Stage 03: P272 Benefits Pack

What stage is this document in the process?

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P272 'Mandatory Half Hourly Settlement for Profile Classes 5-8'

Contents

About this Document

This document is the P272 Benefits Pack. It provides a detailed description of the hypotheses, methodologies and assumptions that will be used to calculate the benefits that could be realised from P272. It also provides an example calculation for each of the benefits and in some cases where no quantitative benefit is calculated the rationale for this.

The structure of each benefit is as follows:

Benefit Structure	
Item	Description
Hypothesis	Definition of how the benefit would be derived or realised (**bold** depicts the source of the benefit).
Input Data	Data that is to be used the benefit calculation, e.g. market data such as number of metering systems, volume of energy in Profile Classes 5-8.
Assumptions	Assumptions made on the hypothesis rationale, input data and key values to be used in the calculation (OR a rationale for not calculating the benefit).
Proposed Calculation	A description of the calculation of the benefit.
Extrapolating the Benefit	A methodology to facilitate extrapolation of the benefits to different levels of uptake of HH elective settlement (counterfactuals) to facilitate comparison with the P272 scenario where everybody is settled HH by April 2014.
Example	A worked example of the proposed calculation with supporting explanation, where available.

1 Market Benefits

There are seven potential Market Benefits:

Market Benefits	
No	Benefit
M1	Load Flattening
M2	Load Reduction
M3	Carbon Benefits
M4	Reduced Central Admin Costs – Fewer Performance Problems
M5	Reduced BSC Admin Costs – Reduced Profiles
M6	Reduced Balancing Costs
M7	Reduced Network Investment

M1: Load Flattening

Hypothesis

By having HH data, Suppliers can offer more **innovative ToU tariffs**, thus promoting customers to use less energy at the time of peak (when wholesale prices are higher) and use more energy off peak, thereby flattening their demand shape.

Input Data

HH Profile data for Profile Classes 5 to 8

Population data for each of Profile Classes 5-8

Total Energy Estimate for Profile Classes 5-8 (TEE)

Half hourly reference prices based on a volume weighted average of day-ahead auction prices from N2EX (**RPP**)

Assumptions

The Total Percentage of Load Flattening (**LFL**) per HH: **1%**. The 1% value is based on the WorkGroup view of the benefits stated in the DECC analysis 'GB wide advanced/smart meter roll out to small and medium non-domestic sites' dated 27/07/2010 (Smart-meter-IA) , which stated a 2.8% energy reduction and Reduction peak load of 5% across the 20% TOU costumers. 1% is used for the load flattening and another 1% is used in M2 for the load reduction.

Benefit Trigger Volume (**BTV**): **50%**. This value is based on the view that at least half of PC 5-8 customers need to be HH settled before load flattening takes effect and is used for the counterfactual scenarios.

Spring and Summer Reduction Window (**SSRW**): **10:00 – 13:00**. This is derived from looking at the peak demand period for spring and summer.

Autumn and Winter Reduction Window (**AWRW**): **16:00 – 19:00.** This is derived from looking at the peak demand period for autumn and winter.

Proposed calculation

The Total National Profile (**TNP**) is calculated by multiplying, on a half hourly basis, the consumption for Profile Classes 5-8 by their respective consumption size, and adding them together to create the Total National Profile.

For each Settlement Day, the TNP volume in the Reduction Window is reduced by the Load Flattening Percentage, and the reduction volume is smeared across all Settlement Periods outside the Reduction Window, creating a flattened profile.

The benefit is calculated by comparing the total wholesale cost of energy for the Total National Profile with the total wholesale cost for the flattened profile. In each case the total wholesale cost is calculated by multiplying the Settlement Period consumption by the relevant half hourly reference price.

Extrapolating the benefit

The Benefit is not triggered in the model until the BTV has been reached. The model inputs the appropriate population estimates into the calculation. It will then be included as a per annum benefit from that point.

M2: Load Reduction

Hypothesis

By having HH data, Suppliers can offer more **innovative ToU tariffs** (and other products, such as demand side reduction). This promotes customers to use less energy overall.

Input Data

HH Profile data for Profile Classes 5 to 8

Population data for each of Profile Classes 5-8

Total Energy Estimate for Profile Classes 5-8 (**TEE**)

Half hourly reference prices based on a volume weighted average of day-ahead auction prices from N2EX (**RPP**)

Assumptions

The Total Percentage of Load Reduction (**LR**) per HH: **1%** The 1% value is based on the WorkGroup view of the benefits stated in the DECC analysis 'GB wide advanced/smart meter roll out to small and medium non-domestic sites' dated 27/07/2010 (Smart-meter-IA) , which stated a 2.8% energy reduction and Reduction peak load of 5% across the 20% TOU costumers. 1% is used for the load flattening and another 1% is used in M2 for the load reduction.

Benefit Trigger Volume (**BTV**): **50%**

Spring and Summer Reduction Window (**SSRW**): **10:00 – 13:00**

Autumn and Winter Reduction Window (**AWRW**): **16:00 – 19:00**

Proposed calculation

The Total National Profile (**TNP**) is calculated by multiplying, on a half hourly basis, the consumption for Profile Classes 5-8 by their respective consumption size, and adding them together to create the Total National Profile.

