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Premature Replacement Costs for Electricity PPMs - Guidelines on Methodology and Application Process

Background

1.1. Electricity distributors (DNOs) have sought guidance from Ofgem on the methodology that should be used for the calculation of premature replacement costs for electricity prepayment meters (PPMs). Ofgem considers that this would be beneficial and help to ensure fairness and consistency.

1.2. Accordingly, this document sets out our proposed methodology for PPM stranding cost calculation. As well as methodological issues, the guidelines also cover some other matters relating to the application process for PPM stranding cost recovery - such as the information that DNOs will be expected to provide when making an application to the Authority.

Status

1.3. These guidelines set out Ofgem's recommended approach on the methodology and application process for PPM stranding cost recovery. Under our recent amendments to the electricity distribution licence, both DNOs and the Authority will be required to have regard to these guidelines in the course of the application process.

1.4. However, applications that deviate from these guidelines will not necessarily be rejected by Ofgem. Where DNOs can make a strong case on economic or other grounds for exceptions to the published guidelines, we will consider such applications on a case-by-case basis. Conversely, the Authority also reserves the right to deviate from and/or make alterations to the guidelines where it can make a strong case that the circumstances require it. We will consult with DNO licensees prior to making any changes to the published guidelines.

1.5. This guidance is a technical document and is intended primarily for DNOs. More general information about Ofgem's metering price control and the adjustment mechanism for PPM premature replacement can be found on Ofgem's website (www.ofgem.gov.uk).

Methodology for Calculating PPM Stranding

1.6. Ofgem's proposed methodology is based on a net book value approach, using the modern equivalent asset value (MEAP) of the relevant PPM, depreciated on a straight line basis over the economic life of the meter (ELA). The annual depreciation figure should be added to the "operations and maintenance" charge in the price control formula (£0.242 per annum, in 2002 prices), and then multiplied by the remaining asset life of each meter to give a total book value for installed PPMs.

1.7. A forecast of the net present value of PPM revenues – based on the expected period that the meters will remain on the walls, discounted at 6.9% to reflect the cost of capital in the price control formula – should then be deducted from the book value to give an estimated stranded cost figure.

Derivation of MEAP

1.8. The asset value (MEAP) should be derived from the price control formula for the relevant PPM technology. For example, for single-rate token PPMs, the base MEAP in the price control formula is £59.00. The MEAP may be adjusted for inflation from 1 April 2002 (in accordance with the price control formula) up until the date of application.

1.9. For multi-rate PPMs, where the MEAP is not specified explicitly in the licence, the asset value should be that which has been used by DNOs in setting the tariff cap for the relevant meter (and that has been submitted to Ofgem in the past via DNOs' revenue returns).

Derivation of Remaining Meter Asset Life

1.10. There has been considerable debate over how the remaining meter life should be determined for the purposes of calculating PPM asset book values. Some DNOs have suggested simply using the economic life (ELA) of the meter as defined in the price control formula, and deducting the number of years that the meter has been on the walls. Others have argued in favour of using the certified meter life as the base value. One DNO has suggested that the remaining meter life needs to be calculated on a case-by-case basis with reference to the fault rates of the relevant meter type.

1.11. Ofgem's view is that the ELA term in the price control formula provides a simple and transparent benchmark for calculating meter asset lives and hence book value. However, we recognise that using the ELA approach to calculate the remaining life of installed meters may lead to an underestimate of stranding costs. This is because the economic life in the price control formula is effectively an "average", calculated across meters that are removed early due to faults or tariff changes, and those that last their full certified life. If the price control ELA is used on a forward looking basis to calculate stranded asset values, it will underestimate the remaining life of installed meters, particularly for meters that have been installed in earlier years.

1.12. We do not however believe that using the certified life of the meter provides an appropriate solution, since this simply leads to the opposite problem – namely, it will overestimate stranding costs on a forward-looking basis since a proportion of installed meters would not be expected to last their full certified life due to faults.

1.13. For these reasons, we intend to allow DNOs to use one of two different approaches for determining the remaining life of installed meters. The first is simply to use the ELA term in the price control formula, and subtract the length of time that each meter has been on the walls. (For multi-rate PPMs, where the ELA is not specified explicitly in the licence, the value should again be that which has been used by DNOs in setting the tariff cap for the relevant meter, and that has been submitted to Ofgem in the past via DNOs' revenue returns.)

