Department for
Business, Energy
& Industrial Strategy

Smart Meter Policy Framework Post 2020:

Government response to a consultation on minimum annual targets and reporting thresholds for energy suppliers

Annex C: Analytical Evidence

June 2021

Contents

BACKGROUND 3
PART 1: BEIS Projections 5
Modelling Approach 5
BEIS Rollout Assumptions 7
Consumer Acceptance 7
Technical Eligibility 9
Operational Fulfilment 10
Operational Capacity 10
Non-Domestic Calculations 12
Starting Point 14
Tolerance Levels 15
PART 2: Addressing Feedback from Respondents 18
Supplier Heterogeneity 18
Technical Eligibility 19
Operational Fulfilment 20
The Attitude Boost 21
Smart Churn (on change of supplier) 22

BACKGROUND

1. In our November 2020 consultation we set out the details of our modelling approach used for the calculation of tolerance levels under the post-2020 Framework. The modelling approach used in the November 2020 consultation had changed from the 2019 approach, following feedback from stakeholders in response to the 2019 consultation process. The revised model, which is further explained in Part 1 of this document, is based on three main factors which drive the smart meter rollout projections:

    i. **Consumer acceptance:** based on consumer attitudes (seek/accept/indifferent /unlikely) towards smart metering which will define consumers' willingness to accept a smart meter.
    ii. **Operational fulfilment:** based on energy suppliers' ability to fulfil an installation promptly and effectively once the customer has agreed to have a smart meter installed.
    iii. **Operational capacity:** based on the market installation capacity and the ability to meet the potential demand for installations.

2. The model supporting the November 2020 consultation, alongside the description of the assumptions underpinning the projections, was made available to energy suppliers and designated parties during the consultation process. The disclosed information also included a description of the data used in the model (although excluding any references to commercially sensitive data about individual licence-holders). During the consultation process we also operated a separate email address where energy suppliers (or their contractors) with access to the Disclosed Data could address any question about the functionality of the model, including clarification of formulae or definitions.

3. In response to the consultation, we received comprehensive feedback from stakeholders and in particular from energy suppliers on the assumptions used in our projections. A trade body representing energy suppliers submitted an analytical report alongside their response to the consultation. The majority of the feedback received from individual suppliers on the BEIS modelling and assumptions was also included in this report, which was commissioned by the trade body through a third party on behalf of their members. The trade body stated that the report was intended to:

    i. Provide an alternative model to BEIS's projection of industry-wide smart coverage based on energy suppliers' performance.
    ii. Analyse BEIS's modelling and assumptions.
    iii. Provide a critique to BEIS's Impact Assessment.

4. We have considered the challenges raised in the report and by consultation respondents. As a result, we have made a number of updates to our modelling.

5. Part 1 of this annex describes our modelling approach, the main assumptions underpinning our projections, and the changes made to these projections as a result of updates made to the model. The changes mainly relate to the starting

point, the splitting of the domestic and non-domestic tolerance calculations, and the use of the most recently available data. Part 2 summarises our position in response to the main feedback received from respondents relating to our modelling approach and assumptions, including the actions we have taken as a result of this feedback.

6. This annex focuses on addressing the feedback raised by respondents on the modelling approach. Feedback not pertaining to modelling and assumptions has been addressed and discussed as part of the main Government Response document.

PART 1: BEIS Projections

Modelling Approach

7. The binding installation targets for each supplier are determined based on a model of the industry-wide rollout, combined with the smart coverage of individual suppliers at the beginning of the Framework. The target is for the rollout to be complete by the end of the Framework, thus a straight line from the smart coverage at the beginning of the Framework – the "starting point" – to 100% smart coverage represents the installation targets. However, as is explained below, in each year a tolerance level is applied, so that the minimum required installations per supplier are below their straight line to 100% coverage.

8. The minimum requirements for individual suppliers are based on industry-wide minimum requirements. These are calculated using a model which forecasts the smart meter rollout over the Framework period, taking account of a variety of drivers and constraints. In doing this, we want to ensure that the minimum requirements set for energy suppliers are attainable and realistic – while also achieving a sufficient level of ambition to help maximise the delivery of the benefits of the rollout.

