Title: **GB wide advanced/smart meter roll out to small and medium non-domestic sites**	Impact Assessment (IA)
	IA No: DECC0010
	Date: 27/07/2010
Lead department or agency: DECC	**Stage:** Consultation
Other departments or agencies: Ofgem	**Source intervention:** Domestic (GB)
	Contact for enquiries: Geoff Hatherick 0300 068 6083

Summary: Intervention and Options

What is the problem under consideration? Why is Government intervention necessary?

Lack of sufficiently accurate and timely information on energy use may prevent customers from taking informed decisions to reduce consumption and thereby bills and CO2 emissions. This information failure also increases suppliers' accounts management and switching costs. Detailed meter information also aids development of networks, including future smart grids.

Smart metering is a key enabling technology for managing energy systems more efficiently in the future, and providing new information and services to consumers which reduce costs and carbon emissions. In Great Britain, the provision of energy meters to consumers is the responsibility of energy retail suppliers, and is subject to competition. Although some suppliers are rolling out smart meters to a selection of their customers it is expected that, in the absence of a clear steer and intervention by Government, suppliers would roll out only limited numbers of smart meters. Government intervention is needed to ensure commercial interoperability and full market coverage. This will facilitate the capture of wider benefits to consumers, the environment, network operators and new businesses.

The policy for smart meters therefore addresses the market failures in the energy markets described above (information asymmetries, lack of coordination and negative externalities from energy consumption).

What are the policy objectives and the intended effects?

The objective of the Government intervention is to provide non-domestic gas and electricity customers in a cost-effective way, which optimises the benefits to consumers, energy suppliers, network operators and other energy market participants and delivers environmental and other policy goals.

What policy options have been considered? Please justify preferred option (further details in Evidence Base)

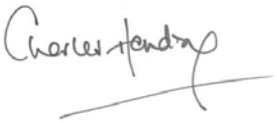
This IA updates costs and benefits from the December 2009 SME IA. It considers the economic impact of options on making use of the Data Communications Company (DCC) mandatory or voluntary. The economic impacts across both options are very similar, and do not point towards a particular approach.

The decision to propose a voluntary approach (Option 2) therefore also reflects qualitative evidence discussed in detail in the Prospectus and referred to in Section F, including the established and active market for metering and metering services in the non-domestic sector, and the scope for delivering commercial interoperability and improved information for networks under a voluntary approach to using the DCC.

When will the policy be reviewed to establish the actual cost and benefits and the achievements of the policy objectives?	The policy will be reviewed during the course of the smart meter rollout. An evaluation is expected to be complete by 2017. The Benefits Realisation Strategy will set out the approach.
Are there arrangements in place that will allow a systematic collection of monitoring information for future policy review?	The requirements for the collection of monitoring information that will contribute to the benefits realisation will be developed in a subsequent phase of the Programme.

SELECT SIGNATORY Sign-off For consultation stage IAs:

I have read the IA and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.



Signed by the responsible Minister: ***Date:*** *27/07/2010*

Summary: Analysis and Evidence Policy Option 1

Description: "Mandate DCC" (SMEs are mandated to use the central communications provider (DCC))

Price Base Year 2009	PV Base Year 2010	Time Period Years 21	Net Benefit (Present Value (PV)) (£m)		
			Low: 1,311	**High**: 3,097	**Best Estimate: 2,219**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A		N/A	N/A
High	N/A		N/A	N/A
Best Estimate	2		40	**596**

Description and scale of key monetised costs by 'main affected groups'

Capital and installation costs amount to £370m; O&M costs amount to £40m.Communications costs amount to £156m.

Other key non-monetised costs by 'main affected groups'

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefits (Present Value)
Low	0		130	**1,906**
High	0		251	**3,693**
Best Estimate	0		**191**	**2,814**

Description and scale of key monetised benefits by 'main affected groups'

Total consumer benefits amount to £2.34bn and consist mainly of savings due to a reduction in energy consumption (£1.61bn).
Total supplier benefits amount to £384m and include avoided meter reading (£256m).
Total other benefits amount to £88m.

Other key non-monetised benefits by 'main affected groups'

Advanced/smart meters are a strong enabling tool for many energy efficiency policies, facilitating improved competition, wider network benefits and demand side shifting.

Key assumptions/sensitivities/risks

The majority of the benefits (and costs) are assumptions produced after discussions with industry. Energy savings depend on the behavioural response of consumers to smart meters; we have made a best estimate considering the current evidence. All costs are adjusted for optimism bias.

For modelling purposes we have assumed that the non-domestic rollout follows the Staged Implementation approach as set out in the domestic IA. There are specific risks to this approach - potentially a greater complexity of processes for industry, higher costs to suppliers from more stranding of 'dumb' meters, and higher communications costs and sub-optimal technology choices. Interoperability problems may also increase costs and limit the scope of benefits to suppliers from switching. These are discussed in detail in the domestic smart meter IA. Policy measures are being developed to manage these risks.

Impact on admin burden (£m):			Impact on policy costs (£m):			In scope
Costs: 0	**Benefit:** 0	**Net:** 0	**Costs:** N/A	**Benefits:** N/A	**Net:** N/A	N/A

Summary: Analysis and Evidence Policy Option 2

Description: "No DCC mandate" (SMEs are not mandated to use the central communications provider (DCC))

Price Base Year 2009	PV Base Year 2010	Time Period Years 21	Net Benefit (Present Value (PV)) (£m)		
			Low: 1,302	**High:** 3,088	**Best Estimate: 2,210**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A		N/A	N/A
High	N/A		N/A	N/A
Best Estimate	2		40	**595**

Description and scale of key monetised costs by 'main affected groups'

Capital and installation costs amount to £393m; O&M costs amount to £40m.. Communications costs amount to £155m.

Other key non-monetised costs by 'main affected groups'

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefits (Present Value)
Low	0		129	1,897
High	0		251	3,683
Best Estimate	0		191	**2,805**

Description and scale of key monetised benefits by 'main affected groups'

Total consumer benefits amount to £2.34bn and consist mainly of savings due to a reduction in energy consumption (£1.61bn).
Total supplier benefits amount to £384m and include avoided meter reading (£256m).
Total other benefits amount to £83m.

Other key non-monetised benefits by 'main affected groups'

Advanced/smart meters are a strong enabling tool for many energy efficiency policies, facilitating improved competition, wider network benefits and demand side shifting.

Key assumptions/sensitivities/risks

The majority of the benefits (and costs) are assumptions produced after discussions with industry. Energy savings depend on the behavioural response of consumers to smart meters; we have made a best estimate considering the current evidence. All costs are adjusted for optimism bias.

For modelling purposes we have assumed that the non-domestic rollout follows the Staged Implementation approach as set out in the domestic IA. There are specific risks to this approach - potentially a greater complexity of processes for industry, higher costs to suppliers from more stranding of 'dumb' meters, and higher communications costs and sub-optimal technology choices. Interoperability problems may also increase costs and limit the scope of benefits to suppliers from switching. These are discussed in detail in the domestic smart meter IA. Policy measures are being developed to manage these risks.