1.14. Under the second approach, DNOs may estimate the average remaining asset life for installed PPMs using the certified life as a base, but factoring in the expected fault rate of the relevant meter type. Once the average remaining asset life has been determined, this can be converted to a book value using the following formula:

$$\text{Book Value} = \frac{\text{Average meter life remaining}}{\text{Full ELA}} * \text{number of meters} * \text{meter value}$$

1.15. In this case, we will expect DNOs to provide supporting evidence as to how they have arrived at their average remaining asset life figure and how they have derived the fault rate.

Derivation of Forecast Revenues

1.16. The forecast revenues should be based on the volume of PPMs that are expected to remain on the wall in each future year, multiplied by the current value of the tariff cap for that PPM according to the price control formula[1].

1.17. The number of meters in each year may be calculated as an average of the forecast opening and closing volumes for that year. Alternatively, if DNOs have sufficient information available to make a more detailed forecast of meter volumes, the revenues and number of meters may be calculated on a monthly basis.

1.18. Forecast revenues should be discounted to present value based on a 6.9% cost of capital/discount rate, as assumed in the price control formula.

[1] In an earlier version of these guidelines we advised that the tariff cap should be adjusted for inflation in outyears. Following feedback from one DNO, we have now concluded that this is not necessary. Since the discount factor is based on a 6.9% real cost of capital, it is more appropriate for the current value of the price cap to be used in calculating forecast revenues.

Cost of Capital in Revenue Forecasts vs Book Value

1.19. Some DNOs have questioned whether it is appropriate to incorporate the cost of capital into the forecast of revenues (via the tariff cap, which includes both depreciation and a 6.9% return on capital), while not allowing the cost of capital to be included in the estimate of the book value of installed meters. It has been suggested that Ofgem should either incorporate a cost of capital into the estimate of book value, or remove it from the calculation of forecast revenues.

1.20. We have considered this point but believe that our proposed approach is correct in economic terms. The reason for not allowing a cost of capital in the estimate of meter book value is that under our proposed mechanism, capital costs will be recovered early and can then be reinvested elsewhere to earn a rate of return. The return on capital is therefore not "stranded" in the same way as the cost of the meter asset itself.

1.21. We believe it is however correct to calculate the forecast revenues using the price control tariff cap, which incorporates a return on capital. Because the revenues are then discounted to present value using the cost of capital, we are effectively already adjusting for the cost of capital on the revenue side. If we were to base the revenue forecast on an annual depreciation figure only, AND then discount this figure by the cost of capital, this would effectively be a form of double counting[2].

Mathematical Formula for Calculation of Stranding Cost

1.22. The calculation of the stranding costs for each relevant PPM technology type i can be simply expressed in the following formula:

$$SC_i = AV_i - NPV(RAP)$$

where AVi = the asset value of the PPM technology i
NPV(RAP) = is the net present value of revenue under the accelerated replacement programme and current price cap

[2] Another way of looking at this issue is that we are effectively allowing early recovery of stranded capital costs (via the tariff uplift) which could be reinvested elsewhere to earn a rate of return. But the meters that are due for early replacement will nonetheless remain installed and earning a return over the forecast replacement period. If we were to remove the return on capital from the revenue forecast, this would effectively mean that DNOs were allowed to earn their cost of capital twice - once on the installed meters, and once through the early recovery of stranding costs which can then be invested elsewhere.

Worked Example

1.23. Attached to these guidelines are two worked examples of a stranding cost calculation using the methodology discussed above – one estimating remaining meter asset life based on the ELA in the price control formula (less the number of years each meter has been on the wall), and the other showing an estimate of average meter life remaining based on the certified life and an expected fault rate.

1.24. The first example is based on a DNO that has installed 1000 single-rate token PPMs in each of the years 1997-2006 (a total of 10,000 meters), and commences an accelerated 3-year replacement programme beginning in April 2007.

1.25. The second example is also based on a starting point of 10,000 installed meters in April 2007, with an accelerated 3-year replacement programme commencing from this date. It assumes that the statutory changeout profile for the meter base is evenly spread across a 15-year certified life, and that the meter fault rate is 5.65%.