9. The main drivers of the model used to calculate minimum requirements are:

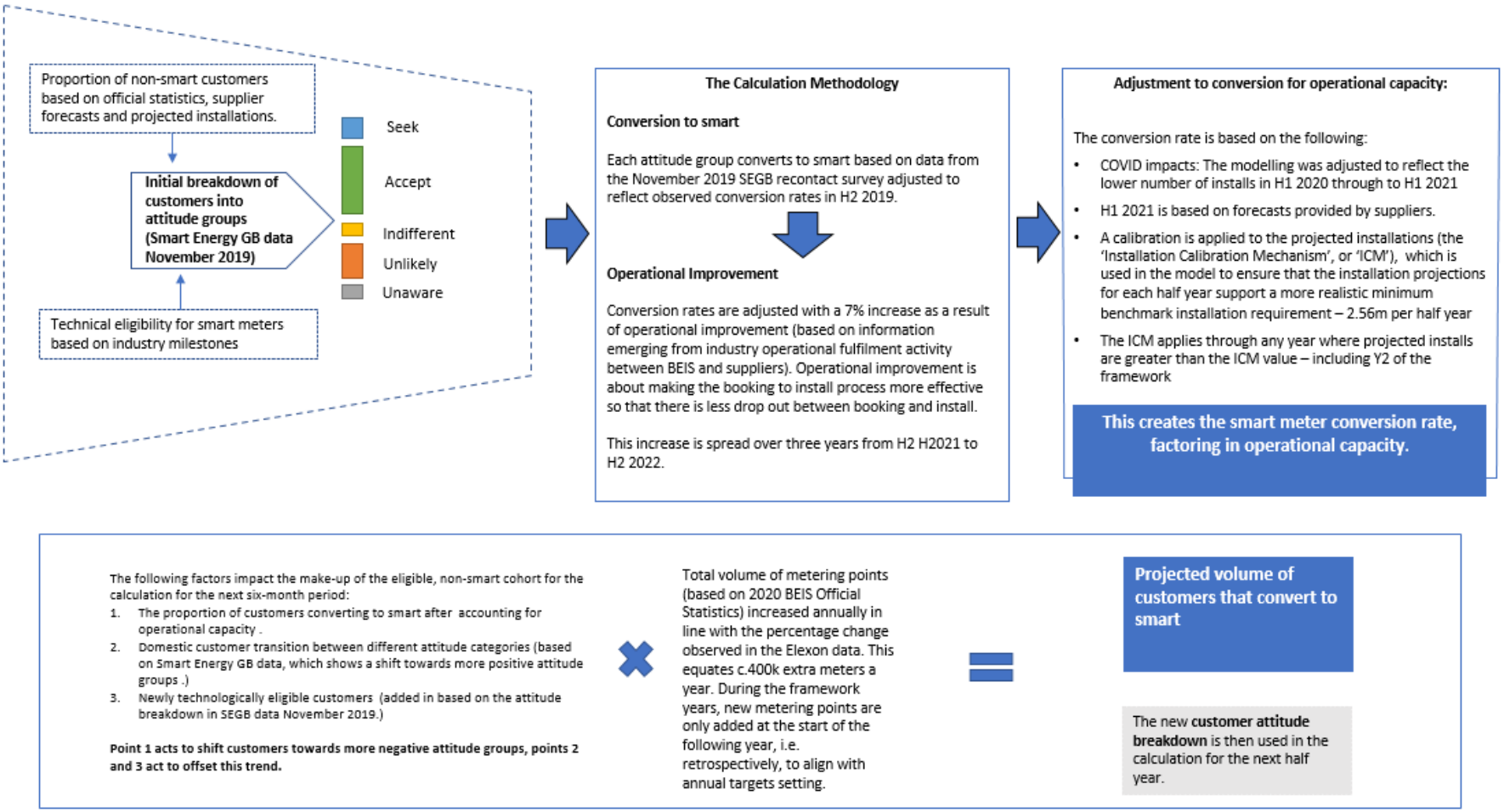
    i. Consumer demand, or willingness to accept a smart meter installation.
    ii. The technical eligibility of consumers to have a smart meter installed in their home or non-domestic premise.
    iii. The average level of operational fulfilment, i.e., the rate at which energy suppliers and third parties are able to install smart meters for willing consumers (or to put it another way, the rate at which willing, non-smart customers are "converted" into smart customers).
    iv. The industry-wide operational capacity, i.e., the total capacity of industry to install smart meters in a given period.

10. Each of these drivers is discussed in more detail in the next section. Jointly, they determine the rate at which consumers are converted from traditional meters to smart meters, which in turn determines the forecasted coverage and thus the industry-wide minimum requirement at each point of the Framework.

11. Within this model, the minimum requirements for the domestic and the non-domestic sectors are calculated separately. This is due to the contextual differences between rollouts in the two sectors (see Question 1 of the Government response document) and the effect this has on smart conversion. While the specific inputs used for the domestic and non-domestic calculations are different, the overall modelling approach remains the same for both.

12. Figure 1 summarises this modelling approach, the details of which (including the underlying assumptions) are discussed in the next section.

Figure 1: Diagram of the modelling approach



BEIS Rollout Assumptions

13. The main inputs and assumptions underpinning the model used to calculate minimum requirements are listed below. These are inputs and assumptions referring only to the calculation of minimum requirements in the domestic sector. How the non-domestic inputs differ is discussed subsequently.

Consumer Acceptance

14. Smart Energy GB's Outlook survey[1] is a large-scale survey of households carried out by Smart Energy GB every six months. Domestic customers who do not yet have a smart meter are asked about their current attitude to getting one. The Outlook survey is carried out online, with an off-line boost[2], and uses a large sample size (9,970 respondents in November 2020) designed to ensure that results are representative and robust for all GB households, customer groups and key variables.

15. There are now 14 waves of the Outlook survey, providing a timeseries of data on domestic consumer attitudes and acceptance. We use this data as the basis for our modelling of domestic consumer acceptance. [3]

16. The Outlook survey segments non-smart consumers in the following five categories:

    i. Seek: likely to actively seek a smart meter in the next six months.
    ii. Accept: if offered one, would accept a smart meter in the next six months.
    iii. Indifferent: have no clear view as to whether they would accept a smart meter in the next six months.
    iv. Unlikely: unlikely to take up an offer of a smart meter over the next six months.
    v. Unaware: unaware of smart metering.