Impact on admin burden (£m):			Impact on policy costs (£m):			In scope
Costs: 0	**Benefit:** 0	**Net:** 0	**Costs:** N/A	**Benefits:** N/A	**Net:** N/A	N/A

What is the geographic coverage of the policy/option?			Great Britain		
From what date will the policy be implemented?			The start date will be confirmed in accordance with the rollout plans for the preferred Option.		
Which organisation(s) will enforce the policy?			DECC/ Ofgem		
What is the total annual cost (£m) of enforcement for these			N/A		
Does enforcement comply with Hampton principles?			N/A		
Does implementation go beyond minimum EU requirements?			Yes		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** 6.2	**Non-traded:** 11.2	
Does the proposal have an impact on competition?			Yes		
Annual cost (£m) per organisation (excl. Transition) (Constant Price)	**Micro** N/A	**< 20** N/A	**Small** N/A	**Medium** N/A	**Large** N/A
Are any of these organisations exempt?	N/A	N/A	N/A	N/A	N/A

Evidence Base

Annual profile of monetised costs and benefits* - (£m) constant prices

	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Transition costs[1]	0	0	0.6	2.1	3.6	4.5	4.9
Annual recurring cost	0	0	2.7	14.7	29.3	44.0	60.0
Total annual costs	0	0	3.3	16.8	32.8	48.6	64.9
Transition benefits	0	0	0	0	0	0	0
Annual recurring benefits	0	0	13.4	50.2	97.7	144.9	193.8
Total annual benefits	0	0	13.4	50.2	97.7	144.9	193.8

	2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Transition costs[2]	4.2	2.0	-0.1	-1.3	-1.8	-2.2	-2.6
Annual recurring cost	72.0	74.1	73.6	70.6	65.8	61.0	56.3
Total annual costs	76.2	76.1	73.5	69.3	64.0	58.8	53.8
Transition benefits	0	0	0	0	0	0	0
Annual recurring benefits	234.7	251.6	261.8	266.9	269.1	270.9	273.1
Total annual benefits	234.7	251.6	261.8	266.9	269.1	270.9	273.1

	2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**

[1] We consider transition costs to include only those costs incurred during the rollout- costs of disposal of legacy meters and pavement reading inefficiencies. In contrast, the December 2009 IA considered communications costs to be transition costs as well. We now consider these to be ongoing as they reoccur every 15 years (i.e. WAN module costs). In the attached spreadsheet, some of these costs run to 2030 as they have been annuitised in the model, but in practice would not occur beyond the rollout. Industry set up costs are covered in the domestic IA – the rollout of smart meters to SMEs will not require additional costs in this area. There are no transition benefits for the smart meter policy, as benefits are assumed to accrue continuously.

[2] Note that from 2019, the one-off, transition costs become negative. This is largely driven by costs from pavement reading inefficiencies (increased costs of reading legacy meters) when compared to the counterfactual. Under both options considered in the analysis there would be no more pavement reading costs towards the end of the rollout , whereas in the counterfactual (with only 50% of smart meters rolled out) some would remain. Hence subtracting the counterfactual costs produces a negative cost or cost saving.

Transition costs	-2.9	-3.2	-3.4	-3.4	-3.2	-2.3	-1.2
Annual recurring cost	51.7	47.6	43.3	37.9	32.4	27.0	21.7
Total annual costs	48.8	44.4	39.8	34.6	29.1	24.6	20.5
Transition benefits	0	0	0	0	0	0	0
Annual recurring benefits	276.9	300.3	311.7	311.3	310.9	309.1	306.3
Total annual benefits	276.9	300.3	311.7	311.3	310.9	309.1	306.3

* For non-monetised benefits please see summary pages and main evidence base section

Emission savings by carbon budget period

Version of GHG Guidance	June 2010

Sector		**Emission Savings (MtCO2e) – By Budget Period**		
		CB I: 2008-2012	CB II; 2013-2017	CB III; 2018-2022
Power sector	Traded	0.00	0.00	0.00
	Non-traded	0.00	0.00	0.00
Transport	Traded	0.00	0.00	0.00
	Non-traded	0.00	0.00	0.00
Workplaces & Industry	Traded	0.02	0.93	1.64
	Non-traded	0.04	2.06	3.56
Homes	Traded	0.00	0.00	0.00
	Non-traded	0.00	0.00	0.00
Waste	Traded	0.00	0.00	0.00
	Non-traded	0.00	0.00	0.00
Agriculture	Traded	0.00	0.00	0.00
	Non-traded	0.00	0.00	0.00
Public	Traded	0.00	0.00	0.00
	Non-traded	0.00	0.00	0.00
Total	Traded	0.02	0.93	1.64
	Non-traded	0.04	2.06	3.56
Cost effectiveness	% of lifetime emissions below traded cost comparator	100%		
	% of lifetime emissions below non-traded cost comparator	100%		

Evidence Base (for summary sheets)

A. Glossary of Terms

CAPEX – Capital Expenditure
DCC – Data Communications Company
DNO – Distribution Network Operators
GHG – Greenhouse Gas
GPRS – General Packetised Radio Service
GSM – Global System for Mobile Communication
HAN – Home Area Network
IHD– In-Home Display
IT – Information Technology
LAN – Local Area Network
NPV – Net Present Value
O & M – Operation & Maintenance
OPEX – Operational Expenditure
PPM – Prepayment Meter
RTD – Real Time Display
SPC – Shadow Price of Carbon
ToU – Time of Use (tariff)
WAN – Wide Area Network

B. Strategic Overview

The Government set out its commitment to the roll out of smart meters within its coalition Programme [3].

The coalition Programme sets out the strategic context for the roll-out of smart metering alongside the establishment of a smart grid. The smart meter policy sits in the broader Government Programme for an increase in the EU carbon emission reduction target by 2020, through encouraging investment in renewable energy both locally and for large scale offshore wind developments, feed in tariffs and home energy efficiency via the Green Deal.

Smart metering will play an important part in supporting these policies and objectives, by directly helping consumers to understand their energy consumption and make savings, reducing supplier costs, enabling new services including facilitating demand-side management which will help reduce security of supply risks and help with our sustainability and affordability objectives. Smart metering is a key enabler of the future Smart Grid, as well as facilitating the deployment of renewables and electric vehicles.

The roll-out of smart metering therefore needs to happen on a timescale appropriate to supporting these various objectives and policies.

This IA builds upon the work DECC has undertaken in the last 3 years to establish a case for rolling out smart meters. This has been supported by cost benefit modelling and analysis by Mott Macdonald[4], Baringa Partners and Redpoint.

Following previous analysis and consultation, energy suppliers were required to provide advanced metering to larger electricity sites (defined as those within profile classes 5-8) and larger gas sites (defined as those with consumption above 732MWh per annum). Since April 2009, such metering must be provided where a meter is newly installed or replaced, and in any case, should be installed by April 2014. More recent analysis and consultation has focused on remaining, smaller sites – those in electricity profile classes 3 and 4, and those with gas consumption below 732 MWh per annum. These sites are the subject of the Impact Assessment.

DECC has been working with Ofgem E-Serve as delivery partner for the scoping phase of the Programme that has concluded in this IA. Ofgem engaged PA Consulting Group to support them.

The changes made to the analysis against the December 2009 IA are noted within the text of this IA in section F. For ease of reference an overview of the changes to input values is also provided in Annex 1.

Section F below sets out the optimism bias adjustment factors that have been applied to the cost figures and the assessment of the impact of the options for mandating/not mandating use of DCC.

This IA accompanies a Prospectus produced by the smart meter Programme setting out the detail and discussion on the policy options considered by the smart meter Programme.

[3] HMG, *'The Coalition: Our Programme for Government'*, 2010

[4] BERR, *IA of Smart Metering Roll Out for Domestic Consumers and Small Businesses*, April 2008, http://www.berr.gov.uk/files/file45794.pdf

C. The issue

Within Great Britain's small and medium non-domestic energy market (which we define as electricity sites within profile classes 3 & 4 and gas sites with consumption below 732MWh/year)[5], there are information failures for both consumers and suppliers. Suppliers usually only know exactly how much a site consumes after a quarterly reading, and consumers are generally only aware of consumption on a quarterly, historic basis. In addition, many consumer bills are derived not from actual readings, but from estimates.

Consumers do not have dynamic and useful information to enable them to easily manage their energy consumption. In addition, problems with accuracy of data and billing create costs for suppliers and consumers, causing problems in terms of disputes over bills (complaints) and problems with the change of supplier process, thereby possibly hindering competition and diminishing the customer experience.

Smart meters with a real-time display or other means of providing information, or advanced meters providing information that can be accessed via computer or other remote means, would help address these issues. Work specific to SMEs by the Carbon Trust[6] (using field trials) suggested that potential energy savings per business could be between 5% and 12% depending on the advice they received. The Carbon Trust anticipated that, if its field trial were scaled up nationally, there would be savings of over 2% of all carbon emissions from businesses.

Smart meters provide remote communication between the meter and the supplier, facilitating, amongst other things, more efficient collection of billing information, the development of more sophisticated tariff structures and demand management approaches that could be used further to incentivise energy-efficient behaviour by consumers and suppliers alike.