1.26. The following terms and calculations have been used in the worked example:

Components of the stranding cost worked example

Modern Equivalent Asset Value (MEAP)	As defined in price control formula - £59.00 for single-rate token PPMs (in 2002 prices)
Economic Life of Asset (ELA)	As defined in price control formula – 9.72 years for single-rate token PPMs
Annual depreciation	MEAP depreciated on a straight line basis over the economic life - £59.00/9.72 or £6.07 for single-rate token PPMs (in 2002 prices)
Asset management / procurement cost	As defined in the price control formula - £0.242 per annum (in 2002 prices)
Token meter price Cap (TPPM)	As defined in price control formula - £8.56 per annum for single-rate token PPMs (in 2002 prices)
Inflation adjustment	Based on RPI figures for each year since 2002
Years of economic life remaining in 2007	This is calculated as the economic life of the asset less the time that it has already been on the walls or ELA – (2007 - installation year)
Depreciated asset value per meter, by year of installation	Calculated as the annual depreciation multiplied by the years of economic life remaining in 2007
Total depreciated asset value, by year of installation	The depreciated asset value per meter, multiplied by the number of meters in each installation year
Opening volume	The number of meters on the wall at the start of the year
Closing volume	The number of meters on the wall at the end of each year

Book value of assets under ELA approach	Sum of the total depreciated asset values for each year of installation
Estimated fault rate	The percentage of the meter asset base expected to be removed each year due to faults
Statutory changeout	The number of meters in each year that are expected to be changed out as they come to the end of their certified life
Estimated average remaining meter life	Calculated as the number of meters changed out in each year (due to stat changes and faults), times the estimated life of each meter from present day
Book value of assets under certified life/fault rate approach	The estimated life remaining as a proportion of the ELA, multiplied by the total number of meters and the meter value
Forecast annual revenue recovery	The number of meters in the relevant year (calculated as the average of opening and closing volumes), multiplied by the tariff cap in the current year
Discount factor / discount rate	Used to arrive at the Net Present Value (NPV) of forecast revenues. The discount rate used to derive the discount factor is the 6.9% cost of capital assumed in the price control formula.
Stranding Cost	Calculated as the total book value of the assets, less the NPV of the forecast revenues

Methodology for Deriving the Adjustment Factor (AFt)

1.27. Once the PPM stranding cost has been agreed between the Authority and the relevant DNO, this figure will be used to derive the Adjustment Factor (AFt) for the price control uplift across all price-controlled meters.

1.28. The calculation of the Adjustment Factor can be expressed in the following formula:

$$AF_t = \frac{0.30 \times \sum_i SC_i}{\left(\left(MP_{initial} + MP_{final}\right)/2\right)} \times \frac{1}{TR}$$

where SC = stranding costs per type of technology i being replaced
MP initial = the estimated meter population at the start of the period TR
MP final = the estimated meter population at the end of the period TR
TR = the time period over which the costs are to be recovered.

The TR will be determined by the Authority on a case-by-case basis, and may be extended over more than one year in cases where the required uplift per meter would otherwise be unduly high. In such cases, we will allow DNOs to include an adjustment for both inflation and the cost of capital, in order to reflect the "time value of money" over the period in which stranding costs are being recovered.

Information Required from DNOs in Applying for Stranding Cost Recovery

1.29. The above discussion and attached worked example should provide a good summary of the type of information DNOs will need to provide when making an application to Ofgem for PPM stranding compensation. In general, we will expect to see evidence of the following (for each type of PPM that is being replaced):

- Supporting information on the age profile/year of installation of the PPM asset base
- supporting information on suppliers' change out plans in terms of the forecast period over which meters are expected to remain on the walls (for example, a documented request from suppliers to commence a PPM replacement programme)
- supporting information on the nature of the replacement programme – in particular, the type of PPM that is being removed (eg token, key or smartcard), and the type of PPM technology that is being put in its place
- in the case of multi-rate PPMs where the MEAP and ELA are not set out explicitly in the price control, supporting information on the value of the asset and the life used to set the tariff cap for that type of meter
- supporting information on the current and expected size of the meter base over which the price control adjustment factor will apply
- depending on the methodology used to calculate stranding, supporting information on the fault rate for the relevant PPM technology may also be required - particularly if the assumed fault rate differs significantly from that which appears to have formed the basis of the price control formula[3].

