, where HHS for domestic and smaller non-domestic consumers remains on an elective basis.

- 3.8. We will supplement this quantitative analysis with qualitative analysis, looking to capture any impacts that are hard to monetise and analysing the distributional impacts of HHS (drawing on analysis published in July 2017⁴³). We will also use the economic case, primarily at the FBC stage, to examine the costs and benefits of different options for implementation.

Interaction with other market-wide HHS workstreams

- 3.9. We will use the economic case, initially in the OBC but primarily in the FBC, to examine the costs and benefits of the main options for market-wide HHS, as set out in our September 2017 publication.⁴⁴ The economic analysis needs to take into account the TOM design work and policy development around access to half-hourly data for settlement purposes and the question of whether or not to centralise functions currently performed by supplier agents.
- 3.10. The economic case in the OBC will provide information on high-level project costs and benefits to inform these two policy areas. It will not, however, be used to justify the decisions taken on these key policy areas. We will take those decisions based on their own analysis and will feed this into the narrowing of options to assess in the FBC. We will use the separate analysis in these policy areas to inform the more high-level economic analysis.
- 3.11. The economic case will be complemented by further, more detailed analysis of options for the design of settlement arrangements for market-wide HHS. This detailed options analysis will take place through the TOM design work, with the results feeding into the economic case and other aspects of the Business Case.
- 3.12. The iterative development of all of these workstreams will lead to a point by the second half of 2019 where we will use the final TOM and FBC to support a decision on market-wide HHS and arrangements for implementation.

⁴³ See: <https://www.ofgem.gov.uk/publications-and-updates/distributional-impacts-time-use-tariffs>

⁴⁴ See: <https://www.ofgem.gov.uk/publications-and-updates/project-objectives-and-assessment-options-market-wide-half-hourly-settlement-business-case>

The economic case so far

Project objectives and assessment options

- 3.13. The development of the economic case began with identification of the objectives for the project (outlined in paragraph 2.35. of the strategic case above) and a set of options to potentially achieve these. We published a document summarising this work in September 2017.⁴⁵
- 3.14. This forms the start of a qualitative process to move from a longlist of options to a shortlist, including a 'preferred way forward'. As shown in Figure 3, this qualitative process is followed by quantitative analysis of the shortlisted options, with a preferred option determined through cost-benefit analysis.

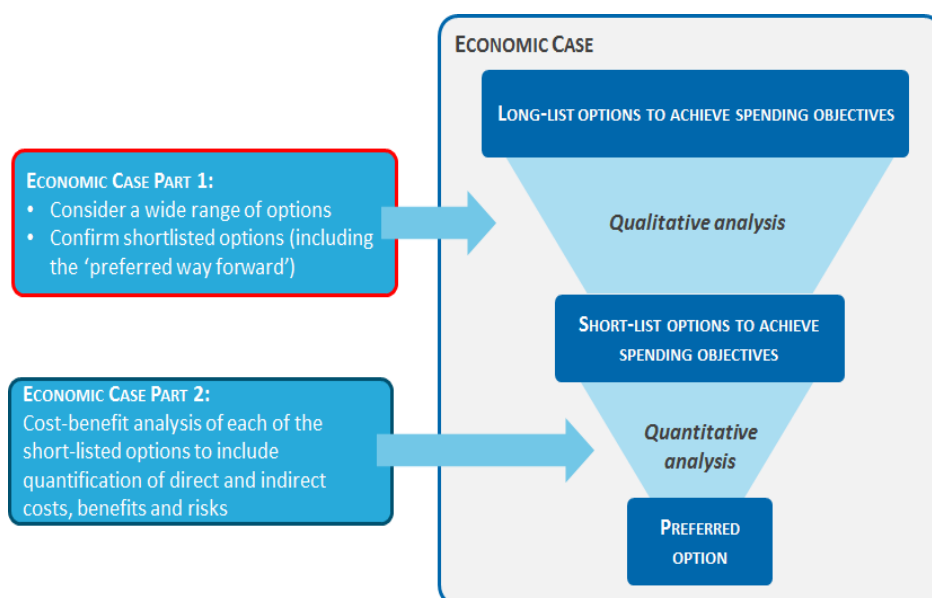


Figure 3: the economic case process

- 3.15. The options defined in our September 2017 publication were assessed against the Project Objectives and a set of Critical Success Factors.⁴⁶ They were assessed based on the information we currently have available to us, with a number of sub-options carried forward for further assessment before they are either preferred or discounted. We will continue to narrow the options as the policy and design work develops, leading to a point where we can identify a shortlist of options including a preferred way forward.

⁴⁵ See: <https://www.ofgem.gov.uk/publications-and-updates/project-objectives-and-assessment-options-market-wide-half-hourly-settlement-business-case>

⁴⁶ For more information on this assessment process, please see the link in footnote 45.

- 3.16. This shortlist will be assessed in the FBC including the options for implementation. The OBC will indicate the economic costs and benefits of market-wide HHS at high level, rather than giving a detailed analysis of specific options.

Initial Information Request

- 3.17. We issued a voluntary Information Request in August 2017⁴⁷ to start building a base of evidence on the impacts of market-wide HHS and shape the options to be assessed. This requested both qualitative and quantitative evidence on the costs of market-wide HHS, seeking to understand the drivers and scale of costs. We are grateful to the many stakeholders who provided evidence, which is being used as we begin the economic analysis for the OBC.
- 3.18. Many stakeholders said that at this stage of the process, with the TOM at an early stage of development, it is not possible to accurately quantify a number of cost areas. We recognise that at this stage in the SCR, accurately estimating impacts is challenging. This is part of a two-stage Information Request process, and we will issue a further request later in the process (probably towards the end of 2018) to gather detailed cost information once the TOM is clearer, to inform the development of the FBC.