The benefits from a roll-out of smart/advanced meters fall to a number of actors – to customers (more accurate bills, accurate and real-time information to enable them to reduce energy consumption and potential availability of new services), to suppliers (more frequent information, reduced costs to serve) and to society (in terms of reduced carbon emissions resulting from behavioural change).

There are also potential benefits for network companies in using data collected via smart metering better to identify technical losses and electricity outages, and better to inform long-term investment in the network. Depending on their functionality, smart and advanced meters can also help to support future smart grids by facilitating demand management.

Companies are already installing smart/advanced meters or retrofit options in the non-domestic market. In the absence of Government intervention, feedback from market participants suggested that a roll-out of smart/advanced meters could, over time, involve around 50% of meters. Experience from other countries shows that suppliers and others interested in meter provision, such as meter-owners (at least in competitive markets) rarely fully embrace smart/advanced metering as the benefits fall to a variety of actors and the market does not effectively maximise and share these benefits without some form of Government involvement/intervention. The analysis in this IA shows that a mandated roll-out to all sites in this sector will provide substantial benefits over and above those expected from a 50% roll-out of smart/advanced meters. However, within that overall mandate, it shows only a marginal difference between the economic effects of making use of the central communications body in this sector mandatory or voluntary.

[5] Where the term "SME" is used, it should be taken to include all sites within these groupings, including the smaller sites of larger private and public sector organisations, as well as those of small and medium enterprises and micro-businesses.
[6] "Advanced metering for SMEs: Carbon and cost savings", Full Report, Carbon Trust, May 2007

D. Objectives

The objectives of Government intervention in the rollout of smart metering through the Smart Metering Programme are:

1. To promote cost-effective energy savings, enabling all consumers to better manage their energy consumption and expenditure and deliver carbon savings;
2. To promote cost-effective smoother electricity demand, so as to facilitate anticipated changes in the electricity supply sector and reduce the costs of delivering (generating and distributing) energy;
3. To promote effective competition in all relevant markets (energy supply, metering provision and energy services and home automation);
4. To deliver improved customer service by energy suppliers, including easier switching and price transparency, accurate bills and new tariff and payment options;
5. To deliver customer support for the Programme, based on recognition of the consumer benefits and fairness, and confidence in the arrangements for data protection, access and use;
6. To ensure that timely information and suitable functionality is provided through smart meters and the associated communications architecture where cost effective, to support development of smart grids;
7. To enable simplification of industry processes and resulting cost savings and service improvements;
8. To ensure that the dependencies on smart metering of wider areas of potential public policy benefit are identified and included within the strategic business case for the Programme, where they are justified in cost-benefit terms and do not compromise or put at risk other Programme objectives;
9. To deliver the necessary design requirements, commercial and regulatory framework and supporting activities so as to achieve the timely development and cost-effective implementation of smart metering and meeting Programme milestones;
10. To ensure that the communications infrastructure, metering and data management arrangements meet national requirements for security and resilience and command the confidence of stakeholders; and
11. To manage the costs and benefits attributable to the Programme, in order to deliver the net economic benefits set out in the Strategic Business Case.

These objectives will form the basis of the benefits management work which will be developed in greater detail as part of the next phase of the Programme.

E. Options Identification

As set out in the introduction this IA builds on the analysis set out in the December 2009 consultation response IA. Core to that response and IA was the concept of a central communications provider. This provider would manage central communications and data and is referred to as Data Communications Company (DCC) throughout this IA.

This IA examines two options for the market model under which smart metering would be rolled out in this sector: one under which use of DCC should be mandatory for smart meters; and one under which such use is voluntary. These options mirror the discussion about market model and the use of DCC contained in the non-domestic annex to the Smart Metering Prospectus. Cost and benefit estimates of communications and meter functionality and interoperability are all covered within the main IA and have been developed to inform the options for the economic assessment set out in Section F.

The domestic IA presents updated costs and benefits for a preferred option for the rollout of meters involving a transitional approach where the start of the roll out precedes full establishment of the DCC ("Staged Implementation") against another option which proposes waiting for full DCC services to be established (called "Full Establishment" in the Domestic IA). For the purposes of this IA we have only considered the impact of mandating use of DCC using the preferred 'Staged Implementation' approach to ensure consistency with the preferred option in the domestic IA.

1. Communications infrastructure

Smart metering requires a suitable communications platform over which data can be securely transmitted (e.g. consumption data transmitted for defined periods). In addition ad hoc remote configuration and diagnostics, software and firmware changes should be able to be made remotely. The December 2009 IA assumed the communications costs of a currently available communications technology infrastructure, which can provide sufficient functionality (GSM GPRS solution). This simplified the analysis as it did not entail the modelling of hybrid options and, using a currently available technology, reduces the level of cost risk attributable[7].

Further work carried out by PA Consulting Group (PA) for DECC and Ofgem in the course of Phase 1 considered a wider range of technology options. PA's review was based on informal soundings with service providers, commercially confidential inputs to Ofgem and PA's own experience of cost drivers in the communications sector. The review indicated that the existing £4.80 assumption with an additional £0.50 as an allowance for communications security is a reasonable estimate, subject to the inclusion of 10% optimism bias to reflect residual uncertainty prior to an RFI process and the potential need for additional expenditure to address 'hard to reach' meters.

2. Minimum scope of the Data Communications Company (DCC)

The smart metering Programme presents an opportunity for fundamental streamlining and efficiency improvements to existing gas and electricity industry processes and systems. For modelling purposes we have assumed a "thin" scope of the DCC, which would include activities including secure communications and access control[8], centralised head-ends[9] and data retrieval functions[10]. This should not be interpreted as a policy preference for this scope but rather as an initial view which is subject to change as a result of ongoing cost and benefit analysis on the scope of the DCC which is being conducted in parallel to this consultation.

3. Roll-out profiles

An accelerated roll out means that the benefits come on line more quickly and a more intensive approach would provide greater benefits of scope and scale and the necessity to run multiple back office systems would be reduced.

[7] This is in line with the recommendations of Baringa Partners *Risk and Optimism Bias Project*

[8] Secure two way communications with smart meters, enabling remote meter reading, meter diagnostics and other data communications.

[9] The conversion of different technical protocols to support inter-operability.

[10] Scheduling of the collection of meter readings and managing that process on behalf of suppliers and network operators.

However, costs would also come on line earlier. Where timelines are shorter, higher capital costs might be expected as it would be necessary to acquire the equipment, competent labour and meters within a compressed period. And there would also be additional stranding costs. Additionally the scope to adjust delivery and learn from mistakes is less – the time available to adjust being shorter. There is potential for greater risk to consumers in terms of cost.

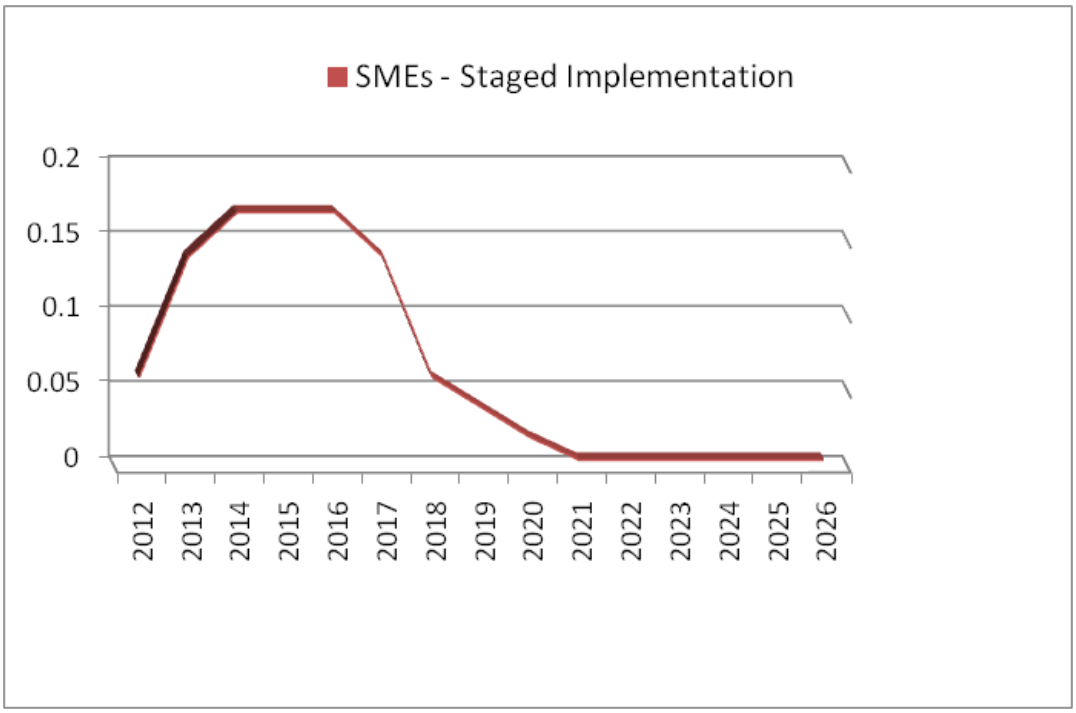
The latest Programme timeline – discussed in more detail in the Prospectus - indicates that the full DCC will be offering services from Autumn 2013. The roll-out start date and profile for both options have been slightly amended to reflect this.