17. Awareness of smart meters amongst domestic consumers is high, with just under 3% reporting they were unaware in November 2020[4]. Whilst awareness levels are high overall, some groups of consumers are less likely to be aware of smart metering. To support engagement with these audiences, Smart Energy GB is undertaking tailored awareness-raising activities and have established partnerships with relevant community organisations. As we have no evidence to suggest that, once aware, the attitudes of these consumers towards getting a smart meter would differ from existing aware non-smart consumers, the model

[1] Smart Outlook was temporarily paused in May 2020 due to COVID-19 before resuming in November 2020.
[2] From November 2020, the offline boost was carried out via a telephone survey. Prior to this a face-to-face survey was used.
[3] We have used data from both Smart Energy GB's Outlook survey (available from Smart Energy GB's website) and subsequent Recontact (unpublished) surveys.
[4] Smart Energy Outlook, November 2020 (published in March 2021)

distributes them between the other four attitude groups using the same proportion as for already aware consumers.

18. The Recontact survey, also commissioned by Smart Energy GB, estimates the proportion of domestic consumers within each of the consumer attitude categories that were successfully converted to smart during the six-month follow-up period. [5] This data finds that, while "seekers" are more likely to receive a smart installation than those in other categories, consumers from all other attitude categories are also converting to smart meters. This allows us to estimate half-yearly "conversion rates" for each attitude group.

19. It is also important to note that the attitudes outlined above relate to consumers' intentions over the coming six months and that these can, and do, change over this period. For example, the most recent Recontact survey shows that after six months, just under a quarter (24%) of those who said they were unlikely to take-up a smart meter had either had a smart meter installed, attempted to get one, or moved to a more neutral or positive attitude[6]. Many current rejectors highlight resolvable concerns, such as ongoing technical issues or poor past experiences, as reasons for their current negative attitudes towards smart metering. Together, this information demonstrates that changes in consumer attitudes towards smart meters are taking place and can be expected to continue. Consumers' attitudes are not fixed, and therefore it would not be appropriate to assume they are static throughout the Framework period.

20. Instead, we calculate a "boost" to consumer attitudes to reflect this. If consumer attitudes were fixed, we would expect that the attitudes of non-smart consumers would become progressively worse as those accepting a smart meter are more likely to have positive attitudes and are thus removed from the pool of eligible consumers. However, observations from the Smart Energy GB Outlook and Recontact surveys shows that the proportion of eligible non-smart consumers who are "seekers" does not decrease as quickly as would be expected. This shows that customers do move between attitude groups, creating new seekers over time, replacing some of those who have had a smart meter installed.

21. We have only used data on consumer attitudes collected prior to COVID-19. This approach was taken to avoid the risk that unrepresentative data collected during the pandemic impacted findings, either due to temporary changes in attitudes, or issues with data collection. Evidence collected during the pandemic however, including data from Smart Energy GB Outlook in November 2020, suggests that consumer attitudes to smart have continued to evolve, with the overall distribution of attitudes remaining stable despite significant uptake in this period.

22. The last available data on domestic attitudes prior to COVID-19 (from Smart Energy GB Outlook November 2019) shows that there has been a significant increase in the proportion of non-smart customers who would "seek" or "accept" a smart meter (compared to the data from the Outlook May 2019). These shifts

[5] Recontact is sampled from the Outlook survey, comprising of respondents who said they did not own a smart meter at that time. It has been running since 2017, providing a time series on how consumer attitudes change over time and is designed to collect a representative sample across key customer and demographic groups, with the sample sufficient to provide robust estimates for these groups.
[6] Smart Energy GB Recontact Survey, November 2019

were maintained in data collected during the pandemic period, with Smart Energy GB's November 2020 survey finding similar proportions of seek and accept in the non-smart population, despite significant take-up of smart meters in the preceding year. However, we have used a prudent assumption by taking an average of the value from November 2019 with the three previous values (the changes observed between November 2017 and May 2018, between May 2018 and November 2018 and the change between November 2018 and May 2019). Additionally, we have assumed in the modelling that this shift to more positive attitudes or attitude "boost" is delayed until H2 2021 to account for more immediate COVID-19 impacts on installation numbers (see paragraph 23 below).

23. Whilst we recognise the impact that COVID-19 has had on installation numbers, data collected throughout the COVID-19 period suggests there has been no enduring impact on underlying consumer attitudes towards smart meters[7]. The recent work on remobilisation carried out during spring/summer last year suggested that energy suppliers were able to return to previous installation levels (or even higher) 2-3 months after lockdown restrictions were lifted. On that basis, our forecasting model takes account of COVID-19 impacts for projections prior to the start of the Framework through the calculation of the starting point and the ICM, the application of a delay in the consumer attitude "boost", and through recognising the demonstrable impact on installation numbers and immediate effects of lockdown restrictions. However, there is no evidence to suggest an enduring impact on consumer attitudes and therefore on smart conversion as a result of COVID-19 and so we have included no further adjustments to account for COVID-19 in our modelling for the projections of the first two years of the Framework.

Technical Eligibility

24. For a non-smart consumer in any attitude group to be converted to smart, they need to be technically eligible to receive a smart meter. That means their metering points need to be technologically capable of having a smart meter installed in smart mode. In other words, if an install were attempted for an eligible consumer, a successful smart metering installation should take place.

25. The overall proportion of consumers whose metering points are technically eligible is expected to increase over time, due to the availability of technical solutions such as Dual-Band Communication Hubs (DBCH) and the Alt-HAN solution. We expect around 84% of consumers to be technically eligible during 2021, with this number rising to 99.3% in 2022 following the successful delivery of the Alt-HAN solution and national availability of DBCHs. We have revised the eligibility series used in the November 2020 consultation following the emergence of new operational evidence on the availability of DBCHs (more detail on this change can be found in Part 2.)