For each Settlement Day, the TNP volume in the Reduction Window is reduced by the Load Reduction Percentage, creating a reduced profile.

The benefit is calculated by comparing the total wholesale cost of energy for the Total National Profile with the total wholesale cost for the reduced profile. In each case the total wholesale cost is calculated by multiplying the Settlement Period consumption by the relevant half hourly reference price.

Extrapolating the benefit

The Benefit is not triggered in the model until the BTV has been reached. The model inputs the appropriate population estimates into the calculation. It will then be included as a per annum benefit from that point.

M3: Carbon Benefits

Hypothesis

By having HH data, Suppliers can offer **more innovative ToU tariffs** and other products, thus promoting customers to use less energy overall and thus save on carbon costs.

Input data

HH Profile data for Profile Classes 5 to 8

Population data for each of Profile Classes 5-8

Total Energy Estimate for Profile Classes 5-8 (**TEE**)

Carbon Price: **£12/tonne**. This value is taken from published data.

Carbon emissions associated with supplying electricity from coal-fired generation (**CF**): **0.887 tonnes/MWh.** This value is taken from published data.

Assumptions

The Total Percentage of Load Reduction (**LR**) per HH: **1%** (see M1 for rationale)

Benefit Trigger Volume (**BTV**): **50%** (see M1 for rationale)

Spring and Summer Reduction Window (**SSRW**): **10:00 – 13:00** (see M1 for rationale)

Autumn and Winter Reduction Window (**AWRW**): **16:00 – 19:00** (see M1 for rationale)

As load is reduced at times of peak demand, this will result in less coal-fired generation. The carbon emissions calculated in this benefit are therefore based on savings from using less coal generation.

Proposed calculation

The Total National Profile (**TNP**) is calculated by multiplying, on a half hourly basis, the consumption for Profile Classes 5-8 by their respective consumption size, and adding them together to create the Total National Profile.

For each Settlement Day, the TNP volume in the Reduction Window is reduced by the Load Reduction Percentage, creating a reduced profile.

The benefit is calculated by comparing the total carbon cost of energy for the Total National Profile with the total carbon cost for the reduced profile. In each case the total wholesale cost is calculated by multiplying the Settlement Period consumption by the relevant half hourly reference price.

Carbon Cost = [Energy Volume] * CF * [Carbon Price]

Benefit = [Carbon Cost of TNP] – [Carbon Cost of Reduced Profile]

Extrapolating the benefit

The Benefit is not triggered in the model until the BTV has been reached. The model inputs the appropriate population estimates into the calculation. It will then be included as a per annum benefit from that point.

M4: Reduced Central Admin Costs – Fewer Performance Problems

Hypothesis

By having more customers settled HH, there are less performance problems for Code Administrators to manage. This covers BSCCo, MRASCo and DCUSA Agent, **thus reduced central administration costs**.

Assumptions

It is assumed that there will be no net benefit for BSC Performance Assurance given the following rationale:

Profile Class 5-8 MPANs comprise approximately 0.5% of the NHH market, meaning that there will be minimal change to the assurance of the NHH market. Furthermore, the number of PARMS serials is the same for NHH as for HH and there is therefore no change in monitoring costs.

No calculation proposed

Based on the assumptions above, we do not propose to model this benefit for P272. However we believe there is a potential qualitative benefit because the half hourly data

will make it easier to resolve consumption issues, and there will be fewer erroneously large EAC/AA problems.

M5: Reduced BSC Admin Costs – Reduced Profiles

Hypothesis

By settling HH there is no need for profiles to be produced year on year for Profile Classes 5-8, **thus reduced central administration costs**.

Input Data

Profile Data Retrieval and Maintenance Costs (**DRMM**) per month: **£xx**

Annual Data Analysis and Sampling Costs (**ADAC**): **£yy**

% of Sample in Profile Classes 5 to 8 (**SPC**): **27%**

Assumptions

No data is needed to be collected from the meters or need to maintain them.

No validation of meter data or produce the profiling results for these meters.

BSCCo does not have to manage the process (validate the data or produce new sampling requests, review the deliverables and get PEG review and SVG approval) for customers in Profile Classes 5 to 8.

Proposed calculation

Annual Data Retrieval Saving (ADRS) for PCs 5-8 = DRMM * 12 * SPC

Annual Data Analysis and Sampling (ADAS) Cost Savings = ADAC * SPC

Total BSC Administration Cost Saving = ADRS + ADAS

M6: Reduced Balancing Costs

Hypothesis

By having HH data, Suppliers can **better forecast their demand**, leading to lower imbalance volumes in general. These lower imbalance volumes would reduce the overall balancing requirements by the System Operator. Also, if Suppliers can better predict their actual demand, they will contract more accurately for the generation they need, resulting in generators' FPNs being more accurate, meaning less balancing actions will be required. This leads to two benefits:

1. less energy balancing actions costs; and
2. lower imbalance prices and less overall market imbalance costs.