The Government has stated it will work with suppliers to establish more ambitious installation targets. In advance of this work. For modelling purposes we have assumed different installation rates for the two options. These rates should not be interpreted as policy options on the installation targets that could be set on suppliers.

We have assumed for both options that the rollout is the same as the "Staged Implementation" approach for the domestic sector. Under such an approach, a technical specification for meters and associated technology would be agreed and referenced in supplier licences. This would provide suppliers the certainty they need to install meters prior to full DCC operation being in place. The following assumptions have been made under this model for the roll-out profile:

- Suppliers base preparations for the roll out on meter specifications available at end of Q2 2011.
- Suppliers start to roll out meters at volume from summer 2012 once the supplier licence conditions are finalised.
- Suppliers also want as flat a profile as possible over the bulk of the roll out (2014 to 2018) as it is easier to manage their resources.

Figure 1 – Roll out profile



Overall we feel this approach to the profiles best isolates the impacts on costs and benefits of the roll out. The profile is not intended to assess the impacts on costs and benefits of different target dates for completion of the rollout. Therefore the difference in assumed rates should not be interpreted as policy options on the installation targets that could be set on suppliers. We have defined roll-out profiles for this option on the basis of:

- when the mass roll-out gets underway
- a vast majority of smart meters is rolled-out within the proposed timescales

- peak installation rates are kept below an assumed annual rate of 17%[11]
- beyond 90% coverage, installation rates are likely to decelerate substantially because of harder to reach customers

4. Options analysed

The IA considers two policy options to deliver the preferred Government solution for a smart meters roll-out in non-domestic premises:

Option 1 – Mandate use of DCC
Option 1 would see all SME suppliers being required to use the DCC service for their smart meters from the time DCC is operational. The Option requires that suppliers transition any smart meters that have been installed with separate communications prior to the DCC being operational to DCC from the end of 2013.

Option 2 - DCC use at discretion of suppliers
Option 2 leaves the use of DCC to supplier discretion. Section F describes the assumptions regarding supplier incentives to use DCC.

A Government mandate that the non-domestic sector (small and medium) should have either smart or advanced meters by end-2020. It is assumed that by 2020 the split between smart and advanced meters would be:

- Electricity: 77% smart and 23% advanced
- Gas: 60% smart and 40% retrofit advanced

The 2009 consultation indicated the broad form of a potential mandate in the non-domestic sector, the expected balance between smart and advanced metering, and the rules that would affect that balance.

The consultation response published in December 2009 did not indicate what market model should be used in the non-domestic market, and, in particular, whether use of DCC should be mandatory or voluntary for smart and/or advanced metering. This issue has since been considered under Phase 1 of the Smart Meter Programme, and the Smart Metering Prospectus contains formal proposals, which are discussed in detail in the Prospectus's non-domestic annex. The Prospectus proposes, subject to consultation, that use of DCC should not be mandatory for smart meters, but that those providing them should be able to use DCC if they wish to do so. For its part, DCC would be required to offer them terms. Similarly, advanced meters would be able to use DCC.

The Programme's view is that a voluntary, rather than a mandatory approach to using DCC for smart meters should not materially change the number of electricity meters that actually use it. For the purposes of this analysis, we assume that there may be rather more effect in gas. This reflects the fact that suppliers with large, domestic portfolios are likely to wish to install a common, smart meter where they can, and to wish to use a common communications platform, even where they are offered a choice. Existing advanced meters and the advanced meters likely to be installed in the future are likely principally to have their own attendant communications arrangements as part of existing contracts, although, over time, these may migrate to use of DCC. In the non-domestic electricity sector, supply is dominated by those with large, domestic portfolios, whereas there are a number of gas suppliers with no domestic business, but a significant share of the non-domestic market.

For modelling purposes we have assumed that under Option 1 (mandated approach) the percentage of meters using DCC would be broadly in line with our expectations of smart penetration in the small and medium non-domestic market of 77% for electricity and 60% for gas. In contrast, under the voluntary approach (Option 2), only 97.5% of smart electricity meters and 75% of smart gas meters would choose to use DCC. These percentages are in line with the market share of suppliers with large domestic portfolios which are likely to wish to install a common, smart meter where they can, and to wish to use a common communications platform, even where they are offered a choice. Benefits enabled by the use of DCC are adjusted accordingly: we assume that, without DCC, smart meters would realise only 40% of switching benefits and would not realise any of the benefits from reduced losses.

[11] The existing cost/benefit model and the December 2009 IA assume that installation costs increase by 1% for every percentage point the installation rates are above 17%. We need to do further work to test this assumption.

Similarly, for those meters that would use DCC under both options, the benefits are adjusted before 2014, as the rollout follows the approach in the 'staged implementation' option in the domestic IA, under which the rollout proceeds without DCC being fully operational.

Counterfactual Case

The counterfactual case was established in an earlier smart meter IA and assumes no Government intervention. The market participants are left to carry on installing smart/advanced meters where there is a business case. We assume that this would be up to 50% of the market by 2030. We assume that meter competition and choice will exist – in the model we assume that the meter take-up will be: advanced meters - 40%; smart meters - 40%; retrofit advanced - 20%. As in the options assessed above, DCC enabled benefits are adjusted - we assume that, as there is no DCC under the counterfactual, smart meters only realise 40% of the switching benefits and do not realise any of the benefits from reduced losses.

The domestic sector counterfactual assumption in the IA has now been revised to include a new methodology which accounts for the impact of other policies in reducing the overall level of energy consumption, as well as the impact of macroeconomic variables such as income, energy prices and population growth on energy levels. This projects a substantial decrease in business as usual levels of energy consumption per household in the future.

For the SME sector IA, a similar assessment has been carried out. This has concluded that maintaining an assumption of stable levels of energy consumption per SME going forward is, based on the currently available information, a sensible and conservative representation of business as usual energy levels projections for SMEs.

Even though energy projections for the non-domestic sector are available[12] it is not possible to derive from these a sensible representation of the diverse business groupings represented in the SME sector as defined in this IA, the drivers of its energy consumption, and its projected levels of energy consumption going forward.

Preliminary analysis suggests that both gas and energy consumption business as usual trends per SME are, if anything, likely to be upwards. Therefore a flat baseline is if anything likely to underestimate the energy and carbon savings of the policy.

[12] http://www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx

F. Analyse the options

In this section we describe the main assumptions made in the analysis and the reasons for them, including any references or discussions. These assumptions are generally shared between the policy options already outlined, with any differences noted. Also noted are the differences, if any, between the assumptions used in this IA and the December 2009 IA. An economic model has been used to analyse the options using these assumptions and to calculate the results which are presented below.

Most of the assumptions used in this IA are shared with the assumptions used in the analysis for the domestic sector. When this is the case the assumptions are only referenced in this section and greater detail can be found in the IA for the roll out of smart meters in the domestic sector.