[7] There is no evidence that underlying attitudes (as measured by Seek, Accept, Indifferent, Unlikely) have been negatively impacted as a result of Covid-19 with Smart Energy GB's weekly tracker (domestic), 6 monthly Outlook (domestic) and annual microbusiness tracker showing consistent (and potentially slightly positive) trends compared to the pre-pandemic period.

26. The conversion rates estimated from the recontact survey do not take into account the eligibility or ineligibility of consumers. This has an impact on conversion rates, as ineligible consumers cannot be converted to smart. We therefore adjust the conversion rates for all attitude groups to account for technical eligibility.

Operational Fulfilment

27. Before being used to forecast the smart metering rollout in the model, the eligibility-adjusted conversion rates are adjusted again to match observed overall conversion rates from the official statistics. This is to ensure that the model does not implicitly assume a higher level of operational fulfilment than that observed in historical data. These final, adjusted conversion rates are then used to project the number of smart installations in each half year of the Framework.

28. Evidence from the Smart Metering Implementation Programme's benchmarking work with large energy suppliers (which is shared in anonymised form with participating energy suppliers) indicates that there are currently several areas in which energy suppliers could deliver improvements to operational fulfilment (for instance through adoption of industry best practice, for example in pre-installation engagement with customers and in handling installation failures) as demonstrated by some energy suppliers to date. Such improvements would be expected to translate into increases in these conversion rates from the same volume of smart metering installation appointments. We have considered and included a small improvement in operational fulfilment (7%) spread over three half years between the start of the second half of 2021 and the end of the second half of 2022, based on a weighted average of information provided by energy suppliers to BEIS in bilateral meetings.

Operational Capacity

29. A key constraint on energy suppliers' abilities to operationally deliver on their obligations is the number of installers available. No explicit constraint on installer availability in the market has been assumed in the modelling, on the basis of feedback received from energy suppliers in response to our September 2019 consultation (although we do calibrate our projections to ensure that unrestrained consumer demand does not lead to operationally unfeasible minimum requirements – see paragraph 31 for more detail.). During the peak of the COVID-19 disruption in 2020, the majority of installers were placed on furlough as fewer installations were taking place. The majority of installers have now returned to work, so installers not being operationally constrained remains a valid assumption. Indeed, several consultation responses from 2019 indicated that energy suppliers themselves do not directly consider installer resource within their internal rollout forecasts, but instead perform an ex-post analysis to validate that their forecasted rollout rates are deliverable under scheduled resource constraints. Additionally, some energy suppliers have reported that the attrition rate risk of installers has been reduced due to the current wider economic position.

30. The BEIS rollout projections will be used to set the tolerance levels from which individual energy supplier's minimum requirements for annual installations will be calculated. Given previous consultation responses and stakeholder feedback that the primary constraint on the rollout is consumer demand, the BEIS rollout projections use a consumer attitude-based conversion model to generate installation numbers for each half year period. This means that the model projects installations based on consumer demand and assumes that this demand can be fulfilled. The reduction in installations in 2020 (particularly in Q2) caused by the COVID-19 response, alongside noted increases in consumer smart technical eligibility throughout 2021/22, generates a large number of Seek/Accept consumers ready to be converted to smart during the first two years of the Framework. This arrangement of large numbers of non-smart customers in the model waiting to be converted to smart generates high volumes of projected installations. If these flowed through directly to the tolerance levels without calibrating for market installation capacity, they would generate potentially unrealistic minimum annual targets for energy suppliers to meet.

31. To address this, we have applied a calibrating mechanism to the installation projections generated by the consumer attitude-based conversion projection. This Installation Calibration Mechanism (ICM) applies only in situations where the consumer conversion calculation projects meter installations at a rate above levels that the market has demonstrated it can successfully complete, currently and historically. In such a scenario, the ICM – rather than the conversion model – directly sets the tolerance levels from which individual energy supplier annual installation minimum requirements will be calculated. In effect, the ICM operates as a safety net to ensure any projections generated by expected consumer demand are supported by market operational capacity, thus avoiding unrealistic minimum targets based on a flow of unconstrained consumer demand. It is important to note that the ICM does not represent an upper limit on the operational installation capacity of the market; rather it is used in the model to ensure that the installation projections for each half year supports a realistic benchmark and sets reasonable minimum installation requirements, based on proven underlying market installation capacity. The ICM should not be viewed as a restriction on energy suppliers who can install above their minimum installation target if their operational capacity allows them to do so. In fact, we expect energy suppliers to increase their operational capacity over time, where needed, to meet consumer demand, including through improvement (and, in some cases, expansion) in energy suppliers' smart meter installation operations.

32. If the consumer conversion model projects installations below the level defined in the ICM, then the conversion model will set the tolerance levels from which individual energy supplier annual installation minimum requirements will be calculated.