Input data

Estimated Volume of Misallocated Energy for PC 5 to 8 per annum (**EVME**): **0.9TWh**

Annual Balancing Costs (National Grid)

Assumptions

If there are less balancing actions the Balancing costs and Imbalance Prices will reduce.

Split of Settlement Periods when the market is long versus short: **2:1.** This is based on analysis of Net Imbalance Volumes for the last BSC Year 2011-12.

Average decrease in imbalance volume per settlement period based on EVME: **50MWh.** This uses the calculation within the PSRG Profile Class 5-8 CBA. This stated that there is 0.9TWh of energy out of 17.5TWh of annual energy that will be correctly allocated to the right Settlement Period (5% of 17.5TWh) if PCs 5-8 are settled HH. That is by settling half hourly data, the Supplier's portfolio of PC5-8 customers' demand is settled in the correct half hour compared with NHH profiles which may put a proportion of that energy in the wrong half hour.

Proposed calculation

National Grid as System Operator (SO) will perform this calculation using a model over a year's worth of data to work out the impact on balancing costs and imbalance prices. The model allows the examination of the sensitivity of energy costs (including operating margin) to a number of key parameters.

The model uses an ex-post BM pseudo price, which is the average price of all actions that are available to us to resolve NIV. This price is lower than System Buy Price (SBP), System Sell Price (SSP) because it is just to resolve energy imbalance, not the cost of all the actions we need to take, e.g. for margin, constraints etc.

The calculations include the impact on energy balancing but also the costs for the SO to maintaining operating margin.

There are complex interactions between energy balancing and margin costs and changes in the amount of headroom available due to changes in market length.

The text below summarises the modelling approach to the calculation:

When the market is long, an increase in market length, i.e. a longer market, would increase headroom and actually reduce National Grid balancing costs because they would need to spend less on system margin to create additional headroom. Average market length over the past year for periods when the system was long is around 350MWh. In terms of market prices, when the system is long, system buy price is based on market prices. If suppliers can forecast their demand more accurately based on half hourly metering, then they would potentially have to spend less on their imbalance, and the system prices based on market trades would potentially be lower based on the lower cost of trades required to balance their positions.

When the market is short, a reduction in market length, i.e. less short, would reduce costs of resolving energy imbalance in the BM, however the short market would also require additional margin to be created so the net effect would be more complicated to assess. Average market length over the past year for periods when the system was short is

around 250MWh. In terms of market prices, when the system is short, system buy price is based on the cost of balancing actions. This would be expected to reduce based on less expensive actions being required in the bid / offer stack.

The annual cost of energy balancing actions last year was around £[-60]m, i.e. a benefit

The cost of margin actions last year was around £[150]m.

From the estimate of 0.9TWh being more accurately forecasted in each settlement period across the year as a whole, this corresponds to an average of 50MWh in each settlement period. This represents around 15-20% of average NIV imbalance in a given period.

When the market is long, this would result in an increase in margin costs, but when the market is short, any net reduction in costs from reduced energy balancing costs and margin costs is harder to assess.

Extrapolating the benefit

For the counterfactual scenarios, assume a linear extrapolation of benefit:

0% change in HH Elective = no change in benefit

50% change in HH Elective = 50% of P272 benefit over time

100% change in HH Elective = 100% change in benefit over time

System Operator calculation

Total Benefit = – £10m + £1.2m
= £8.8m increase in costs per annum from reducing BSC imbalances.
= Benefit 1 + Benefit 2

Benefit 1

The change in total energy imbalance costs (annual energy imbalance costs and operating margin costs) is negative. The increase in costs is still that operating margin costs are higher because less headroom (reserve) is provided by the market, and the SO would receive less income (negative benefit) from bids taken to resolve long market periods which represents the majority of Settlement Periods (66%).

Benefit 2

The price sensitivity to NIV shows a very approximate reduction of average BM offer prices of around £4/MWh for a reduction of 50MWh in NIV. Bid prices are pretty flat with no appreciable change with a similar NIV reduction.

Using the volume of 0.9TWh more accurately forecasted across the year, assuming 33% of this is in periods when the market is short, then the market as a whole (all BSC parties with imbalances) might save:

900,000MWh *0.33 * £4/MWh = £1.2m savings

The SO has noted that:

- the costs are assuming that imbalance volume does change by the stated 50MWh, and imbalances between forecasts based on profiles compared with HH data may not be similarly reduced; and
- the cost model is a model and does not guarantee that these changes would be seen in reality.

M7: Reduced Network Investment

Hypothesis

By having HH data Suppliers, can offer more **innovative ToU tariffs**, thus promoting customers to use less energy at time of peak which will lead to reduced Peak Demand. Reducing peak demand will lead to a benefit for the System Operator and Distributors through reduced network investment costs. Use of System tariffs are calculated to apportion the cost of network re-enforcement to different market sectors. Hence, the likely reduction in Distribution Use of System (DUoS) and Transmission Network Use of System (TNUoS) charges associated with the reduction in load and load flattening are likely to be reflective of the cost savings to the System Operator and Distributors in reducing the re-enforcement requirements.