It should be noted that within the economic model all up-front costs are annuitised over the lifetime of the meter (assumed to be 15 years) or over a 20 year period in the case of basic meters in the counterfactual. This is based on the assumption that a loan is required to pay for the asset (and other up-front costs), and is repaid over the period. Therefore the up-front cost is spread over the lifetime of the asset (or 20 years) in addition to the interest, calculated by multiplying the up-front cost by the cost of capital (similar to a mortgage agreement). We have assumed a cost of capital of 10%. The benefits are not annuitised, but are represented annually.

1. Costs

Advanced meter

In the December 2009 IA, we based our assumption of advanced meter costs on the work done by the Carbon Trust and the work done by DECC for the IA for larger non-domestic sites[13]. The costs used were the mid-point between the high and low costs for advanced meters used in the Carbon Trust trials. This also applied to installation and maintenance costs. It is assumed that the up-front communications costs are part of the asset price but running costs are separate. We also provided sensitivity analysis in which we assumed the cost of an advanced electricity meter to be £120, compared to £247 assumed in the central case[14]. We have retained these assumptions in the present IA.

A variety of advanced metering solutions is available, and used, within the non-domestic market. These carry a variety of costs. If the costs of advanced metering are lower than those we have modelled, the effect would be to increase the overall net present value of the policy, and, within the options, marginally to increase the net benefit of the voluntary option vis-a-vis the mandatory option because of the slightly higher incidence of advanced installation assumed for the former.

Smart meter

The smart meter costs are based on the proposal and high-level specification for domestic smart meters as detailed in the 2009 consultation. The installation costs are based on domestic installation cost estimates and the maintenance cost is assumed to be 2.5% of the asset costs. Upfront and running communications costs are seen as separate from the meter.

Retrofit advanced

This option means that the meter is not replaced, but is read remotely by a retrofit device attached to the meter, resulting in lower installation costs and avoiding stranding any assets. It is assumed that the upfront communications costs are part of the asset cost and that maintenance is 2.5% of the asset cost.

Display

For the purposes of this assessment, we continue to assume that a display of information in some form would be provided, with a consequent cost. In this sector, information would be provided in a variety of ways, not necessarily through a display device, although we anticipate that a significant number of customers, particularly smaller customers, would use a display device.

[13] IA of Smart Metering Roll-out for Domestic Consumers and for Small Businesses, www.berr.gov.uk/files/file45794.pdf
[14] See discussion and results of this option in section F.

Table 1: Summary of costs per meter

	Asset cost	Installation costs	Maintenance costs (annual - 2010)
Advanced meter Electric	£247	£136	£6.1
Advanced meter Gas	£247	£136	£6.1
Retrofit option Gas	£120	£68	£3
Smart meter Electric	£43	£29	£1.08
Smart meter Gas (excluding valve)	£43	£49	£1.4
Smart meter gas (including valve)	£56	-	-
RTD	£15	-	-

Smart and advanced meters require suitable communications platforms over which data (eg consumption data transmitted for defined periods) can be uploaded and/or downloaded depending on the functionality of the metering system.

The domestic market will use central communications arrangements, although the Government has not prescribed the communications solutions or technologies that would underpin it. The December 2009 IA assumed the communications costs of a currently available communications technology infrastructure, which can provide sufficient functionality (GSM GPRS solution). This simplified the analysis as it did not entail the modelling of hybrid options and, using a currently available technology, reduces the level of cost risk attributable[15].

More detailed work carried out by PA Consulting for DECC and Ofgem in the course of Phase 1 has allowed us in the present IA to relax this assumption and assess the costs of the communications solution against a mix of different technology solutions.

No optimism bias adjustment for operating and maintenance costs of the communications solution was assumed in the December 2009 IA, as for modelling purposes it was assumed that a GSM GPRS communications solution would be used. A 10% optimism bias adjustment has now been applied to reflect that depending on the technology solutions deployed, some additional cost may be required to address 'harder to reach' meters, whether due to geographic factors or the specific circumstances of meter deployments at premises. Under both options considered, there is also a risk that smart meters installed prior to DCC being place do not have an appropriate communications solution.

In the non-domestic sector, even under Option 2 where Government does not require the use of central communications it is likely that a significant number of sites will, in fact, use its services. For modelling purposes, one-off legal, IT, marketing and organisational costs from the roll-out have been fully allocated to the domestic cost benefit analysis in order to avoid double-counting. Therefore, these are not included in the cost benefit modelling presented in the non-domestic IA.

Table 2: Communications costs

	Capex (£ per meter)	Opex (£ per meter per year)
WAN	15	5.3
HAN electricity	1	0
HAN gas	3	0

It is assumed that, due to technological advances, the costs of the meters and communications will fall over time. This has been seen with current meters and – internationally - for smart meters. We assume

[15] This is in line with the recommendations of Baringa Partners *Risk and Optimism Bias Project*

that costs would fall by approximately 1% per annum, resulting in a 6.8% reduction in costs between 2010 and 2017, and by 2024 costs have fallen by 13.1%.

In line with the domestic IA, we have revised our cost estimates for the operation and maintenance costs of the communication technology We now assume – in line with the available evidence – these to be £5.3 per meter per year (annuitised) for the WAN devices which now include an additional £0.50 as an allowance for communications security.

2. Benefits

We assume that smart/advanced meters, together with provision of data, will reduce energy consumption by between 2.8% (electricity) and 4.5% (gas) per meter in the central case. This is in line with the changes seen in the Carbon Trust trials. The electricity savings are in line with the savings used in the IA for domestic consumers.

DECC has valued the avoided costs of carbon delivered from the savings of energy through smart meters[16].

Smart/advanced meters will reduce supplier costs in several respects – for example through avoidance of manual meter reads, lower disconnection charges, reduced losses and reduced contact centre time. The table below shows the assumed benefits per meter per year and the share of these received by the different technology options:

Table 3: Summary of benefits per meter

Benefits	**Assumptions**	**Smart (in DCC)**	**Smart (not in DCC)**	**Advanced**
Energy saving	2.8% for electricity and 4.5% for gas in the central case.	100%	100%	90% for electricity and 80% for gas
Load shifting (electricity only)	Benefit from a 3% reduction in bills for the 20% of SMEs assumed to take-up TOU tariffs	100%	100%	0%
TOU tariffs (electricity only)	Reduction peak load of 5% across the 20% TOU costumers means that less capacity is required.	100%	100%	30%
Avoided meter reading	£6 per meter per year	100%	100%	100%
Inbound enquiries	£1.9 per meter per year	100%	100%	80%
Customer service overheads	£0.3 per meter per year	100%	100%	80%
Debt handling	£2.2 per meter	100% for electricity; 70% for gas as no valve assumed	100% for electricity; 70% for gas as no valve assumed	20% for electricity and 20% of 70% for gas (14%)
Remote (dis)connection	£0.5 per meter	100% for electricity meters; 0% for gas as no valve assumed	100% for electricity meters; 0% for gas as no valve assumed	0%
Avoided site visit	£0.8 per meter	100% for	100% for	0%

[16] DECC has not netted off the carbon emissions embodied in production and transportation metering equipment. The analysis does not take account of life cycle carbon emissions.

		electricity meters; 0% for gas as no valve assumed	electricity meters; 0% for gas as no valve assumed	
Reduced losses	5% of the Government target for reduced losses is met through smart metering	100%	0%	0%
Reduced theft	Assume no savings	N/A	N/A	N/A
Microgeneration (electricity only)	£0.4 per meter	100%	100%	0%
Supplier switching	£1.2 per meter per year	100%	40%	40%

The proportion of benefits assumed for each type of meter profile is changed from the December 2009 IA. We assume that, without DCC, smart meters would realise only 40% of switching benefits and would not realise any of the benefits from reduced losses. Similarly, we previously assumed that 80% and 70% of the switching benefits would be realised by electricity and gas advanced meters respectively – this is now also 40% for both.

3. Other Key Assumptions

Table 4: Additional key assumptions

	Electricity	**Gas**
Meters (2009)	2,140,000	1,500,000
Consumption (kWh)	17,400	79,800
New meters	2% - 51,000 per annum	

The number of electricity meters and their average electricity consumption have been updated in light of updated data from ELEXON. Assumptions on energy prices follow the latest set of DECC forecasts. We assume that there are no additional IT and legal and contractual costs for the non-domestic sector as they have already been taken into account in the IA for the domestic sector.