33. The ICM was calculated at the aggregate level using recent SMETS2 installation numbers from DCC data and Elexon data on SMETS1, Advanced and traditional meter installations. It amounts to 2.56m installations in each half year of the modelling, which equates to 2.45m installations in each half year for the domestic sector and 0.11m installations in each half-year for the non-domestic sector (following the separation of domestic and non-domestic capacity). For more detail

on the ICM calculation, see Figure 2 below (for more information on the domestic/non-domestic split, see Figure 3)

Figure 2: Calculation of the aggregate ICM

Calculation of ICM (for 6 months) = 2.56 m
Current total meter installations (SMETS2, SMETS1, Advanced and traditional meters)
1. SMETS2 installations in October 2020 • Average installations per day during the month • Scaled up to 6 months (taking into account public holidays)
2. SMETS1 installations in September 2020- Elexon data • Multiplied by 6 (6 monthly) • Multiplied by 1.8 to scale up to dual fuel installations
3. Advanced meter installations in September 2020- Elexon data • Multiplied by 6 (6 monthly) • Multiplied by 1.8 to scale up to dual fuel installations
4. Traditional meters installations in September 2020- Elexon data • Multiplied by 6 (6 monthly) • Multiplied by 1.8 to scale up to dual fuel installations

34. The ICM has not changed since the November 2020 consultation as we are not seeing any evidence of a change in the market-wide installation capacity in the last six months, as weekly smart meter installation rates recorded by the DCC have returned to the level used for the ICM back in autumn 2020 indicating that capacity has been maintained. The September/October 2020 data sources provide a stable data set which is post-COVID (and therefore acknowledges any underlying engagement/acceptance impact created post restrictions). Using Q1 2021 data would significantly underestimate the capacity in the market as installations were impacted by the third wave of restrictions. As referred above we have recently seen a return to the same DCC recorded SMETS2 installation levels as per September/October 2020.

Non-Domestic Calculations

35. The calculation of the minimum requirements in the non-domestic sector follows the same guiding principles as those for the domestic sector. However, we have identified some areas where our assumptions can be adjusted to reflect the specific circumstances of the non-domestic sector raised by the consultation respondents and so where data is available, we have included these in the calculation of non-domestic tolerance levels.

36. Customer acceptance in the non-domestic sector is modelled in a similar way to the domestic sector. Instead of the Outlook survey, we use Smart Energy GB's

Microbusiness Tracker, which collects data on attitudes towards smart meters from microbusinesses. The majority of sites covered by the non-domestic smart meter mandate are microbusinesses; in this sector, the main challenge is low awareness of smart meters rather than negative attitudes towards them. As in the domestic sector, we assumed that unaware customers would – once they become aware – be distributed in the same way as aware customers between attitude groups. However, given the higher proportion of unaware customers in this sector (38%), we undertook appropriate sensitivity analysis around this assumption. The approach taken is also validated by evidence around the progression of non-domestic consumer awareness from Smart Energy GB's Microbusiness Tracker, which suggests that unaware non-domestic customers are distributed broadly in the same way as aware customers once they become aware themselves.

37. Smart Energy GB does not undertake surveys of microbusiness customers as frequently as it does for domestic customers, and there is no corresponding Recontact survey to estimate conversion rates. To estimate non-domestic conversion rates, we have therefore calibrated the domestic conversion rates for each attitude group against historical non-domestic smart conversion figures. In other words, we assume that the extent to which consumers in the "Seek", or "Accept" attitude group are more easily converted than, consumers in the "Indifferent" and "Unlikely" groups is the same as in the domestic sector. However, the actual conversion rate for all categories is lower in the non-domestic sector, as historical data shows lower conversion rates in that sector and our parameters are calibrated against this historical data. This ensures that installation forecasts are realistic while also allowing for differential conversion rates based on attitudes in the non-domestic sector.

38. The technical eligibility series used for the non-domestic sector is the same as the domestic technical eligibility series. There is no reliable alternative eligibility series for non-domestic customers, and while non-domestic premises are less likely to require a Dual-Band Communications Hub or an Alt-HAN solution, they are more likely to require specific meter variants. We estimate that these different needs are likely to broadly balance each other out, such that the same technical eligibility series can be used for both sectors.

39. As mentioned above, conversion rates are adjusted to match historical operational fulfilment data, which is done separately for the domestic and non-domestic sector. Unlike in the domestic sector, no operational fulfilment uplift was applied to non-domestic conversion rates. This is a prudent assumption given the less comprehensive evidence around operational fulfilment in the non-domestic sector.

40. Operational capacity is applied in the model in the same way as in the domestic sector, with a non-domestic specific ICM. The same data sources were used, with some adjustments due to differences in data availability. SMETS2 installations attributed to non-domestic suppliers were taken from the DCC October 2020 data (and scaled up); we then assumed that all advanced meter installations (from Elexon data) were in non-domestic premises (with all SMETS1 installs assigned to domestic properties) and pro-rating traditional meter installations by the non-domestic market share. The non-domestic ICM thus

amounts to 110k installations per half year for suppliers of non-domestic premises.

Figure 3: Separation of domestic and non-domestic ICM

Domestic ICM calculations	
Components	Installs
1. DCC SMETS2 Installs	2.17m
2. Apportion all SMETS1 installs to domestic	0.13m
3. Scale legacy installs to domestic	0.15m
4. Total	**2.45m**

Non-domestic ICM calculations	
Components	Installs
1. DCC SMETS2 Installs	60k
2. Apportion all Advanced installs to non-domestic	41k
3. Scale legacy installs to non-domestic	9k
4. Total	**110k**

Starting Point

41. A key variable in determining the smart tolerances generated by the modelling is the assumed smart coverage at the start of the Framework period (end of December 2021.)

42. Actual data from Official Statistics on the number of smart meters operated (as of 31 December 2020)[8] has been used to measure smart coverage to the end of 2020.