Next steps

- 3.19. The first iteration of the economic assessment will form part of the OBC, which is planned for mid-2018. We will continue to develop the economic analysis to feed into this over the coming months, using information from the first Information Request to build a basis of costs to compare against a high-level estimate of the benefits. We will continue to work with our stakeholders as we develop this and will feed in progress made on stage 1 of the development of the TOM.
- 3.20. The final iteration of the economic assessment will be produced in the FBC, supported by the final TOM. This is planned by the second half of 2019 to support the final decision on market-wide HHS.

⁴⁷ See: <https://www.ofgem.gov.uk/publications-and-updates/information-request-mandatory-half-hourly-settlement-business-case>

4. Outline commercial case

Chapter Summary

The outline commercial case provides our initial views on the key drivers that may affect stakeholder actions needed to deliver market-wide HHS, including procurement of new IT systems and any non-system changes that are needed.

- 4.1. Any proposed reforms to introduce market-wide HHS will involve changes to the existing arrangements. The level of change required could vary significantly across a spectrum of options, ranging from:
 - an evolution of the existing settlement arrangements, involving incremental changes which also incorporate learning from recently implemented changes to existing settlement arrangements
 - to
 - establishing, and then implementing, completely new IT systems solutions and ways of working (as set out in industry codes) between all market participants (existing and new) to ensure they are interoperable.
- 4.2. The level of change chosen could be anywhere along that spectrum. Whichever reform path is chosen, it will involve significant changes for market participants. This commercial case reflects on the main drivers that participants may need to encourage them to deliver reform. Ofgem will not procure solutions architecture, new IT systems for example, if these are required, but we will decide on the preferred TOM design following the industry-led design process. The implementation of these solutions will be a matter for market participants, once relevant code changes have been approved by us.

Commercial viability for taking forward change

- 4.3. The reformed arrangements for delivering market-wide HHS will need to be commercially viable. The solutions should also facilitate innovation and attract new entrants and providers to the energy market to enhance competition, and should also be deliverable in a timely and cost-effective way. Work to identify and develop a preferred TOM design for the revised arrangements is being progressed by the Design Working Group (DWG). The TOM design we decide on will determine which future arrangements are to be delivered by industry.
- 4.4. Taking the examples in 4.1 above, reforming the current settlement arrangements could involve:
 - Evolving the existing arrangements, leaving current business processes and relationships largely unchanged. Suppliers, their agents (for example, data

collectors and aggregators) and other market participants, including new participants, would broadly retain their existing relationships, but with modified BSC central systems to facilitate market-wide HHS. We will make a separate decision on whether competitive supplier agent services continue under this approach or whether to move to a centralised agent. New entrants would join the revised arrangements through whichever market entry requirements are put on market participation.

- New settlement arrangements, where existing relationships fall away and new roles and relationships between participants are defined to facilitate market-wide HHS.⁴⁸ New agents or agent relationships could emerge alongside other reforms to parties' roles or responsibilities, eg new agent functions within a revised competitive model. Alternatively, a central agent function could be established to interact with suppliers and other retail providers. Ofgem would make a decision on this separately from the TOM design decision.
- 4.5. The pros and cons of each of these potential models will be explored through the DWG, before a recommendation is given to Ofgem. Following our final decision on the TOM design, we would then expect market participants to implement the necessary processes, systems, interfaces, data (and any non-systems solutions) in a cost-effective and timely way.
 - 4.6. If the preferred TOM design suggests evolving the existing arrangements through incremental improvements to the current processes, eg developing the current settlement IT systems and the rules set out in codes to make them compatible with a smart, flexible energy system, we expect market participants to work together to deliver the changes following relevant Ofgem decisions. The delivery timescales ought to be relatively short, in line with expectations that incremental changes are building upon the existing IT systems and rules in the code frameworks.
 - 4.7. Should the preferred TOM design suggest that new IT system and non-system frameworks are needed, the delivery timescales would be longer. We would expect market participants to implement a clearly produced and agreed design and a route map for achieving it. We will use the FBC to set out the timeframe for transitioning to the new arrangements.

Learning from previous reform of settlement arrangements

- 4.8. To assist with formulating a preferred settlement design, we can draw on learning from recent settlement changes to help us identify incentives that will deliver effective arrangements for implementing market-wide HHS.

⁴⁸ We are separately considering the future of the 'supplier hub' principle – see footnote 29.

Settlement reform for Profile Classes 5-8 (P272)

- 4.9. The installation of advanced meters for Profile Classes 5-8 is a licence obligation (Standard Licence Condition (SLC) 12 of the electricity supply licence). From 1 April 2017, settlement of actual half hourly data recorded by these meters is mandated through BSC code changes (P272 and P322), ie an obligation on suppliers to settle medium to large non-domestic consumers metered through an advanced meter on a half-hourly basis. This enables suppliers to offer these consumers smart tariffs and other innovations.
- 4.10. The original electricity supply licence changes (made by DECC and introduced in 2009) mandated supply of electricity through advanced meters for consumers in Profile Classes 5-8 by April 2014 but did not mandate HHS of the data from those meters at the same time. Industry therefore progressed HHS of these meters through the codes process (P272 was originally raised in May 2011, with parallel code changes to address changes to the structure of distribution charges). However, a lack of coordination across codes meant that it took a long time to identify the appropriate changes and then implement them (with final implementation delayed further until 1 April 2017). This affected the realisation of benefits for consumers. That is why we are collaborating with industry to deliver market-wide HHS in a coordinated way through our SCR, led by us using an end-to-end process.⁴⁹

Project Nexus

- 4.11. Project Nexus was the upgrade to the gas settlement system. The new SAP-ISU system went live on 1 June 2017. There were a number of regulatory reforms progressed as part of the project which made changes to the settlement systems, processes and rules for the GB gas market. The reforms intended to rectify issues that were identified with the previous settlement systems and processes, namely inaccurate charging of gas transportation and energy balancing costs for non-daily metered customers. The changes included introducing new and additional settlement classes and the gas reconciliation process. The proposed changes to systems and rules began with code changes raised in late 2011 and early 2012, but final implementation only took effect in June 2017. There were significant challenges in undertaking reform, partly because of the de-centralised approach to identifying and progressing changes and the lack of incentives on market participants and service providers to drive industry change. The delays experienced prior to Ofgem assuming Programme Sponsorship have affected the realisation of benefits for consumers.⁵⁰