Input data

HH Profile data for Profile Classes 5 to 8

Population data for each of Profile Classes 5-8

Assumptions

The assumption values are derived from the current published DUoS and TNUoS charges.

Average annual TNUoS Charge for HH MPAN (**ATD**): **£400**

The Total Percentage of Load Flattening (**LFL**) per HH: **1%**

The Total Percentage of Load Reduction (**LR**) per HH: **1%**

DUoS Red charge period:

DUoS Red period tariff: **£68.91/MWh**

DUoS Amber charge period:

DUoS Amber period tariff: **£7.09/MWh**

DUoS Green charge period:

DUoS Green period tariff: **£0.46/MWh**

Spring and Summer Reduction Window (**SSRW**): **10:00 – 13:00**

Autumn and Winter Reduction Window (**AWRW**): **16:00 – 19:00**

TNUoS Triad periods occur during the Autumn-Winter Reduction Window

Proposed calculation

DUoS benefit

The Total National Profile (**TNP**) is calculated by multiplying, on a half hourly basis, the consumption for Profile Classes 5-8 by their respective consumption size, and adding them together to create the Total National Profile.

DUoS charges are calculated by multiplying the volumes consumed during the Red Amber and Green (**RAG**) periods by the appropriate tariff. The calculation reduces demand in the Reduction Window through load flattening and load reduction as described in Market Benefits M1 and M2, and smears the proportion due to load flattening between periods outside the Reduction Window. The benefit is calculated as the difference between the annual DUoS charges for the baseline PC 5-8 consumption and the reduced/flattened consumption profile.

TNUoS benefit

TNUoS charges are based on a Supplier's HH-settled demand during the Triad Periods. The calculation reduces demand in the Triad Periods through load flattening and load reduction as described in Market Benefits 1 and 2. The proportionate demand saving (2%) is applied to the average annual TNUoS charge to derive the MPAN saving.

Example calculation

DUoS benefit

TNP * RAG Charges = £190,993,104

Flattened Load (from M1) * RAG Charges = £190,133,502

Reduced Load (from M1) * RAG Charges = £190,362,822

Total System Investment Benefit = (£190,993,104 - £190,133,502) + (£190,993,104 - £190,362,822)

Total System Investment Benefit = £1,489,885

TNUoS benefit

HH TNUoS Charge = £400 per MPAN

Benefit = £400 * 2% = £8 per MPAN

Total Annual Benefit = £8 * [PC 5-8 Population] = £8 * 154,500 = £1.24m

2 Supplier Benefits

There are seven potential benefits for Suppliers:

Supplier Benefits	
No	Benefit
S1	Reduced Supplier Imbalance Costs
S2	Reduced Supplier Energy Purchase Costs
S3	Better Matching of Purchases versus Sales
S4	Reduced Supplier Costs
S5	Reduced Costs due to Faster Settlement
S6	Reduced HH Agent Services
S7	Reduced BSC SVA Specified Charge for HH Administration

S1: Reduced Supplier Imbalance Costs

Hypothesis

By having HH data, Suppliers can **better forecast their demand** and benefit from reduced imbalance volumes and hence imbalance costs.

Input data

The following data is based on the last BSC Year 2011/12.

Total Market Imbalance Costs per annum: **£670m**

Number of MSIDs: **29.3m**

Total Energy: **320TWh**

Supplier Portfolio Numbers for Profile Classes 5 to 8: **154,500**

Supplier Energy Estimates for Profile Classes 5 to 8: **17.6TWh**

Half-Hourly and Non-half Hourly Energy Split: **40:60**

Supplier: Generator split of Total Market Imbalance Costs per annum: **53:47**

Assumptions

Percentage of Supplier Imbalance Costs attributed to Profile Class 5 to 8 Customers: **10%**. This is based on the percentage of total demand in PCs 5-8.

Percentage Benefit of Suppliers having the Half-Hourly data: **9.7%**. This based on the analysis undertaken in the Cost Benefit Analysis for PCs 5-8 (PC 5-8 CBA). This stated that there is 0.9TWh of energy out of 17.5TWh of annual energy that will be correctly allocated to the right Settlement Period if PCs 5-8 are settled HH. This profiling error worked out to be +/-10% in each settlement period. This is then reduced to 9.7% due to the

Workgroup's estimated that 97% of Pc5-8 customers will have an Advanced meter installed (3% no access).

Percentage of Profile Class 5 to 8 Customers in Supplier's Portfolio having half hourly data above which it starts to realise benefits: **30%** (see Appendix 1 of the main consultation document for rationale).

Percentage of Profile Class 5 to 8 Customers in Supplier's Portfolio having half hourly data above which there is no further benefit: **60%** (see Appendix 1 of the main consultation document for rationale).

Proposed calculation

Supplier Imbalance Costs = [Total Market Imbalance Costs per annum] * [Supplier Proportion of Total Market Imbalance Costs per annum]

PC 5-8 Imbalance Costs = [Supplier Imbalance Costs] * [Percentage of Supplier Imbalance Costs Attributed to PC 5-8 Customers]

Total Benefit of HH Data = [PC 5-8 Imbalance Costs] * [Percentage Benefit of Suppliers Having HH Data]

Extrapolating the benefit

Cost Benefit of X% of Supplier's Profile Class 5 to 8 Portfolio being HH =

Where X is below 30%, there is no benefit.