43. For H1 2021 the following steps have been taken:

    i. Official statistics for Q1 2021[9] on installations by large suppliers have been used as the basis of our Q1 2021 estimate. The figure has then been uprated by ~5% using evidence gathered from bilateral meetings and the DCC to account for installs by small suppliers.

    ii. For Q2 2021 we initially used supplier forecasts for Q2 2021 and adjusted them down in line with the observed historic difference between forecasted and realised installs. This forecast data was provided to the programme in January/February 2021.

    iii. We have then used evidence gathered from bilateral meetings with energy suppliers and SMETS2 installation data from the DCC to check and validate these projections; ensuring that they suitably account for the impact of COVID-19 on H1 2021 installs in particular.

    iv. Given the impact that COVID-19 has had on installs in Q1, we have used a slightly revised (downwards) estimate for Q2 installs and combined this with the install data from Q1 to reach a final projection for H1 2021 installs.

[8] Smart metering statistics, Quarterly update December 2020
[9] Smart metering statistics, Quarterly update March 2021

44. For H2 2021 we have made a prudent estimate of installs using an extrapolation from the current rate of DCC installs and evidence obtained from supplier bilateral meetings and forecasts to BEIS. Given the uncertainty involved with making estimates further into the future, we have used more cautious estimates to calculate installs in this period. For the purposes of the modelling, we therefore assume 2.04m installs in the domestic sector and 80k installs in the non-domestic sector for H2 2021.

Tolerance Levels

45. The methodology described in the preceding section allows us to calculate the industry-wide minimum requirements which is then used to determine tolerance levels for all energy suppliers. The methodology to calculate tolerance levels is operated as follows:

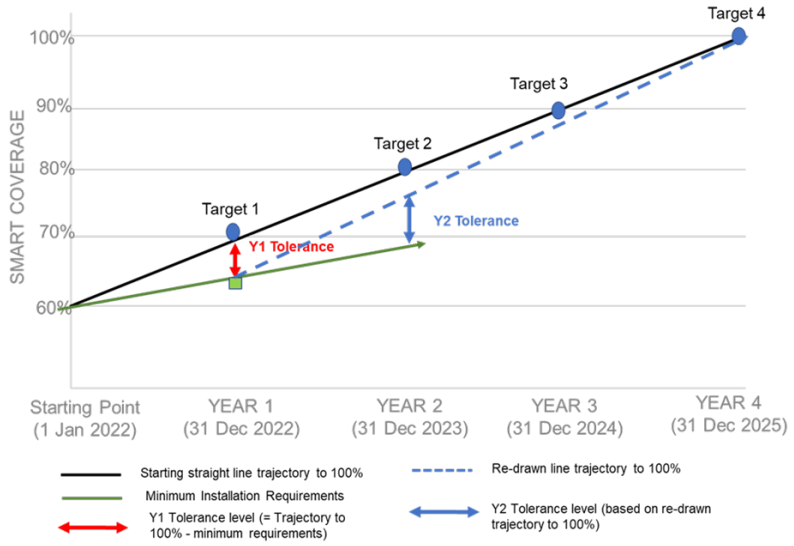
    i. A straight line is drawn from the estimated industry-wide smart coverage at the beginning of the Framework (starting point) up to 100% smart coverage at the end of the Framework.

    ii. The industry-wide minimum requirements, as calculated by the model described above, are subtracted from the line to 100% coverage, resulting in the percentage tolerance level for Year 1 of the Framework. Tolerance levels are separate for the domestic and non-domestic sector in line with the separate projected rollouts.

    iii. At the end of Year 1, the line to 100% coverage is redrawn in line with the smart coverage achieved at the end of Y1 (assumed to be the minimum installation requirements for that year), with Year 2 tolerance level calculated against the newly drawn line. **See figure 4 for illustrative purposes.**

    iv. These percentage tolerance levels are applied to individual suppliers in each year, subtracting them from the individual supplier's line to 100% coverage (this line will be different for each supplier as they will have different starting points). For mixed suppliers, operating in both the domestic and the non-domestic energy market, the tolerance levels are calculated separately for their domestic and non-domestic customer bases, and then combined to give that supplier's overall tolerance allowance which will define their overall minimum installation requirement for the year.

Figure 4: : Illustration of the methodology to calculate tolerance levels re-drawing trajectory towards 100% after Year 1



46. The modelling and methodology discussed in this annex results in the industry-wide average smart penetration coverages and annual tolerance levels, as shown in Table 1 below.

Table 1: Smart coverage and tolerance levels for Year 1 and Year 2 (domestic and non-domestic rollouts)

Rollout	Position at year end	Y0 (Starting Point) December 2021	Y1 December 2022	Y2 December 2023
Domestic	Target (Straight line to 100%)		61.9%	72.1%
	Minimum Smart Penetration	49.2%	58.5%	66.9%
	TOLERANCE		**3.5%**	**5.1%**
Non-Domestic	Target (Straight line to 100%)		61.7%	70.2%
	Minimum Smart Penetration	49.0%	55.6%	61.8%
	TOLERANCE		**6.1%**	**8.3%**

**Individual numbers may not add up due to rounding to 1 decimal point.*

To note:

i. The tolerance calculation for Year 1 does not include the addition of new metering points expected during Year 1. As metering point growth in a given year is somewhat uncertain (when considered at the beginning of the Framework Year), it would not be reasonable for the tolerance calculation to retroactively consider new metering points.

ii. The tolerance calculation for Year 2 then accounts for new metering points created in Year 1 at the beginning of the new year. This will lower slightly the smart coverage percentage achieved at the end of Year 1. Subsequently, the target line is redrawn to 100%, accounting for the smart coverage achieved in Year 1 and the increase in metering points in Year 1 (which decreases smart coverage and increases the Year 2 tolerances in proportion to Year 1 metering point growth).

iii. The tolerance levels produced by the modelling for the domestic rollout for Year 1 and Year 2 are lower than the ones produced for the November 2020 consultation mainly as a result of the changes in the starting point, now moved back six months. This means that the smart coverage at the beginning of Year 1 of the Framework is higher than it would have been if the Framework had started on 1 July 2021 and therefore the trajectory towards 100% is less steep (as it is drawn from a higher point), hence producing the lower tolerance levels.