⁴⁹ Further information about the process followed for P272 and the lessons arising appears as a case study in the final report of the CMA's energy investigation (Appendix 18.2: Codes AEC, Annex A): <https://assets.publishing.service.gov.uk/media/576bcd32ed915d622c000081/appendix-18-2-codes-aec-fr.pdf>

⁵⁰ Further information about the process followed for Project Nexus and the lessons arising also appears as a case study in the final report of the CMA's energy investigation (Appendix 18.2: Codes AEC, Annex A): <https://assets.publishing.service.gov.uk/media/576bcd32ed915d622c000081/appendix-18-2-codes-aec-fr.pdf>

Elective HHS changes

- 4.12. Changes to industry codes to introduce elective HHS came into force by the end of June 2017. They aim to encourage a market-led approach to HHS for domestic and small non-domestic consumers (Profile Classes 1-4).
- 4.13. We are monitoring (with ELEXON's support) the uptake of elective HHS and the product offerings from 'early movers' among industry participants. This will help industry and ourselves obtain some real-world experience to inform the development of the TOM for market-wide HHS and the arrangements for its implementation.

Drivers on market participants to develop and implement market-wide HHS

- 4.14. In light of the issues that arose with the implementation of P272 and Project Nexus, it is critical for achieving market-wide HHS that industry works together to design, agree and then implement the reformed arrangements in a timely way. We discussed the lessons we can learn from P272 in a workshop held with stakeholders in October 2017, and will use these lessons as we develop a plan for implementation.
- 4.15. We intend to make our decision on the preferred TOM design by the second half of 2019, which will then trigger the implementation phase of the project. We are looking to both potentially new and existing market participants to be involved in designing the reformed arrangements to ensure that the preferred design is one they could ultimately deliver. Those involved in the DWG and the Design Advisory Board (DAB), a strategic board set up to provide guidance on products developed by the DWG, will drive the design process through their expertise and knowledge of settlement arrangements.
- 4.16. Stakeholders' engagement with the TOM design and the development of the Business Case so far (eg by responding to our Information Requests on the economic case and on agent functions) is a positive sign for ongoing involvement. To help industry further and to ensure a wide variety of stakeholders are able to input into the process, we and ELEXON will be holding stakeholder engagement opportunities throughout the TOM design process as well as updating on progress with the project throughout. Opportunities will include dedicated workshops, periodic teleconferences and consultations, and updates on the project through our website.
- 4.17. New entrants will want to influence the TOM design process to ensure that their business models are compatible with the reformed settlement arrangements and that they can maximise the opportunities for using customers' actual half-hourly data (with the customer's consent) to offer new products and services. Existing market participants will want to ensure that the reformed arrangements are flexible enough for them to continue to offer their existing products and services if they want to. They will also want the

TOM to allow them to adapt their offerings to customers with minimal disruption and meet increasing competition from new market players.

- 4.18. The commercial benefits from increased settlement efficiency and accuracy should encourage industry to seek to establish a robust implementation plan that can deliver benefits promptly and cost-effectively. As the project progresses, we will consider whether there are additional drivers for market participants in progressing and delivering market-wide HHS. This could, for example, take the form of helping to assess the scope of future licence or code changes as the TOM design develops.
- 4.19. We have specifically chosen to use the SCR Option 3 process (an end-to-end process led by Ofgem) so we can manage, drive forward and maintain momentum in the delivery of market-wide HHS by market participants.⁵¹ This SCR process option will provide multiple opportunities for broad and effective stakeholder engagement to ensure industry identifies issues early and remains on track to deliver change.

⁵¹ While we are currently taking forward our work on market-wide HHS through SCR Option 3, we recognise that there are still some risks of delay to implementing the outcomes of this project when using the SCR process, eg if licence or code changes are required later in the implementation phase. Parliament is currently considering, through the Smart Meters Bill, giving Ofgem legislative powers to deliver market-wide HHS more effectively than through an SCR: <https://services.parliament.uk/bills/2017-19/smartmeters.html>

5. Outline financial case

Chapter Summary

The outline financial case sets out the high-level resource requirements for Ofgem and stakeholders to develop and deliver the changes needed in order for market-wide HHS to be implemented. It also sets out, to the extent known, the funding arrangements to meet these requirements. It does not look specifically at the costs for implementation, which will be addressed through the economic case.

- 5.1. The TOM design work and concurrent policy work will involve both Ofgem and industry resources. There is a direct cost to running the TOM design workstream by inviting industry participants with suitable expertise to take part. Alongside this, there will be a further cost associated with broader stakeholder input to the design phase. Unless any unforeseen issues arise, these costs should be affordable for both Ofgem and industry to deliver promptly and cost-effectively.⁵²
- 5.2. In this outline financial case, we discuss the arrangements for carrying out the SCR, including the broad financial costs of the process for those participating.

Resource implications for developing and delivering reform

- 5.3. The future resource implications of delivering market-wide HHS depend on the TOM design work, which is being led by ELEXON and industry. At this stage, we have provided only general information about the resource requirements for undertaking the design and development work.
- 5.4. Ofgem will retain ultimate control of deciding on the preferred TOM solution, so the costs of making changes will depend on those decisions. We will aim to ensure that the TOM solution taken forward balances factors such as cost-effectiveness, timely implementation, and the early realisation of benefits for consumers. We will assess these potential benefits in the economic case at the FBC stage.

Resource requirements

- 5.5. Ofgem's Settlement Reform team is leading the project. The resource requirement we expect to deploy has been determined via Ofgem's internal processes.

⁵² The costs referred to in this financial case relate to the process for designing the TOM and developing the necessary changes for delivery of market-wide HHS. The potential costs associated with implementing the changes are to be addressed through the economic case.