Where X is between 30% and 60%:

{[Total Benefit of HH Data] * (100 – 30 / 100)} + {[Total Benefit of HH Data] * (X – 30 / 100)}

Where X is above 60%, the total benefit is achieved.

Example calculation

This example assumes that 50% of Profile Class 5-8 is settled half hourly.

Supplier Imbalance Costs = £670m * (53 / 100) = £355m per annum

PC 5-8 Imbalance Costs = £355m * 10% = £35.5m per annum

Total Benefit of HH Data = £35.5m * 9.7% = £3.44m per annum

So the benefit for 50% of Profile Class 5-8 Customers moving half hourly:

{£3.6m * (100 – 30 / 100)} + {£3.44m * (50 – 30 / 100)} = £3.1m

S2: Reduced Supplier Energy Purchase Costs

Hypothesis

By having HH data, Suppliers can **better forecast their demand** and contract forward better. This reduction in purchase costs would be based on the difference between the

costs of a Supplier of contracting forward compared with those of the System Operator of procuring close to real time.

Input data

The following data is based on settlement data from the last BSC Year 2011/12.

Total Market Imbalance Volume (TMIV): **17.2TWh**

Supplier : Generator split of Total Market imbalance Volume: **60:40**

Assumptions

Percentage of Supplier Imbalance Volume (**PIMV**) attributed to Profile Class 5 to 8 Customers: **10%** (see S1 for rationale)

Percentage Benefit of Suppliers having the Half-Hourly data (**PB**): **9.7%** (see S1 for rationale)

Forward Contract Price (**FCP**): **£45/MWh,** based on N2EX day ahead auction data over the period 1 July 2011 – 30 June 2012.

SO purchase price (**SOPP**): **£47/MWh**, based on an average of System Sell and Buy Prices over the period 1 July 2011 – 30 June 2012.

Trigger Percentage of Profile Class 5 to 8 Customers in Supplier's Portfolio having half hourly data above which it starts to realise benefits: **30%** (see Appendix 1 for consultation document for rationale).

Percentage of Profile Class 5 to 8 Customers in Supplier's Portfolio having half hourly data above which there is no further benefit: **60%** (see Appendix 1 of the main consultation document for rationale).

Proposed calculation

Supplier Imbalance Energy Volume (SIEV) = TMIV * [Supplier Split of Total Market Imbalance Volume]

PC 5-8 Imbalance Volume (PCIV) = SIEV * PIMV

Total Supplier Benefit = PCIV * PB * (SOPP – FCP)

Extrapolating the benefit

Cost Benefit of X% of Supplier's Profile Class 5 to 8 Portfolio being HH:

Where X is below 30%, there is no benefit.

Where X is between 30% and 60%:

Benefit = PCIV * PB * (SOPP – FCP)

Where X is above 60%, no further benefit is achieved.

Example calculation

This example assumes a 30% uptake in the first year, and a total 40% uptake in the second year.

SIEV = 17.2TWh * 60% = 10.3TWh

PCIV = 10.3TWh * 10% = 1.03TWh

Supplier Benefit at 30% Uptake = 309,000 * 9.7% * (£47 – £45) = £59,946

Supplier Benefit the Following Year at 40% Uptake = 412,000 * 9.7% * (£47 – £45) = £79,928

Total Supplier Benefit = £59,946 + £79,928 = £139,874.

If the calculation was performed for 100% of PCs 5-8 the annual benefit would be £200k per annum.

S3: Better Matching of Purchases versus Sales

Hypothesis

By having HH data, Suppliers can better match what they are getting paid for from the customer against what energy they are purchasing and any other costs they are paying for, such as imbalance costs, DUoS charges (and any other costs incurred to serve the customer). This better match of purchases and sales results in **reduced Supply costs** due to using the same source of meter data for billing (no EACs/AA or use of profiles) and purchasing.

In the HH market, there is no disconnect between the sales and purchases, e.g. like for like, buy apples and sell apples.

In the NHH market, there is a disconnect due to:

- meter reads being converted to EAC and AAs;
- profiles converting to HH estimate;
- distribution losses;
- errors, e.g. erroneously large EAC/AAs, LTV sites, Energisation status;
- CoS issues;
- longer settlement timescales; and/or
- GSP Group Correction.

Assumptions

Annual volume of Profile Class 5-8 energy allocated to wrong Settlement Period (**EVME**): **0.9TWh** (see S1 for Rationale).

The above EVME figure is taken from analysis performed for the PSRG PC5-8 CBA.

The opportunity cost (**OC**): **5%.** This figure is taken from the WorkGroup's view on the quantifiable benefit to the Supplier based on consideration of avoided costs, improvements in cashflow, credit cover, the cost of debt and the risk a Supplier is exposed from purchase and sales not being matched.