PART 2: Addressing Feedback from Respondents

47. Part 2 of this annex summarises the actions we have taken in response to the main feedback relating to our modelling approach, raised by respondents to the consultation. Feedback received on aspects other than the modelling approach has been addressed in the main Government Response, which complements the discussion in this section.

48. We have grouped the feedback on the modelling approach into to four main areas, as multiple respondents had very similar comments: supplier heterogeneity, technical eligibility, operational fulfilment, and the attitude boost. These issues, and the way we have addressed them, are discussed in detail below. A fifth area of feedback that tangentially relates to our modelling approach – about the impact of churn on coverage levels – is also mentioned but is discussed in more depth in the Government Response.

Supplier Heterogeneity

49. Some respondents to the consultation raised the point that setting the same tolerance levels for all energy suppliers based on industry-wide data could be problematic due to the heterogeneity in suppliers' customer bases. In particular, this was perceived as a problem with regards to domestic and non-domestic suppliers, as there are important structural differences between the domestic and non-domestic markets. Some respondents also highlighted that suppliers with a specific focus in terms of consumers – e.g. a specific geographic focus – could also face greater challenges in reaching their minimum requirements than other suppliers.

50. We have addressed the concern around the heterogeneity of domestic and non-domestic customer bases by separating the calculations through which our model computes domestic and non-domestic tolerances. Whilst equivalent data to that used for the domestic calculation is not always available for the non-domestic sector (most notably around conversion rates), we have made a series of reasonable adjustments and prudent assumptions to arrive at a reasonable approach. The use of non-domestic specific data to calculate non-domestic tolerance levels ensures that the heterogeneity between domestic and non-domestic customers is reflected within our modelling approach.

51. Beyond this adjustment, we do not believe that there is sufficient evidence that other major sources of heterogeneity between different suppliers' customer bases affect their ability to rollout smart meters. By using consumer attitude data, combining it with eligibility and operational fulfilment data, and calibrating the results based on total operational capacity in the market, our modelling approach already integrates important mechanisms that ensure that the minimum requirements in smart coverage are attainable for energy suppliers. Suppliers'

individual targets are reflective of their customer size and existing smart penetration, and the extension of the "all reasonable steps" policy Framework by six months provides energy suppliers with further time to complete their planning and implementation ahead of the new Framework commencing on 1 January 2022. Therefore, we do not believe that any further adjustments to the modelling to account for supplier heterogeneity are necessary.

Technical Eligibility

52. Some respondents argued that the technical eligibility time series used in our original model underestimates the proportion of consumers that were eligible for a smart meter installation in the second half of 2019. They added that this was due to energy suppliers not knowing in advance of booking an installation, whether consumers would require a technical solution such as a Dual-Band Communication Hub[10], thus treating these consumers as eligible. The same respondents also noted that our assumptions around technical solutions such as Dual-Band Communication Hubs and Alt-HAN[11] becoming widely available in the near future may be overly optimistic. This would lead to an overstatement of eligibility gains over time.

53. Broadly speaking, we do not think that this is a valid criticism of the modelling approach. Firstly, the model uses technical eligibility as its input; that is, the proportion of customers whose metering points are technologically capable of completing a successful smart meter installation. Whether or not energy suppliers consider consumers eligible for campaigning is a separate concern. Moreover, while it is true that suppliers do not always know from the outset which consumers will be ineligible for a smart meter installation, many have developed screening policies that lead to identifying ineligible consumers before they are able to book an installation. Where such screening policies fail, installers would be unable to complete a booked installation, resulting in an installation failure and in consumers not being converted to smart. Thus, it is appropriate for our model to continue to track technical eligibility over time rather than eligibility to be campaigned to.

54. However, we do acknowledge that since our consultation there have been some issues with the availability of Dual-Band Communication Hubs and so we have adjusted our eligibility series following the consultation to reflect the delay in market-wide availability of this technical solution.

[10] A smart metering installation usually includes gas and electricity smart meters, an In Home Display (IHD) and a Communications Hub (Comms Hub). These devices communicate with each other via a Home Area Network (HAN) which is generated by the Comms Hub. For further information please visit Dual Band Communications Hubs (smartdcc.co.uk)

[11] "Alternative Home Area Network" is the technical solution capable of connecting the devices required for consumers to enjoy the full smart metering experience. For further information please visit: Alt HAN

Table 2: Technical Eligibility following modelling revisions.

	2018 baseline	H1 2019	H2 2019	H1 2020	H2 2020	H1 2021	H2 2021	H1 2022	H2 2022	H1 2023	H2 2023
Technical eligibility	65.0%	65.0%	70.0%	70.0%	76.0%	77.0%	84.0%	99.3%	99.3%	99.3%	99.3%

Operational Fulfilment

55. A third area of feedback from some respondents was the treatment of operational fulfilment in the model; in particular, these respondents did not agree with our assumption of a 7% uplift in operational fulfilment over the course of 2021 and 2022. Moreover, some respondents argue that while technological eligibility improvements should lead to improvements in operational fulfilment (as fewer installations fail due to technological issues), suppliers are actually already carrying out installations in ineligible premises, installing smart meters in traditional mode.