In December 2009, in light of responses to the May 2009 consultation, we amended our assumption of the average consumption of gas meters. Our assumption now divides meters between: (a) those used at around 400,000 larger sites with consumption of between 73,200 kWh and 732,000 kWh per annum, where we continue to assume average consumption of 170,000 kWh per annum; and (b) those used at around 1.1 million sites with consumption of under 73,200 kWh per annum, where we assume an average consumption of 47,000 kWh per annum. Average consumption across the 1.5 million sites is therefore reduced to kWh 79,800.

Some stakeholders have indicated that our assumption of 1.5 million non-domestic gas sites with consumption below 732,000 kWh may be an overestimate. We acknowledge that there is substantial uncertainty around the actual number of gas meters in the SME sector as defined in this IA. DECC is currently developing a National Energy Efficiency Data Framework (NEED),which will allow us to verify with a substantially higher degree of confidence the validity of the assumption on the number of gas meters.

4. Results

Comparison of results across the options analysed

The results below are produced by running a cost benefit estimation model using the assumptions outlined above. Within the model, the upfront costs are annuitised over either the lifetime of the device or over the period 2010-2030. The cost numbers are risk-adjusted, i.e. they have been adjusted for optimism bias (see section G on risk). We have applied sensitivity analysis to benefits and we present benefits in terms of low, central and high scenarios. Table 9 shows the impact of smart meters on energy

bills of SMEs customers[17]. This builds on existing DECC modelling on energy prices to estimate the impact on domestic energy bills in cash terms of the deployment of smart meters.

The period of the analysis has been adjusted to reflect the fact that we are in 2010. Therefore the PV base year for the analysis is 2010 in contrast with 2009 in the December 2009 IA. The price values are nevertheless still based on 2009 (for example, energy prices are based on 2009 to reflect the latest available price data from the Interdepartmental Analysts Group guidance[18]).

For both options some of the benefits from the DCC being in operation would be compromised for those smart meters installed before DCC is fully operational in late 2013, such as supplier switching benefits, and there are likely to be one-off integration costs to DCC once this is put in place. Other costs have also been considered such as increased risk of sub-optimal communications solutions due to lack of coordination and increased operation and maintenance costs for communications as the DCC would need to support multiple communications solutions. The assumptions, in line with the domestic IA are:

- 40% reduction in supplier switching benefits for those smart meters installed previous to DCC being in place.
- One-off nugatory costs to integrate existing communications solutions to DCC.
- CAPEX and OPEX communications cost optimism bias adjustments are assumed to be 30% - rather than 10% - in the period 2011-Q3 2013. After this point both opex and capex are assumed to return to the levels in the DCC solution as we are assuming that the one off integration provides a full DCC solution.

It is important to note that where there are specific risks to the Staged Implementation approach, the IA has attempted to quantify these risks to allow a comparison of costs and benefits between the options. There is however uncertainty around the extent and the degree to which these risks would be realised and hence the estimates presented should be treated with caution.

Results show a negligible difference in NPV between options, which in both cases is positive. Costs are equal and benefits are only marginally higher (£9m) for Option 1 as more SMEs realise the full benefits from switching and reduced losses enabled by the use of DCC. As we judge that most smart meters under option 2 would still use DCC the difference in benefits is small.

The economic analysis does not, therefore, by itself clearly suggest a preferred option. The non-domestic annex to the Smart Metering Prospectus sets out in detail the rationale, including the wider policy reasons, for the Government's proposal to make use of the DCC voluntary. These include, on the one hand, the established and active market for metering and metering services in the non-domestic sector and the choice and innovation they can offer, and, on the other, the scope for delivering commercial interoperability and improved information for networks under a voluntary approach to using the DCC. The voluntary approach does not exclude use of DCC, and, as the Assessment makes clear, such use is likely to be both substantial and increasing. We judge that, on the basis of this, Option 2 is the preferred option.

Table 5: NPV (£bn)

Option 1	2.22
Option 2	2.21

Table 6: Total costs and benefits (PV) (£bn)

	Total costs	Total benefits
Option 1	0.60	2.81
Option 2	0.60	2.81

Table 7: Total supplier and consumer benefits (PV) (£bn)

	Consumer benefits	Supplier benefits

[17] Updated values of the average annual impact per meter are available for the central case in Annex 2

[18] http://www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx

Option 1	2.34	0.38
Option 2	2.34	0.38

Table 8: Sensitivity (PV) (£bn)

	NPV		Total benefits		Energy saving		Global carbon reduction	
	Low	High	Low	High	Low	High	Low	High
Option 1	1.31	3.10	1.91	3.69	1.05	2.14	0.33	0.53
Option 2	1.30	3.09	1.90	3.68	1.05	2.14	0.33	0.53

Further details on the results are available in Annex 2.

5. Impacts of smart/advanced meters on SME energy bills

The costs to energy suppliers will be recovered through higher energy prices, although we assume that any benefits to suppliers will also be passed on to SME consumers.[19] This increase in price will result in higher energy bills. However, the reduction in energy consumption from smart meters will counteract this impact, leading, on average, to a net decrease in energy bills. The results below show the average impact on SME energy bills. It is possible there will be some variation between SMEs depending on the level of energy they save and on how suppliers decide to pass through costs to SMEs. For the purposes of our analysis we have assumed that on average energy suppliers will pass down to SMEs the average additional cost of installing smart/advanced meters.

The impact on SMEs is shown in Table 9, with substantial reductions in energy bills from the first year of the roll-out for the average SME. It is important to note that prices are expressed in nominal terms, hence not being discounted by the opportunity cost of time.

Table 9: Impact on SMEs energy bills for a dual fuel customer (policy option 2)

Year	Impact on gas bill	Impact on electricity bill
2012	- 6	- 2
2013	- 12	- 4
2014	- 25	- 9
2015	- 39	- 15
2016	- 54	- 21
2017	- 71	- 28
2018	- 85	- 36
2019	- 95	- 41
2020	- 106	- 45
2021	- 110	- 48
2022	- 114	- 51
2023	- 117	- 54
2024	- 121	- 58
2025	- 124	- 68
2026	- 127	- 76
2027	- 130	- 79
2028	- 133	- 81
2029	- 135	- 83
2030	- 137	- 85

The price impacts of smart meters in the SMEs sector are detailed in Table 10 below. It is important to note that even though the price impact per unit of energy is expected to be positive for a number of years, the reduction in energy consumption arising from the policy will mean that overall the average net impact on bills will be negative from year one.

[19] For this analysis we have assumed that suppliers pass 100% of the costs and benefits on to consumers due to the pressures of the competitive market.

Furthermore, price impacts are projected to become negative from 2027 since the savings to suppliers - for example from avoided meter reading and site visits, lower customer overheads and debt handling costs - will lead to suppliers lowering prices, despite having to pay for smart meters. Note that the vast majority of meters will be installed by 2020 and the installation cost will fall substantiality from then whilst the benefits continue.

Table 10: Price impacts on SMEs

£/MWh	Gas price impacts	Electricity price impacts
2012	0.01	0.03
2013	0.10	0.31
2014	0.16	0.49
2015	0.19	0.59
2016	0.23	0.70
2017	0.23	0.72
2018	0.18	0.56
2019	0.15	0.47
2020	0.12	0.38
2021	0.10	0.29
2022	0.07	0.23
2023	0.05	0.17
2024	0.04	0.11
2025	0.02	0.06
2026	0.00	0.01
2027	- 0.02	- 0.05
2028	- 0.03	- 0.11
2029	- 0.05	- 0.15
2030	- 0.06	- 0.19

Please note that price and bill impacts presented in tables 9 and 10 update those presented in the December 2009 IA. Estimates of bill savings from smart meters in small non-domestic premises have been revised upwards. For example, by 2020 gas and electricity bill savings have increased from £63 to £106 and from £29 to £45 respectively. This is largely due to methodological changes rather than changes to costs and benefits of the options assessed.