1.30. Ofgem will apply a common sense approach in terms of the level of detail that DNOs are able to obtain regarding the points outlined above. We have also written to suppliers requesting them to provide us with information on their current PPM change out plans, so that we are able to cross-reference this against the information provided by DNOs.

[3] Calculations provided to us by one DNO suggest that the annual fault rate that would be required to cause a meter with a statutory certified life of 15 years to have an average economic life of 9.72 years (as assumed for single-rate token PPMs in the price control) is 5.65% per annum.

Other Issues

1.31. There are also some other points on which DNOs and others have sought guidance with respect to the PPM stranding compensation process.

Forecast vs Actual Replacement and Revenues

1.32. One issue is the procedure that should be followed if the actual rate of PPM replacement turns out to be significantly different to the forecast rate assumed in the application for price control adjustment. (Or similarly, if the assumed meter base over which the price control adjustment is applied changes significantly over the adjustment period - for example, due to an acceleration of competition - such that the expected revenues from the price control adjustment do not materialise.)

1.33. We would expect DNOs (and suppliers) to apply a common-sense "materiality test" in such instances. However, if the actual replacement rate is significantly faster than the forecast rate, we will allow DNOs to re-apply to Ofgem for further adjustments to the price control. A similar approach will apply if other events lead to a significant difference between forecast and actual revenues.

1.34. If on the other hand the actual replacement rate is significantly slower than the forecast rate (ie, meters remain on the walls for longer than anticipated), we will expect DNOs to discount their PPM charges in the years beyond the forecast period. The discount should be proportional to the stranding cost recovery that is allowed through the price control adjustment. For example, if a DNO applies to Ofgem on the basis that all token meters will be removed by the end of 2008, and receives a 30% compensation for stranding costs on this basis, we would expect any token PPMs that remain on the walls beyond 2008 to be charged for at a 30% discount to the tariff cap.

Stranding costs incurred prior to application

1.35. Some DNOs have inquired as to whether stranding cost compensation will be allowed for PPMs that have already been replaced prematurely, prior to any application being made for price control adjustment. (For example, Centrica's competitive meter operators had already begun replacing token PPMs prior to Ofgem's receipt of the first application for price control adjustment from EDF Energy Networks.)

1.36. Under the existing asset-life adjustment mechanism, it was the responsibility of DNOs to approach the Authority for a price control adjustment if it became apparent that they were incurring costs from the premature replacement of PPMs. The fact that no DNOs had made such an application prior to EDF Energy Networks' approach to us in July 2006 suggests that the scale of PPM premature replacement costs incurred by DNOs was limited up until that point.

1.37. However, we recognise that other DNOs may have been preparing to make an application for asset-life adjustment when the current consultation process was launched, and moreover that DNOs may not have had full information to hand regarding suppliers' PPM change out programmes. We therefore intend to take the following approach to stranding costs incurred prior to application:

- PPM premature replacement costs incurred from the date the consultation was launched (29 September 2006) will be fully eligible for cost recovery at the agreed level of 30%[4]

- applications for recovery of premature replacement costs incurred between 1 April 2005 (the start of the current price control period) and 29 September 2006 will be considered on a case-by-case basis. We would expect a materiality test to apply in such instances, and will also expect DNOs to provide supporting information as to why they did not approach the Authority for a price control adjustment under the existing licence mechanism during this period.

[4] In the case of EDF Energy Networks, cost recovery will be allowed from the date on which we first received an application for asset-life adjustment.

Stranding Calculation Example 1
Single Rate Token PPMs - Remaining Life Calculated as ELA Less Years on Wall

Key Terms

Modern Equivalent Asset Value (MEAP) in 2002	£59.00
Modern Equivalent Asset Value (MEAP) in 2007 (RPI adjusted)	£66.47
Economic Life of Asset (ELA) in years	9.72
Annual Depreciation (MEAP/ELA) in 2002	£6.07
Annual Depreciation (MEAP/ELA) in 2007 (RPI adjusted)	£6.84
Asset Management/Procurement Cost	£0.24
Asset Management/Procurement Cost in 2007 (RPI adjusted)	£0.27
Asset Management/Procurement Cost over ELA	£2.65
Price Cap (TPPM) in 2002	£8.56
Price Cap (TPPM) in 2007 (RPI adjusted)	£9.64

Inflation Figures

RPI 2006/07	2.58%
RPI 2005/06	3.25%
RPI 2004/05	2.79%
RPI 2003/04	2.04%
RPI 2002/03	1.42%
5 year average RPI	2.42%