56. We disagree with this assessment. There is good justification for including an operational improvement uplift and the scale of this improvement is supported by multiple sources. Overall, there is a large spread in the completion rates reported by the large suppliers, ranging from approximately 60% to 90% (Q4 2020 data) and so some suppliers have a demonstrable opportunity to improve. We expect the average completion rate to improve, driven (to a degree) by the poorer performers adopting the lessons learned and best practice of the leading suppliers. These improvements are being supported by BEIS and industry-led initiatives such as the Operational Fulfilment Maturity Model, End to End Improvement project carried out with suppliers in Autumn 2020 and Spring 2021, and Quarterly Installation Failure benchmarking reporting. Over the timescales of "consistent failure" reporting (mid-2018 onwards) some suppliers have applied a fully end-to-end approach to their installation journey and achieved sustained, material improvements in their completion rates drawing on detailed performance insights from operational data. This demonstrates that systematic improvement can be achieved and that it is reasonable to expect that other suppliers can deliver similar levels of improvement in average completion rates.

57. We also reject the challenge that harder-to-reach customers who are looking to convert in the next couple of years will have higher failure rates. Over the same timescales historically, there has been no evidence that average completion rates have decreased as smart penetration increased, indeed if anything average completion rates have improved marginally. We do recognise however, that over time the proportion of non-smart customers remaining will steadily shift towards those less likely to accept the offer of a smart meter (the BEIS rollout projection reflects this changing profile). However, this does not mean that when a customer is converted towards the later years of the Framework, their installation will necessarily be technically any harder to complete .

58. The approach we took to reach the 7% figure is based on ongoing work between BEIS and energy suppliers on an Operational Fulfilment Maturity Model looking at the end-to-end installation journey from a best practice and innovation

perspective. It remains the case that some suppliers have consistently better completion rates than others, demonstrating via their benchmark that it is possible for other suppliers to improve their performance significantly. It is our view that the improvements in average operational improvement can continue as there remains considerable leakage[12] from the end-to-end journey whereas noted better performers demonstrate that other suppliers could materially improve their performance in these areas. We required a reasonable data point from which to estimate the value for that expected operational improvement and turned to the bilateral information provided by suppliers when discussing the actions they could take to improve operational fulfilment. We can validate this value of the expected operational improvement by comparison with supplier benchmarking data over the last 2 years which illustrates the spread of completion rates and hence opportunity available to poorer performers when compared to leading suppliers, and also that some suppliers have been able to improve and sustain that performance so indicating that improvement in operational fulfilment is readily achievable.

59. Furthermore, we also disagree with the point about technological eligibility issues leading to a large number of smart meters installed in traditional mode. We have no evidence that significant numbers of smart meters are being installed in traditional mode in technically ineligible premises, nor do we expect suppliers to be carrying out such installations. The vast majority of installed smart meters that are currently in traditional mode are SMETS1 meters that have lost smart functionality upon customer switching and have not yet been enrolled by the DCC, rather than smart meters installed to remain in traditional mode for any significant period of time.

The Attitude Boost

60. The fourth area of feedback raised in relation to our modelling approach concerned the attitude boost that is applied to consumer attitudes in every period of the model. Responses raised four relatively distinct points, all relating to the calculation and application of the attitude boost in our model:

    i. There is a computational error in the way that the counterfactual is treated in the calculations that estimate the attitude boost with historical data.
    ii. Technical eligibility is not accounted for appropriately in the calculations that estimate attitude boost.
    iii. The conversion rates used to calculate the attitude boost overstate historical conversions, leading to an overall overstatement of the estimated attitude boost.
    iv. In the main model, the attitude boost is applied additively – i.e. a certain percentage of all consumers moves from one attitude group to another in every period. Respondents argue that, by contrast, it would be more realistic to apply the attitude boost as a percentage rate – i.e.

[12] Customers have booked an appointment for a smart meter installation but the installation has not been fulfilled (completed) for a variety of reasons.

a certain proportion of consumers in each attitude group moves to another attitude group in every period.

61. We accept points (i) and (ii) and have updated our calculations to reflect the improvements suggested to us. We also agree that point (iv) reflects a more intuitive way of thinking about an attitude boost and have therefore revised our calculations. Point (iii), however, has not been accepted because our calculations already adjust conversion rates to match historical installation volumes in the main model. There is therefore no need to adjust the attitude boost again to reflect this.

Smart Churn (on change of supplier)

62. Finally, some respondents highlighted the effect that churn of consumers between different suppliers may have on these suppliers' ability to meet their installation targets. In particular, these respondents are concerned that suppliers who are further ahead with their smart meter rollout (compared to the industry-wide average) will on average lose more smart meter customers to churn than they will gain. If yearly installation targets fail to account for this, it could feasibly result in energy suppliers who are further ahead in the rollout (and invested more heavily to reach such a point) being effectively penalised within the Framework.

63. We have considered the evidence provided by energy suppliers to illustrate the effect of smart churn on annual installation requirements and acknowledge their concerns and the potential adverse impact that churn can have on some suppliers, particularly those further ahead in the rollout. On this basis we are considering an adjustment in the calculation of Year 2 targets to neutralise the impact of churn. The impact of churn is discussed in more detail in the Consultation Response (in response to Question 5).