In particular, the key difference is the assumption on retail price used to calculate the bill savings from a reduction in energy consumption. The analysis in the December 2009 IA used a proportion of the domestic retail price, while the present analysis has used retail price from average medium sized industry, which is higher. Therefore, absolute bill savings are also larger, even though the percentage reduction in bills as a result of the smart meters roll out has remained at similar levels as in the December 2009 IA at 2% and 3.5% for electricity and gas respectively.

6. Stranding

Stranding costs are incurred when a meter is taken out before the end of its expected economic life. Stranding costs are the costs incurred when a meter is taken out before the end of its expected economic life. This does not include the costs of removing old meters and installing new meters, but includes the costs from an accelerated depreciation of the asset (i.e. reduced length of the meter's life). This cost depends on the speed of a roll-out; we assume it would be avoided in a new and replacement scenario, but that costs would occur in a 10-year or shorter roll-out option (the basic meter life span is 20 years). To assess the impact of the different options, we have made some simple assumptions with respect to stranding. These are as follows:

- meter asset value is based on the replacement cost of a basic meter;
- for assets provided by commercial meter operators, the stranding costs include a profit margin and annuitised installation costs since these are included in the annual meter charge;

- no installation costs are included for meters provided by DNOs since installation is paid upfront by suppliers;
- stranding costs for National Grid provided meters include 50% of annuitised installation costs to reflect the fact that prior to 2000 installation costs were annuitised in the meter charges, whereas after 2000 installation was paid up-front;
- meter recertification continues during the deployment period.

Under both options we estimate stranding costs of £95m in line with the level in the December IA

The total stranding costs over the period of a specific smart meter roll-out profile should be the same regardless of the order of meter replacement. Whilst specific contractual relationships between suppliers and meter operators may influence behaviours to an extent, we assume for the economic evaluation that there is no attempt to minimise stranding costs in the early years of the roll-out by replacing older meters first. Hence we assume that the age of the meters replaced (outside of the recertification Programme) is the average age of legacy meters remaining in each year.

G. Risks

Costs: Risk Mitigation and Optimism Bias[20]

The roll-out of smart meters will be a major procurement and delivery exercise. The project will span several years and will present a major challenge in both technical and logistical terms.

There is a consensus that stakeholders do not explicitly make allowances for optimism bias in the estimates they provide for procurement exercises. By calling for pre-tender quotes for various pieces of equipment, suppliers are revealing the likely costs of the elements of smart metering and hence no further adjustment is necessary. However, historically, major infrastructure and IT contracts have often been affected by over–optimism and gone substantially over-budget, so we have adjusted the estimates for optimism bias, in line with guidance from HMT's Green Book.

The optimism changes adopted in the present non-domestic IA are shared with the domestic IA and detail of such changes can be found in that IA.

More detail on optimism bias and how it is applied can be found on the Treasury website in the Green Book guidance[21].

Benefits: sensitivity analysis

No adjustment in respect of benefits is proposed – instead sensitivity analysis has been applied to the main elements of the benefits with its impact on the NPV figures presented in Table 11. No sensitivity analysis was made for costs as it was felt that the risks for costs were covered by the optimism bias. We ran the following sensitivities on the benefits:

Table 11: Sensitivities on benefits

	high benefits	med	low benefit
Energy savings electricity	4%	2.8%	1.5%
Energy savings gas	5.5%	4.5%	3.5%
Call centre costs (supplier benefits)	£2.42	£2.20	£1.98
Meter reading (supplier benefits)	£6.50	£6.00	£5.50

During the May-October 2009 consultation period, cost estimates were provided that suggested a current installed cost of £120 for advanced electricity meters more accurately reflected market prices than the assumed cost of £247 used in the central case of the analysis. If we were to use this assumption in policy option 1, the net present value would increase by around £50 million to £2,264 million (See also section F).

[20] Baringa Partners, *Smart Meter Roll Out: Risk and Optimism Bias Project*, 2009
[21] http://www.hm-treasury.gov.uk/economic_data_and_tools/greenbook/data_greenbook_supguidance.cfm#optimism

H. Enforcement

All of the options outlined in this IA would be implemented via licence obligations. New licence requirements would be enforced in the same manner as existing licence obligations – by Ofgem as the gas and electricity markets regulator. Ofgem has power to investigate any company which is found to be breaching the terms of their licence (including any consumer protection provisions) or is found to be acting anti-competitively. The Office of Fair Trading also has a range of other enforcement powers in respect of consumer protection (see the Consumer Protection annex to the Prospectus).

I. Implementation

The Implementation approach is described in the Prospectus which this IA accompanies.

J. Monitoring and Evaluation

The plan for managing and measuring benefits realisation will be developed alongside the detailed design for the smart meter solution. The objectives set out in section D will form the basis for the benefits realisation work.

It is envisaged that as the roll-out progresses, particular attention will be paid to monitoring early behavioural responses to smart meters with the objective of feeding back any findings from this experience into the roll-out process. This way, adjustments to the roll-out Programme can be realised in order to maximise the benefits from the smart metering roll-out. The post implementation review section contains further information.

Annexes

Annex 1: Base assumptions and changes made

The table below sets out the base assumptions on costs and benefits within the IA. Where changes have been made to the assumptions since the December 2009 IA these are shown below and the basis of the change explained.

BUSINESS AS USUAL		
Item	**Assumptions**	**Rationale for changes**
Business as usual assumptions for number of electricity meters and electricity consumption projections	Small reductions in number of meters and average electricity consumption	To account for the latest set of data from Elexon
COSTS		
Item	**Assumptions**	**Rationale for changes**
Operational and maintenance costs of the communications network	10% optimism bias in order to reflect uncertainty on the technology solutions deployed	Better account of emerging evidence
Operational and maintenance costs of the communications network	Include an additional cost allowance for network security, for example using key encryption, that enables secure communications	Better account of emerging evidence
BENEFITS (sensitivities applied – this table shows central case used)		
Consumer benefits		
Item	**Assumptions**	**Rationale for changes**
Energy savings	Revision of electricity and gas variable prices used in valuing energy savings	To reflect the latest set of DECC assumptions for these prices
Carbon saving	Revision of prices for carbon conversion factors	To reflect the latest set of DECC assumptions
Carbon prices	Revision of traded and non-traded carbon prices	To reflect the latest set of DECC assumptions

Supplier benefits		
Item	**Assumption**	**Rationale for changes**
None		
Other benefits		
Item	**Assumption**	**Rationale for changes**
None		

Annex 2: Results

Option 1

Total costs	**596**		**Total benefits**	**2,814**
Capital	265		**Consumer Benefits**	2,342
Installation	105		Energy saving	1,606
O&M	40		Load shifting	155
Comms upfront	60		TOU tariffs	21
Comms O&M	95		EU ETS	81
Energy	28		Global CO2 reduction	430
Disposal	2		Reduced losses	48
Pavement reading inefficiency	0		**Supplier Benefits**	384
Legal, setup, IT and organisational costs	-		Avoided meter reading	256
Integrate early meters into DCC	-		Inbound enquiries	52
			Customer service overheads	9
			Debt handling	50
			Avoided PPM COS premium	-
			Remote (dis)connection	7
			Avoided site visit	10
NPV	**2,219**		**Other Benefits**	88
Average annual impact per meter (£)	24.5		Reduced losses	48
			Reduced theft	-
Stranding costs	095		Microgeneration	7
Stranding from switching	000		Customer switching	33

Option 2

Total costs	**595**		**Total benefits**	**2,805**
Capital	265		**Consumer Benefits**	2,338
Installation	105		Energy saving	1,606
O&M	40		Load shifting	155
Comms upfront	60		TOU tariffs	21
Comms O&M	95		EU ETS	81
Energy	28		Global CO2 reduction	430
Disposal	2		Reduced losses	44
Pavement reading inefficiency	0		**Supplier Benefits**	384
Legal, setup, IT and organisational costs	-		Avoided meter reading	256
Integrate early meters into DCC	-		Inbound enquiries	52
			Customer service overheads	9
			Debt handling	50
			Avoided PPM COS premium	-
			Remote (dis)connection	7
			Avoided site visit	10
NPV	**2,210**		**Other Benefits**	83
Average annual impact per meter (£)	24.4		Reduced losses	44
			Reduced theft	-
Stranding costs	095		Microgeneration	7
Stranding from switching	000		Customer switching	31

Annex 3: Post Implementation Review (PIR) Plan

Basis of the review:

There are expected to be three separate review processes:

i. Reviews of benefits delivered under the Programme Benefits Management Strategy (BMS) work which is under development – this is expected to track benefits delivery and provide the basis for periodic reviews (frequency still to be established)

ii. A formal review of the roll-out strategy to establish whether additional requirements should be placed on suppliers with regard to local coordination

iii. A Post Implementation Review (date to be determined)

Review objective:

The PIR which will be carried out by DECC will take a broad perspective on the results of Government intervention and the results of the approaches taken to policy and benefits realisation, in order to feed back into the policy making process

Review approach and rationale:

The PIR has yet to be designed but is likely to draw on evidence from the BMS, stakeholder interviews and possibly international comparisons.