- 5.6. We anticipate that the bulk of resource from industry in the initial stages of the project will involve participation in the TOM design. Industry participation in the DWG on TOM design work began in October 2017. We anticipate this work to continue until spring 2019, split into two phases, and dependent upon progress with the initial design considerations.
- 5.7. In the first phase, which we currently expect to continue until spring 2018, the DWG will develop skeleton TOMs and a high-level view of the systems architecture needed to deliver those TOMs. We will consider these skeleton TOMs and decide whether the DWG should proceed with phase two of the design work.
- 5.8. The second phase, which will begin once we have made this decision, will involve the DWG narrowing down the number of potential TOMs and working up detailed designs of the remaining TOMs. We expect to receive a final report from the DWG in spring 2019. We will consider its contents before we decide which option to take forward later in 2019.
- 5.9. We have tasked ELEXON with leading the work of the TOM DWG under our guidance. The current level of commitment from ELEXON, through its Design Authority function, is to undertake a number of responsibilities, primarily through the DWG, leading on the development of the TOM options, their assessment against Ofgem’s design principles and transitional options for Ofgem’s consideration, agreement and approval.⁵³ These include:
- Development for DWG review of high-level TOM options (roles and responsibilities, settlement processes and system architecture)
 - A plan for transition from non-HHS to HHS
 - Detailed TOM development
 - Running the DWG, including:
 - chairing and providing technical secretariat function to the DWG
 - preparing meeting papers, consultations and running stakeholder workshops on the DWG’s work
 - providing technical support to Ofgem on policy issues related to settlement
 - providing dedicated information about the DWG’s work on its website.
- 5.10. Stakeholder participation through the DWG and the DAB⁵⁴ will involve commitment from various industry experts as DWG and DAB members. In the case of the DWG members we have appointed, they are currently expected to

⁵³ ELEXON has produced a high level plan for progression of the ELEXON-led work to support our SCR: <https://www.elexon.co.uk/group/design-working-group/>

⁵⁴ The DAB is chaired by Ofgem and will review the progress of the TOM design work at key stages and provide strategic advice to the Ofgem Senior Responsible Owner to assist in the final decision.

participate in around nine meetings across the two phases. Wider stakeholders will also have an interest in participating in the TOM design process, eg by attending stakeholder workshops organised by us at various points during the design phase, or by making representations to us through consultation responses. We are also facilitating wider stakeholder engagement with the project through regular updates by teleconference and bilateral meetings. The level of commitment of wider stakeholders will vary and depend on how much they wish to engage with the process.

- 5.11. Once the implementation of the preferred model for market-wide HHS is underway, there is likely to be a resource requirement on ELEXON, other code administrators, ourselves and industry more generally to deliver the changes required. This will take the form of industry code changes and any licence changes that are identified and which we may require to make to underpin the revised arrangements that are set out in affected codes. It is too early to say what resourcing may be needed as it will depend on the scope and scale of changes to be made.
- 5.12. There are likely to be system changes required both centrally and at individual participant level to ensure full interoperability for market participants under the reformed arrangements. These system changes will apply to market participants who continue to operate in the electricity market and also to new participants engaging in the market for the first time. The level of resource needed and the number of participants will depend on the outcome of the TOM design work.

Data and Communications Company (DCC)

- 5.13. The DCC is a licensed entity established to manage the smart metering communications infrastructure connecting smart meters to the business systems of energy suppliers, network operators and other authorised service users of the network. The DCC is a monopoly provider regulated by Ofgem. Half-hourly smart meter data will be transported via the DCC communication infrastructure, which will play a key role in enabling the delivery of market-wide HHS. Given the important role that the DCC will play in transporting half-hourly smart meter data, we have appointed a member from the DCC to sit on the DWG and provide input into the design of the TOM.

Funding arrangements

Electricity suppliers, their agents and other market participants

- 5.14. Suppliers, their agents and other market participants operate in a competitive environment. We will consider, as part of the implementation of the reformed settlement arrangements, whether there should be direct regulatory obligations applied to market participants so that they can implement the preferred TOM design and also what those obligations may be. Parties choosing to participate in the market will fund their own costs associated with implementing reformed settlement arrangements.

Distribution and transmission network operators

- 5.15. Both types of network operator are regulated through price controls. Price controls are needed as these networks are natural monopolies and therefore there is no realistic way of introducing competition across the whole sector. Price controls are a method of setting the amount of money (allowed revenue) that can be earned by the network companies over the length of a price control. These companies recover their allowed revenues from charges to suppliers who in turn pass these costs through to consumers. The revenues have to be set at a level that covers the companies' costs and that allows them to earn a reasonable return, with the return subject to them delivering value for consumers, behaving efficiently and achieving their targets as set by us.
- 5.16. We will consider in the future whether delivering market-wide HHS has an impact on network operators. This impact may depend on the preferred TOM design that is taken forward and the scope and scale of the changes to be implemented. Both the DWG and the DAB have representation from network operators to provide their views during the development of the TOM.

Code administrators

- 5.17. ELEXON is the code administrator for the BSC. It is funded by BSC parties in accordance with the terms of the BSC. BSC parties include all licensed generators and suppliers but can also include other parties that choose to become signatories by acceding to the BSC.
- 5.18. We have tasked ELEXON with leading the TOM design work in conjunction with industry through the DWG under our guidance. ELEXON's funding for this work and further involvement in the project comes from funding provided by BSC parties as part of its work on behalf of these parties on settlement arrangements.
- 5.19. Consequential changes may also be required to other industry codes to implement market-wide HHS. Below we outline which codes may be affected and their funding arrangements:
- the Master Registration Agreement (MRA) is the industry-wide multi-party agreement (between GB electricity suppliers, distribution businesses and ELEXON) governing the process by which electricity suppliers transfer customers between each other. The MRA Service Company (MRASCo) oversees changes to the MRA. Suppliers and distributors fund MRASCo's running costs and Gemserv administers the MRA on behalf of MRASCo. Depending upon the changes needed for market-wide HHS, the MRA may also need to change, with changes funded under the MRA arrangements.
 - the Distribution Connection and Use of System Agreement (DCUSA) is a multi-party agreement (between GB licensed electricity distributors, suppliers

and generators) administered by Electralink on behalf of the DCUSA parties by contract. The DCUSA sets out the rules for connecting and using the GB electricity distribution networks and is funded by the DCUSA parties. Depending upon the changes needed for market-wide HHS, eg to distribution charging, the DCUSA may also need to change, with changes funded under the DCUSA arrangements.