Asset Book Value by Year of Installation

[NB: April Years have been assumed throughout, eg 2006=1 April 2006 to 1 April 2007]

Year of installation	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
No of meters installed	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Years of ELA left on 1 April 2007*	0.22	1.22	2.22	3.22	4.22	5.22	6.22	7.22	8.22	9.22
Asset Value per Meter**	£1.56	£8.68	£15.79	£22.90	£30.01	£37.12	£44.23	£51.35	£58.46	£65.57
Asset Value per Year	£1,564.54	£8,676.08	£15,787.62	£22,899.16	£30,010.69	£37,122.23	£44,233.77	£51,345.31	£58,456.85	£65,568.39
Total Asset Book Value	£335,664.65									

* based on assuming an average installation date at the mid-year point of each year
** asset value per meter calculated as MEAP plus asset management cost over ELA (£69.12 in total), multiplied by years of ELA left

Revenue under forecast scenario

Year	**2007**	**2008**	**2009**
No of meters (opening vol)	10,000	6,666	3,333
No of meters (closing vol)	6,666	3,333	0
No of meters (average vol)	8,333	5,000	1,667
Annual Rental*	9.64	9.64	9.64
Revenue (Rental x avg vol)	£80,366.41	£48,216.95	£16,072.32
Discount factor (mid year)	0.967	0.905	0.846
NPV of Revenue (forecast)	£134,957.24		

*adjusted for inflation in out years based on 5 year average RPI

Total Stranding Cost
(Asset book value less NPV revenue) **£200,707.41**

Stranding Calculation Example 2
Single Rate Token PPMs - Remaining Life Calculated Based on 15-Year Certified Life and Estimated Fault Rate

Key Terms

Modern Equivalent Asset Value (MEAP) in 2002	£59.00
Modern Equivalent Asset Value (MEAP) in 2007 (RPI adjusted)	£66.47
Economic Life of Asset (ELA) in years	9.72
Annual Depreciation (MEAP/ELA) in 2002	£6.07
Annual Depreciation (MEAP/ELA) in 2007 (RPI adjusted)	£6.84
Asset Management/Procurement Cost	£0.24
Asset Management/Procurement Cost in 2007 (RPI adjusted)	£0.27
Asset Management/Procurement Cost over ELA	£2.65
Price Cap (TPPM) in 2002	£8.56
Price Cap (TPPM) in 2007 (RPI adjusted)	£9.64
Estimated Fault Rate	5.65%

Inflation Figures

RPI 2006/07	2.58%
RPI 2005/06	3.25%
RPI 2004/05	2.79%
RPI 2003/04	2.04%
RPI 2002/03	1.42%
5 year average RPI	2.42%

Forecast Meter Changeout Profile

Year	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Opening volume	10000	8806	7715	6719	5811	4984	4233	3550	2931	2370	1863	1406	995	626	295
Stat change profile*	667	629	593	560	528	498	470	444	419	395	373	352	332	313	295
Fault @ 5.65%**	527	462	402	348	298	253	213	175	142	112	84	60	37	18	0
Closing volume	8806	7715	6719	5811	4984	4233	3550	2931	2370	1863	1406	995	626	295	0

* based on a 15 year certified life and meter population distributed evenly, so stat change in Year 1=opening vol/15, stat change in Year 2=opening vol/14, etc
** calculated as 5.65% of (opening volume less stat change) in each year

Calculation of Average Remaining Meter Life

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Years remaining (present day to mid year point)	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5
Meters changed out (stat change plus faults)	1194	1091	996	908	827	752	683	619	561	507	457	411	369	331	295
Meter years remaining (changes x yrs)	597	1637	2490	3178	3721	4135	4439	4644	4765	4812	4797	4729	4615	4464	4282

Average remaining meter life*	**5.73**

* calculated as total meter years remaining divided by opening meter population of 10,000

Calculation of Asset Book Value

Book Value = (average remaining meter life/ full ELA) x opening meter volume x meter value*	£407,526.70

* meter value calculated as MEAP (RPI adjusted) plus asset management cost over ELA, or £69.12

Revenue under forecast scenario

NPV of Revenue, as per calculation in Example 1	£134,957.24

Stranding Cost (book value less NPV revenue)	**£272,569.46**