Average electricity retail price (**ERP**)**: £110/MWh**. This is based on average retail tariff of 11p per kWh.

Proposed calculation

The benefit is achieved by Suppliers being able to reconcile their purchases and sales more quickly and accurately.

Total Benefit = EVME * OC * ERP

Extrapolating the benefit

The benefit achieved is the total benefit multiplied by the percentage of PC5-8 MPANs settled half hourly.

Example calculation

If 100% of PC5-8 moves HH:

Benefit = 900,000MWh * 5% * £110 = £4.59m

S4: Reduced Supplier Costs

Hypothesis

By having HH data, Suppliers can **reduce operational costs.** This is based on the activities the Supplier has to undertake in serving the customer HH compared with NHH and the resource savings. There are a number of sources for these operational savings as follows, and these are primarily driven by there being fewer issues in the HH market:

- ***Better matching of purchases versus sales:*** In the HH market there is no disconnection between purchases and sales, e.g. it is a like for like; buy apples, sell apples;
- ***Better billing for customers:*** In comparison to the NHH market, in HH there are fewer queries from customers, leading to greater retention of customers and less costs in gaining new customers;
- ***Reduced Assurance costs:*** This is due to less work needed on performance assurance activities in the HH market compared to the NHH market;
- ***Reduced costs due to faster Settlement:*** By having faster settlement of the consumption for customers that were in PCs 5-8, Suppliers gain a reduction in FTE due to less work needed on these reconciliation activities; and
- ***Reduced costs due to less Change of Supply issues:*** By having HH data, Suppliers will have less work on CoS activities, e.g. less problems when they change supply for a HH customer.

Input data

Profile Classes 5-8 population: **154,500**. This is based on latest settlement data.

Assumptions

FTE cost to serve NHH customer (FTENHH) = **£65 per annum**. This is based on the published figures for typical operating costs of £65 per customer from the Ofgem website Electricity and Gas Supply Market Indicators (Updated 18 July 2012).

Percentage improvement by settling HH (PHH): **5%**. This based on the Workgroup's view that if there is an improvement of 10% (see S1) and halved for Supplier operational costs FTE benefits.

Proposed calculation

Total Benefit = [FTENHH] * [PC 5-8 Population] * [PHH]

Example calculation

If 100% of PC5-8 moves HH:

Total Benefit = £65 * 154,500 * 5% = £500k

S5: Reduced Costs due to Faster Settlement

Hypothesis

By having faster Settlement of the consumption for customers that were in PCs 5-8, Suppliers realise cash flow and credit cover benefits (and any reduction in FTE due to less work on these activities), resulting in the benefit of **reduced Supply costs**.

Input Data

Total Annual Energy in Profile Classes 5-8 (**TEPC**): **17.6TWh**. This is based on settlement data.

Assumptions

The assumptions are based on settlement data.

Percentage of PC5-8 energy currently settled NHH on Actual data at RF: **97% (not used)**

Percentage of PC5-8 energy settled on Actual data with AMR at R1 (**EPPCA**): **90%**

Percentage of PC5-8 energy settled on Actual data at R1, if settled HH (**EPPCHH**): **99.7%**

Cashflow and Credit Cover benefit per MPAN of being settled HH (**MBCCC**): **£0.1/MWh**

Trigger percentage of PC5-8 portfolio settled HH at which benefit is realised: **30%** (see Appendix 1 of consultation document for rationale).

Trigger percentage of PC5-8 portfolio settled HH above which there is no further benefit: **60%** (see Appendix 1 of consultation document for rationale).

Proposed calculation

Supplier Increase in Performance (SIP) = EPPCHH – EPPCA

Increase in Actual Energy Settled at R1 (MWhBS) = (SIP / 100) * TEPC

Total Benefit = MWhBS * MBCC

Extrapolating the benefits

The benefit is extrapolated by working out the MWh difference at different percentages of uptake and applying MBCCC.

The benefit will not be realised until the Trigger percentage of uptake occurs. Once the upper trigger percentage is realised no further benefit will be included in the calculation.

Example calculation

The following example considers the benefit over two years if 30% of the PC5-8 portfolio is settled HH in the first year, and 40% in the second.

Supplier Increase in Performance (SIP) = 99.7% – 90% = 9.7%

MWh Benefit to Suppliers (MWhBS) = (9.7 / 100) * 17.6TWh = 1,707,000MWh

Total Benefit = 1,707000 * £0.1 = £170,700

Or

At 30% of Portfolio Settled HH = £170,700 * 30% = £51,210

Benefit in Following Year if 40% Settled HH = £170,700 * 40% = £68,280

Total Benefits over Two Years = £51,210 + £68,280 = £119,490

S6: Reduced HH Agent Services

Hypothesis

By having an extra 150,000 MPANs settled HH, the average costs of HH services reduces, thereby giving benefits to all currently HH settled customers (>100kW market), hence **reduced Supply costs** for Suppliers.

Input data

Population of current HH market (**HHPOP**): **113,500**. This is based on latest settlement data. The Workgroup considered applying this benefit to all PC 5-8 customers as well as a proportion of PC1-4 who also elect to go HH. However, the group agreed that this benefit should only apply to the existing HH market before any change due to P272 as the other groups would be changing from current NHH services.