- the Connection and Use of System Code (CUSC) is a multi-party agreement (between National Grid Electricity Transmission (NGET) and GB licensed electricity suppliers and generators) administered by NGET on behalf of the CUSC parties. The CUSC sets out the contractual framework for connection to, and use of, the National Electricity Transmission System and is funded through the charges levied on CUSC parties by NGET. Depending upon the changes needed for market-wide HHS, eg to transmission charging, the CUSC may need to change, with code changes funded under the CUSC arrangements.
- the Smart Energy Code (SEC) is a multi-party contract (primarily between the DCC, suppliers and network operators, although other parties may choose to accede to the SEC). It sets out the terms for the provision of the DCC's services and other provisions governing the end-to-end management of smart metering in gas and electricity. The SEC came into force under the DCC licence. The DCC manages the smart metering communications infrastructure under its licence. Costs associated with governance and administration of the SEC (the cost of the SEC Panel, the Code Administrator and Secretariat), including changes to the SEC, are covered by the annual licence fee paid by the DCC to the Authority.

Ofgem

- 5.20. Ofgem is funded through fees levied on licensed companies, subject to agreement from HM Treasury on its overall annual revenue. Ofgem's Performance Delivery Board scrutinises Ofgem's forward work programme and makes decisions about how to allocate its budget to specific projects and work programmes on an ongoing basis. These decisions are made based upon a business case submission by project or programme teams, including activity planning in support of a budget proposal.

6. Outline management case

Chapter Summary

The management case sets out our initial view of the governance and assurance arrangements needed to ensure the successful delivery of market-wide HHS.

- 6.1. The delivery of market-wide HHS is likely to involve major changes to systems (central systems and market participants' systems) and market rules (licences and industry codes). Other significant market reforms are also taking place simultaneously. All these changes will require careful planning and management.
- 6.2. Below are the arrangements we consider are needed to effectively oversee the project over this phase to minimise risks to delivery. These cover:
 - key project management considerations
 - management strategy overview
 - approach to stakeholder engagement
 - risk mitigation activities
 - our use of specialist advisers
 - benefits realisation strategy
 - key milestones.

Key project management considerations

- 6.3. We currently envisage the focus of the project will be on TOM design and development in line with the Design Principles in our SCR Launch Statement, the Ofgem policy workstreams and development of the Business Case. Until this work advances significantly, the implications for systems design and development or for licence and industry codes changes will be unclear.
- 6.4. A number of options are currently open for consideration by the TOM DWG, so we cannot fully assess costs and benefits until the picture is clearer. We intend to make a decision on the preferred option by the second half of 2019.

Management strategy overview

- 6.5. We will want to ensure we can deploy the right level of resource in delivering the reformed arrangements.
- 6.6. Figure 4 below presents an overview of the first phase, up to the decision on progressing with market-wide HHS:

Market-wide Half-Hourly Settlement: Strategic Outline Case

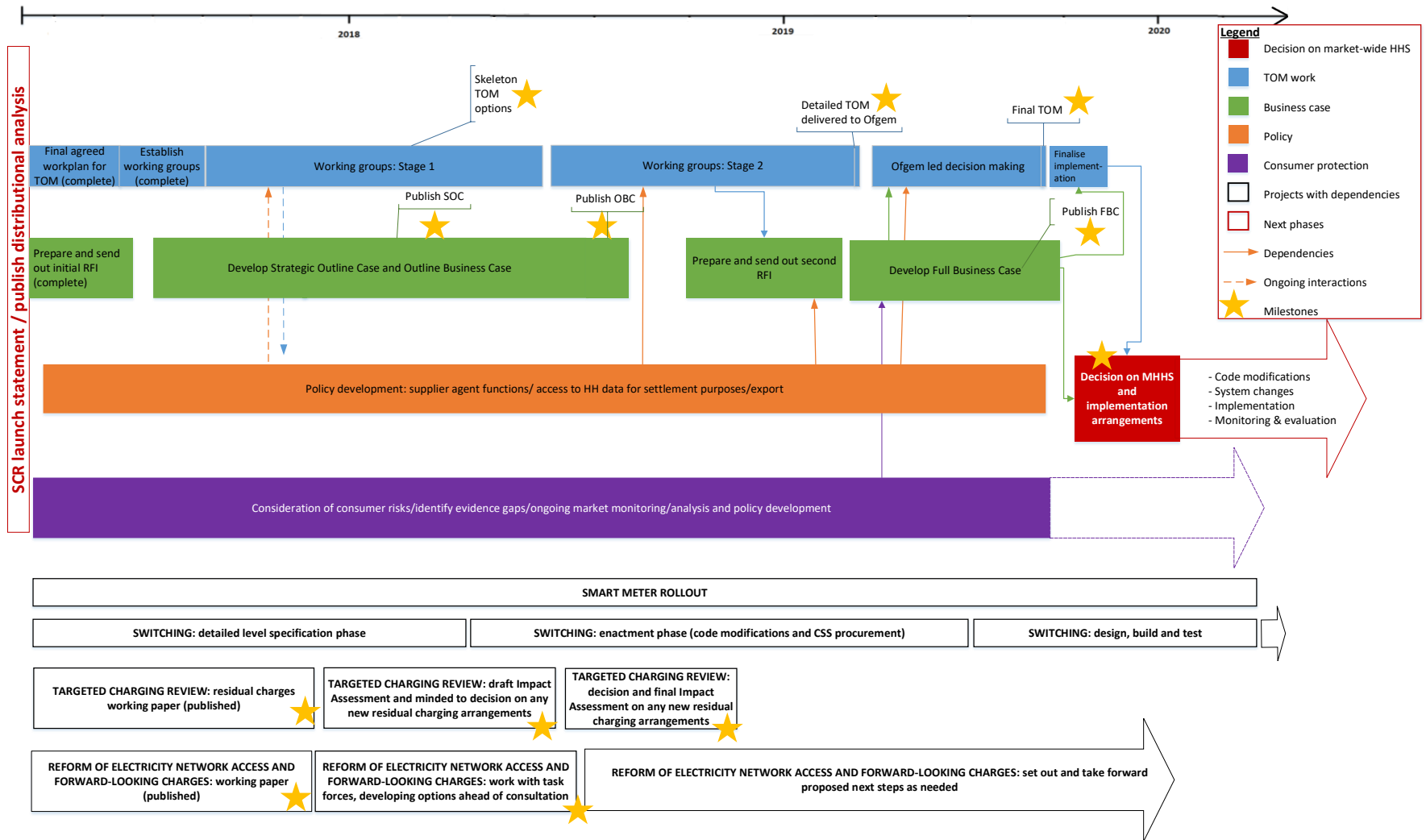


Figure 4: first phase plan

6.7. Our aims for project management are to ensure:

- The design of any new arrangements and development of system and licence/code changes meet our Project Objectives
- Each stakeholder affected by the design changes can understand the impact on them individually and can deliver the changes as envisaged
- The design is rigorously tested and checked across all IT systems (central and participant) to ensure systems are functioning and communicating effectively
- There are clear governance and decision-making arrangements to address any issues and risks at the right levels.

Proposed roles and responsibilities

Governance for the project

6.8. The governance structure we propose to manage our decision-making through is in Figure 5 below. It incorporates the TOM design work which we have tasked ELEXON to lead with industry support:

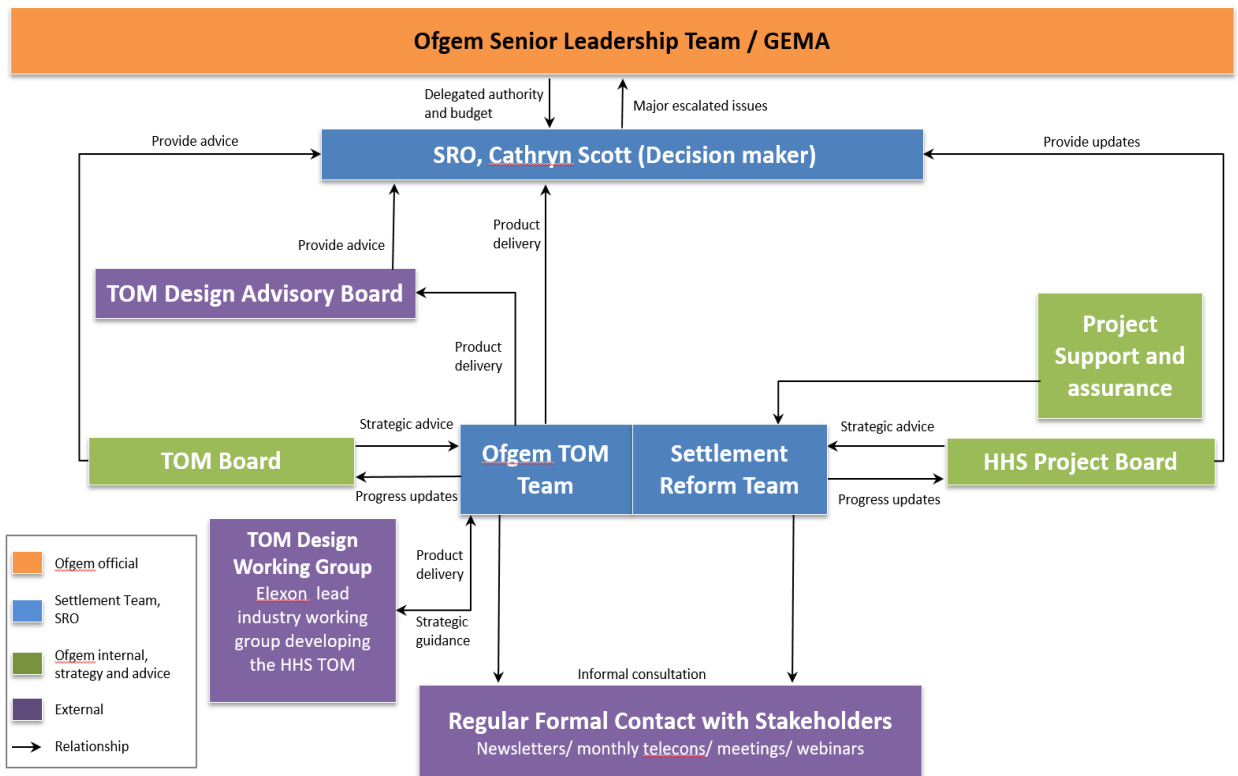


Figure 5: governance structure

- **Senior Responsible Owner (SRO):** the SRO has delegated decision-making authority from the Gas and Electricity Markets Authority (GEMA) in matters relating to the project. On areas where the SRO does not think it would be appropriate for them to take a decision, eg because the decision could affect Ofgem's reputation or ability to conduct its functions, the SRO may ask Ofgem's senior management team or GEMA to do so.
- **Ofgem TOM Board:** the Ofgem TOM Board is responsible for reviewing the progress of Stage 1 and Stage 2 of the design work. It will review the options and recommendations produced by the DWG and will give strategic advice to the SRO to inform decision-making. It will also be responsible for overcoming any issues escalated to it by the Ofgem TOM team, and will ensure the design work is coordinated with other Ofgem policy decisions and projects. The TOM Board comprises members who also sit on the Ofgem Project Board that oversees the broader Settlement Reform work.
- **Ofgem TOM team:** the Ofgem TOM team supports the DWG Chair and attends DWG meetings. The TOM team will regularly update the Ofgem TOM Board on the work of the DWG. The team is responsible for engaging with members of the DWG and those not participating in the DWG through formal stakeholder engagement. The team will ensure design work focuses on the project design principles and objectives. The team will oversee the escalation of options and recommendations to the DAB, Ofgem TOM Board and the SRO for a final decision.
- **Design Advisory Board (DAB):** The DAB will review the DWG's design recommendations and provide strategic input. The Chair of the DWG will attend meetings of the DAB as an observer and present TOM design recommendations alongside the rationale for including them in the TOM. The DAB will provide advice from a broader industry and stakeholder perspective to assist the SRO on TOM design recommendations.
- **Design Working Group (DWG):** The DWG will drive forward and deliver options and recommendations on the design of all aspects of the TOM. TOM design recommendations will be escalated, via the Ofgem TOM Team, to the SRO for decision. TOM design recommendations will be accompanied by supporting evidence and rationale.

Final decision-making on the TOM rests with the SRO who will be advised on TOM design recommendations by the DAB and Ofgem TOM Board.

- **Settlement Reform team:** the Ofgem Settlement Reform team will deliver the project's workstreams, including overseeing the work done by ELEXON, and seeking input from other Ofgem teams to help understand other Ofgem policy issues that are linked to the project.
- **HHS Project Board:** the Project Board will receive updates from the Settlement Reform team and provide strategic steer to the SRO, Cathryn Scott, who will chair the Project Board and take decisions. Other members will be selected according to their expertise in related projects or policy areas, such as flexibility and smart meter rollout. They will advise the SRO on key deliverables and

milestones and, on the basis of advice from the project assurance function, will approve the project's transition from one phase to the next.

- **Project Support and Assurance:** The project manager will report on progress to the Head of Settlement Reform each week, the SRO each fortnight, and to the Project Board each month. The project manager will ensure project documentation is up to date and reviewed regularly.

Approach to stakeholder engagement

- 6.9. We are keen to engage wider stakeholders throughout the project, from the TOM design phase through to implementation. To achieve this, we are holding regular conference calls open to all interested stakeholders to keep up to date with the project as it develops.⁵⁵ We will also use other forms of direct engagement such as bilateral meetings and formal consultations.
- 6.10. We have asked for stakeholder participation in the TOM design by inviting those with relevant expertise to become members of the DWG. ELEXON will also undertake consultation on the TOM at two key stages of DWG design work⁵⁶ and may seek to run workshops, seminars and webinars to inform stakeholders to update stakeholders on the progress of the TOM design work.
- 6.11. We have also asked for strategic advice through the DAB, who will advise the SRO so that we can make informed decisions on the preferred TOM design.

Risk mitigation

- 6.12. We have highlighted the risks of the project in the strategic case. As we develop the OBC and the FBC, we will consider these risks again and refine and score them as appropriate once the relevant costs and benefits are identified.

Assurance

- 6.13. The project will undergo various assurance reviews through deep-dives, critical friend reviews, reporting to the Project Board and using industry expertise. We are developing an integrated assurance and approvals plan that will consolidate all the assurance activities for this phase of work (to the decision point by the second half of 2019).

⁵⁵ More details about how to participate in stakeholder conference calls are available in the regular HHS updates on the Electricity Settlement webpage: <https://www.ofgem.gov.uk/electricity/retail-market/market-review-and-reform/smarter-markets-programme/electricity-settlement>

⁵⁶ See ELEXON planning document for the TOM design work, available at <https://www.elexon.co.uk/wp-content/uploads/2017/09/Design-Authority-DWG-Market-Wide-HHS-forward-planning-document.pdf>

Use of specialist advisers

- 6.14. We have appointed ELEXON to lead the work on TOM design with the help of industry through the DWG. ELEXON will report on this work to us and we will take all decisions on the TOM.

Benefits realisation strategy

- 6.15. We have used the strategic case to outline the case for changing the settlement arrangements and the potential benefits. We will use future iterations of the Business Case to refine our assessment of the project benefits and outline our benefits realisation strategy.

Key milestones

- 6.16. The milestones for the development phase of the project are below. These are our best estimate based on the information we currently have, but may change over time based on the policy and design decisions that are made and the impact of any unforeseen external factors.

Milestone	Date
SCR launch statement published	July 2017
Distributional analysis published	
Information Requests published	August 2017
Decision on DWG membership	September 2017
Decision on DAB membership	November 2017
Publish Strategic Outline Case (this document)	Winter 2017/18
Skeleton TOM options	Spring 2018
Publish working paper on agent functions	Spring 2018
Decision on DWG skeleton TOM options (End stage 1 design)	Spring 2018
ELEXON consultation on skeleton TOM options	Spring 2018
Publish consultation on access to data for settlement purposes	Spring 2018
Commence stage 2 TOM design work	Summer 2018
Publish Outline Business Case	Mid-2018
Call for Evidence on Consumer Impacts	Second half of 2018
Detailed TOM delivered to Ofgem	Spring 2019
Final TOM	Second half of 2019
Publish Full Business Case	
Decision on market-wide HHS	

7. Next Steps

Developing our Business Case

- 7.1. This is the first iteration of our Business Case. The next iteration, the OBC, will present the results of an economic cost benefit analysis of the impact of introducing market-wide HHS. This high-level analysis will indicate a preferred way forward, with the TOM unconfirmed at this stage. We will also add more detail to the commercial, financial and management cases.
- 7.2. We aim to publish the OBC in mid-2018. It will be informed as much as possible by the stage 1 work on the development of the TOM.

Feedback

- 7.3. We will continue to seek input from affected stakeholders throughout the project through the various channels established including the TOM DWG, regular conference calls and bilateral meetings. If you would like to feed into this process and are not currently actively engaged with the project, please contact the team at half-hourlysettlement@ofgem.gov.uk. We also welcome any feedback on this document.