Assumptions

Reduction in HH DC/DA costs caused by increase in HH population (**DCO**): **£20/MPAN**. This is based on the WorkGroup's view that typical HH services costs would drop from £150 per MPAN per year to £130.

Trigger volume of PC5-8 customers moving to HH settlement to realise cost savings for existing customers: **50%**. This value is based on the view that at least half of PC 5-8 customers need to be HH settled before load flattening takes effect and is used for the counterfactual scenarios.

Proposed calculation

Where the number of PC5-8 customers moved to HH settlement is below 50% there is no benefit.

Once the trigger volume is exceeded, the benefit is given by:

HHPOP * DCO

Example calculation

Once the trigger volume is met, the annual benefit is:

113,500 * £20 = £2.3m

S7: Reduced BSC SVA Specified Charge for HH Administration

Hypothesis

The benefit derived from having the HH element of the Supplier Specified Charge calculated over more MPANs will reduce the cost per MPAN to existing Suppliers with HH customers, thereby **reduced Supply costs.**

Input data

These are based on the latest settlement data.

Population data for Profile Classes 5 to 8: **154,500**

Current monthly cost per MSID (**CCMSID**): **£0.56**

Number of HH MSIDs (**NoHHMSID**): **113,500**

Assumptions

The calculation assumes that the total HH charge remains the same, and apportions that total between the increased HH population to determine the new charge per MPAN.

Proposed calculation

Current Costs to Suppliers for BSC Specified Charge (CCBSC) = CCMSID * NoHHMSID

Recalculated Cost per MPAN (RCMSID) = CCBSC / {NoHHMSID + ([PC 5-8 Population] * [Percent of PC 5-8 Moved HH])}

Recalculated Cost to Suppliers for BSC Specified Charge (RCBSC) = RCMSID * NoHHMSID

Total Annual Benefit BSC Specified Charge (TBBSC) = (CCBSC – RCBSC) * 12

Example calculation

The example calculation assumes that 30% of Profile Class 5-8 move to HH in year 1, and the percentage increases to 40% in year 2.

Current Costs to Suppliers for BSC Specified Charge (CCBSC) = 113,500 * 0.56 = £63,560

If in year 1 30% of Profile Class 5-8 has moved HH elective then:

RCMSID = £63,560 / {113,500 + (154,500 * 30%)} = £0.4

RCBSC = 113,500 * £0.4 = £45,400

Total Annual Benefit BSC Specified Charge (TBBSC) = (£63,560 – £45,400) * 12 = £217,920

In the following year if 40% have moved then:

RCMSID = £63,560 / {113,500 + (154,500 * 40%)} = £0.36

RCBSC = 113,500 * £0.36 = £40,860

Total Annual Benefit BSC Specified Charge (TBBSC) = (£63,560 – £40,860) * 12 = £272,400

Cumulative Benefit Over Two Years = £217,920 + £272,400 = £490,320

3 Distributor Benefits

There are five potential benefits for Distribution Businesses:

Distributor Benefits	
No	Benefit
D1	Better Network Planning
D2	More accurate losses calculation
D3	More cost-reflective DUoS charges
D4	Faster resolution of Metering errors
D5	Reduced impact of Gross Volume Correction

The main hypothesis underpinning these potential benefits is that more accurate HH Metered Volumes will benefit a Distribution Business in fulfilling its licence obligations.

D1: Better Network Planning

Hypothesis

From having HH data, Distribution Businesses can better plan their networks and **reduce operational costs**.

Assumptions

There is a potential benefit to LDSOs in using the HH data from customers currently in Profile Classes 5 to 8. However, it is assumed that there is **no** net benefit as:

- LDSOs do not currently use the HH billing data for network modelling purposes and use the D0010s meter readings instead.
- The amount of HH data is hard to link with LDSO network modelling software.
- LDSOs are very unlikely to invest significantly in developing network modelling software that can use the billing data which may or may not give an improvement on using the D0010s.

Therefore, it is unlikely that the improvement would be so significant that it would pay back for the cost of the software.

No calculation proposed

Based on the assumptions above, we do not propose to model this benefit for P272. However we believe there is a potential qualitative benefit because the half hourly data could help to resolve operational issues.

D2: More accurate losses calculations

Hypothesis

From having HH data rather than NHH estimates, Distribution Businesses can better reconcile energy input onto the Distribution System with energy taken off, which leads to a more accurate losses calculation and **reduced operational costs**.

Assumptions

There is a potential benefit to LDSOs in using the HH data from customers currently in Profile Classes 5 to 8. However, it is assumed that there is **no** net benefit as:

- The technical losses will not be changed by the movement of PC 5-8 from NHH to HH settlements, and nor will the theft.
- The only potential benefit is to move some of the losses into the correct STODs by replacing the PC5-8 profiled data with actual reads, but the net effect will be very low as losses calculations are not made on a HH basis.
- Accurate monthly NHH reads from the advanced meter are as good as HH reads from the advanced meter for losses calculations.