Appendix 1 - Glossary

A

Advanced Meter

The electricity supply licence defines an advanced meter as one that must be capable of recording half-hourly consumption data and of providing suppliers with remote access to this data.

B

Balancing and Settlement Code (BSC)

The BSC is the document that sets out the terms for electricity balancing and settlement in Great Britain, including the governance process for modifications to the BSC.

Balancing and Settlement Code (BSC) Panel

The Balancing and Settlement Code (BSC) Panel is established and constituted pursuant to and in accordance with Section B of the BSC. It is responsible for ensuring that the provisions of the BSC are given effect to fully, promptly, fairly, economically, efficiently, transparently and in such a manner as will promote effective competition in the generation, supply, sale and purchase of electricity.

D

Data Aggregator (DA)

As part of the settlement process, the party appointed by an electricity supplier in accordance with Section S of the BSC to package up (or aggregate) metered consumption data to meet the requirements set out in the BSC.

Data Access and Privacy framework

The government has developed a data access and privacy policy framework to determine the levels of access to energy consumption data from smart meters that suppliers, network operators and third parties should have. It also establishes the purposes for which data can be collected and the choices available to consumers.

Data Collector (DC)

As part of the settlement process, the party appointed by an electricity supplier in accordance with Section S of the BSC to retrieve, validate and process meter readings to meet the requirements set out in the BSC.

Data and Communications Company (DCC)

The DCC is the company that manages the data and communications to and from domestic consumers' smart meters.

Demand-side response (DSR)

Actions taken by consumers to change the amount of energy they take off the grid at particular times in response to a signal, such as a price.

Distribution Network Operators (DNOs)

DNOs are the companies that are licensed by Ofgem to maintain and manage the electricity distribution networks in Great Britain.

Dynamic time-of-use tariff

A dynamic time-of-use tariff is one that provides for price or pricing structures to vary at short notice in response to market events, subject to contractual terms.

E

Electricity supplier

A company licensed by Ofgem to sell energy to and bill customers in Great Britain.

ELEXON

ELEXON is the organisation responsible for administering the BSC. The role, powers, functions and responsibilities of ELEXON are set out in Section C of the BSC.

I

Imbalance charge

This is the charge that suppliers (and other market participants) pay for any difference between contracted and metered volumes. See also settlement process.

M

Master Registration Agreement (MRA)

The MRA is the agreement that provides a governance mechanism to manage the processes established between electricity suppliers and distribution companies to enable electricity suppliers to transfer customers. It includes terms for the provision of Metering Point Administration Services (MPAS) Registrations.

N

New Electricity Trading Arrangements (NETA)

The arrangements under which electricity is traded in the Great Britain wholesale electricity market. NETA was initially put in place for England and Wales (since 2001), and subsequently changed its name to the British Electricity Trading and Transmission Arrangements (BETTA) in 2005 with the expansion to include the Scottish wholesale electricity market.

National Grid Electricity Transmission (NGET)

NGET is the System Operator for the electricity transmission system in Great Britain, with responsibility for making sure that electricity supply and demand stay in balance and the system remains within safe technical and operating limits.

Non-half-hourly settlement (NHH)

As part of the settlement process, NHH settlement is the arrangement for estimating how much energy a supplier's customers use in each settlement period based on meter readings spanning longer intervals. These consumers are not settled using half-hourly consumption data.

O

Ofgem

The Office of Gas and Electricity Markets (Ofgem) is responsible for protecting gas and electricity consumers in Great Britain. It is governed by the Gas and Electricity Markets Authority (GEMA).

P

Profile Class

Consumers that are not settled using actual meter readings for each settlement period are grouped into one of eight Profile Classes. For each Profile Class, a load profile is created that estimates the consumption shape of the average consumer. This load profile (or variations of it) is used to determine the consumption in each half hour for all consumers assigned to the Profile Class. See also non-half-hourly settlement.

Profiling and Settlement Review Group (PSRG)

The PSRG was a sub-group of the Supplier Volume Allocation Group (SVG) from 2010-15. The PSRG reported to the BSC Panel and was tasked with maintaining the integrity of the settlement arrangements in the short to medium term as smart meters are rolled out.

S

Settlement period

The period over which contracted and metered volumes are reconciled. This is defined as a period of 30 minutes. See also settlement process.

Settlement process

Settlement places incentives on generators and suppliers to contract efficiently to cover what they produce or their customers consume respectively. For suppliers, it operates by charging for any difference between the volume of electricity that they buy and the volume that their customers consume.

Significant Code Review (SCR)

The SCR process is designed to facilitate complex and significant changes to a range of industry codes. It provides a role for Ofgem to undertake a review of a code-based issue and play a leading role in facilitating code changes through the review process.

Smart Energy Code (SEC)

The Smart Energy Code (SEC) is a multi-Party agreement, coming into force under the DCC Licence, which defines the rights and obligations of energy suppliers, network operators and other relevant parties involved in the end to end management of smart metering in Great Britain.

Smart meter

A meter which, in addition to traditional metering functionality (measuring and registering the amount of energy that passes through it), is capable of providing additional functionality (for example, recording consumption in each half hour of the day and of being remotely read) is known as a smart meter. It must also comply with the technical specification set out by the government.

Static time-of-use tariff

A time-of-use tariff that fixes in advance the peak and off-peak periods for electricity consumption and the prices applied at these times.

Supplier Volume Allocation (SVA) arrangements

Within the BSC, the SVA arrangements provide the mechanism for determining the allocation of energy volumes to suppliers in each half hour of the day.

System Operator

The entity charged with operating the Great Britain high voltage electricity transmission system, currently National Grid Electricity Transmission Plc.

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Time-of-use (ToU) tariffs

Energy tariffs that charge different prices at different times of the day, week, month or year are known as time-of-use tariffs. See also dynamic time-of-use tariff and static time-of-use tariff.