No calculation proposed

Based on the assumptions above, we do not propose to model this benefit for P272. However we believe there is a potential qualitative benefit because the half hourly data could lead to more accurate allocation of energy in the STOD periods.

D3: More cost-reflective DUoS Charges

Hypothesis

From having HH data rather than NHH estimates, Distribution Businesses can better calculate Distribution Use of System (DUoS) charges, allowing DUoS tariffs for these customers to be modelled more accurately within the CDCM and **reduce operational costs**.

Assumptions

There is a potential benefit to LDSOs in using the HH data from customers currently in Profile Classes 5 to 8. However, it is assumed that there is **no** net benefit as these customers will have more cost reflective DUoS charging, however the LDSOs' allowed revenue will not change as a result of P272.

Therefore any additional costs or benefits related to these customers will simply be moved elsewhere and no net financial benefit will be realised by LDSOs.

No calculation proposed

Based on the assumptions above, it is proposed that this benefit is not modelled for P272. However there is a potential qualitative benefit in having more cost reflective DUoS charges.

D4: Faster resolution of Metering errors

Hypothesis

Having accurate HH data rather than NHH estimates leads to the ability to identify metering issues sooner, and potentially avoid or resolve disputes to faster timescales and **reduce operational costs**. The benefit is derived by the Distribution Business avoiding losses incentive payments associated with a longer resolution.

Input data

These based on latest settlement data and published data on losses incentive payments.

Total Energy Estimate for Profile Classes 5-8 (TEE): **17.6TWh**

Population of Profile Classes 5-8: **154,500**

Losses Incentive Payment (LIP): **£60/MWh**

Assumptions

These are based on historic disputes experience and data.

A Meter with an error records a volume **c**, equivalent to **114MWh**, the average annual consumption for a PC5-8 Meter.

Metering errors are split between 55% under-recording and 45% over-recording. This is based on our experience of Trading Disputes which exhibit two predominant types of metering error – ratio mismatches (CT/VT) and phase failures, with ratio mismatches being more frequent. 90% of errors are ratio mismatches and 10% are phase failures.

There are **N** errors resolved in a year, equivalent to **150** errors, **0.1%** of the Profile Class 5-8 population. This is based on the assumption that 10% of meters in PCs 5-8 have CT/VTs and experience of recent disputes demonstrating a 1% instance of errors.

Ratio mismatches are equally likely to cause under or over-recording, and involve a factor of 2 i.e. Meter records 50% or 200% of true consumption.

Phase failures will always cause under-recording of energy, and we assume that the Meter records two-thirds of the real consumption.

Proposed calculation

The number of ratio mismatch errors = $0.9N$

If the Meter has under-recorded the error will be c, but if the Meter over-recorded the error volume will be $-0.5c$.

Aggregating across all ratio mismatch errors will give a net error of:

(c * 0.45N) + (–0.5c * 0.45N) = 0.5c * 0.9N

The number of phase failure errors = $\mathbf{0.1N}$

The error associated with phase failure error = $\mathbf{0.5c}$

The error across all phase failure errors = $\mathbf{0.5c} \times \mathbf{0.1N}$

The total error is:

(0.5c * 0.9N) + (0.5c * 0.1N) = 0.5c * N

The error volume is multiplied by the Losses Incentive Payment to give the benefit.

Extrapolating the benefit

A positive total error means that losses will be reduced, and lead to a benefit for the Distributor, given by:

0.5c * N * LIP * [Percentage PC 5-8 Customers Settled HH]

Example calculation

If 50% of PC5-8 move to HH then the Distributor benefit in year 1 is:

0.5 * 114 * 150 * 60 * 0.5 = £256,500

In the following year if another 10% move elective then the additional benefit in year 2 is:

0.5 * 114 * 150 * 60 * 0.1 = £51,300

Total Benefit across two years is:

£256,500 + (£256,500 + £ 51,300) = £564,300

D5: Reduced impact of Gross Volume Correction

Hypothesis

From having accurate HH data rather than NHH estimates, this group of customers will no longer be in the NHH market and therefore will not give rise to any Gross Volume Correction (GVC), the losses from which can impact LDSOs. The benefit is derived by the Distribution Business avoiding losses incentive payments associated with the longer resolution and **reduces operational costs**.

Assumptions

There is a potential benefit to LDSOs in using the HH data from customers currently in Profile Classes 5 to 8. However, it is assumed that there is **no** net benefit for two reasons.

Firstly, as PC5-8 sites will be fitted with advanced meters they can be read on a regular schedule, which would minimise the need for GVC (which corrects errors more than 14 months old). For this reason it is not clear that settling on a half hourly basis would reduce the amount of GVC by a significant amount.

Secondly, GVC had a large impact on DPCR4 which covered 2005-2010. Although DPCR5 is also based on Settlement data Ofgem is currently considering whether or not to active the losses mechanism for this period. It is therefore unclear at the moment whether or not there will be any link between GVC and losses payments.

No calculation proposed

Based on the assumptions above, it is proposed that this benefit is not modelled for P272.