Baseline:

The comparison to be made is with the position in 2010 prior to the publication of the Prospectus. Baseline data will be collected as part of the BMS work.

Success criteria:

Quantitative targets will be set for all relevant benefits, including those described in this IA, as part of the BMS work as a basis for deciding whether the Programme objectives had been achieved.

Monitoring information arrangements:

Metrics will be developed as part of the BMS. Given the broad objectives of the Programme, a wide range of information will be required. The Prospectus already sets out initial thinking on the need for monitoring of the quality of the customer experience and impacts of the Programme on supplier costs.

A key area where informative metrics and effective monitoring arrangements will be needed is the ongoing contribution of smart metering in delivering behaviour change and enabling energy saving. Work is likely to be needed to develop appropriate methodologies taking account of the need for timely evidence to inform policy on the deployment strategy, as well as the ability to evaluate the overall impacts of the Programme in the longer term.

Specific Impact Tests: Checklist

Use the table below to demonstrate how broadly you have considered the potential impacts of your policy options.

Ensure that the results of any tests that impact on the cost-benefit analysis are contained within the main evidence base; other results may be annexed.

Type of testing undertaken	*Results in Evidence Base?*	*Results annexed?*
1. Competition Assessment	No	Yes
2. Small Firms Impact Test	No	Yes
3. Legal Aid	No	Yes
4. Sustainable Development	No	Yes
5. Carbon Assessment	Yes	No
6. Other Environment	No	Yes
7. Health	No	Yes
8. Equality IA (race, disability and gender assessments)	No	Yes
9. Human Rights	No	Yes
10. Privacy and data	No	Yes
11. Rural Proofing	No	Yes

1.Competition assessment

Consumers

From a consumer point of view it has been argued that the introduction of smart meters will have an effect on the competitive pressure within energy supply markets – in particular because accurate and reliable data flows should facilitate faster switching, encouraging consumers to seek out better deals, thereby driving prices down.

In addition the improved availability (subject to appropriate data controls and/or permissions) of more accurate and timely information should create opportunities for energy services companies to enter the domestic and smaller business markets; and for other services to be developed, for example new tariff packages and energy services, including by third party providers. Overall, smart metering should enhance the operation of the competitive market by improving performance and the consumer experience, encouraging suppliers' and others' innovation and consumer participation.

Whilst these effects are difficult to quantify in terms of the overall IA it is important that consideration of the pro-competitive aspects are considered going forward.

Industry

Great Britain is the geographical market affected by the roll-out of smart meters. The products and services affected will be:

- gas and electricity supply;
- gas and electricity meters;
- provision of energy services (including information, controls, energy services contracting, demand side management) and smart homes
- meter ownership, provision and maintenance;
- other meter support services;
- gas and electricity network services;
- communications services

In competition terms the roll-out would therefore affect:

- gas and electricity suppliers;
- gas and electricity networks;
- meter manufacturers;
- meter owners, providers, operators and providers of ancillary services;
- energy services businesses and providers of smart home services;
- communications businesses.

The competition impact of the Data Communications Company (DCC):

There is an impact on competition through the establishment of the DCC.

DCC will be responsible for managing the procurement and contract management of data and communications services that will underpin the smart metering system. All domestic suppliers will be obliged to use the DCC.

DCC will be a new licensed entity, which is granted an exclusive licence, through a competitive tender process for a fixed term. In effect the DCC would secure the communications services for a fixed period, locking-out competitors for that period. However Ofgem will then be able to exert direct regulatory control over it to ensure that it applies its charging methodology in line with its licence obligations as well as regulating the quality and service levels delivered by the DCC.

Competition will be maximised within the model by re-tendering for services on a frequent basis, but a balance would need to be struck to take account of the length of contract needed to achieve efficiencies.

Suppliers would be obliged to use the DCC services, which would mean there would be limited opportunity for suppliers to differentiate through delivery of communications systems.

Centralised communications could lead to improved supplier competition as a result of making switching between suppliers easier. This is because many of the complexities involved in switching involving numerous stages could be stripped away, making the process simpler, shorter and more robust, resulting in a faster and more reliable consumer experience and thereby encouraging more consumers to switch.

Speed of Roll-Out

One possibility is that smaller energy suppliers might be disadvantaged in a roll-out by being unable to obtain equipment and services at the same cost and rate as larger suppliers, and that this would be exacerbated by a faster roll-out. Similarly, if resources are scarce for all under a roll-out, small suppliers might be feel a greater cost impact than large suppliers. Such concerns have been expressed in a number of responses to consultations

2. Small Firms

Previous consultations on providing smart and advanced metering to non-domestic sites in electricity profile classes 3 and 4 and sites with gas consumption of less than 732 MWh per annum sought the views of small businesses and their representatives.

Small businesses and their representatives see particular benefits in timely and 100% accurate billing. They have expressed concerns about the costs that would be passed through to business during a roll-out, the need to ensure that costs were transparent and that micro-businesses were not unfairly burdened, the need to avoid or minimise business disruption and the availability of thoroughgoing advice and support on use of the meters and on energy efficiency as a whole.

The IA indicates that there would be a net benefit from smart or advanced metering, but, to maximise the benefits, business will have to respond to the additional information provided by the new metering, for

instance, by changing patterns of energy use or installing energy efficiency measures. Clear help and guidance will help mitigate costs and increase benefits for small businesses.

Small business representatives are concerned about the possibility of remote disconnection and have raised the question of the need for protection against its premature use. The Consumer Protection Annex to the Prospectus discusses these matters.

In terms of regulatory burden, responsibility for installing new metering lies with suppliers. There is, therefore, no new administrative burden on small firms. The overwhelming majority of small firms are likely to receive domestic-style smart meters, and, like domestic customers, will benefit from the economies of scale from a large-scale roll-out of these meters. More expensive advanced meters will tend to be installed at the sites of larger users or multi-site operators. Small businesses will not, therefore, have to face costs until a smart meter roll-out begins, which we assume to be in 2012. This avoids imposing new costs on small businesses in the short-term.

Previous consultations have assumed that climate change objectives, to which smart and advanced metering contribute, should not be compromised by the issuing of exemptions to particular sectors of the market, including small firms; indeed, small firms utilising the meters can also benefit in terms of improving energy efficiency and thus reducing energy costs and defraying the cost of the meters themselves.

The proposals also affect small firms where they are gas and electricity suppliers. One issue that has been raised has been the ability of small suppliers to purchase meters or gain access to meter-installation services. The competition test notes that smaller suppliers could be disadvantaged in a roll-out by being unable to obtain equipment and services at the same cost and rate as larger suppliers. It may be necessary in the roll-out to establish mechanisms to ensure that such suppliers are not discriminated against in terms of access to metering and installation resources.

Most small suppliers provide either gas or electricity, but not both. One view is that, as the volume of smart metering increases, there will be an increase in the dual-fuel supply share of the market. It is difficult to assess whether this will be the case in the non-domestic sector, where dual-fuel contracts are rarer. If it were, it is possible that small suppliers could therefore be negatively affected unless they are, or become, dual-fuel suppliers.

More generally, smart metering is expected to provide new business models for energy services which may have relatively low entry costs and regulatory restrictions if they do not involve the licensed supply of energy. Experience in other areas e.g. Internet businesses show that small firms may be highly competitive in such areas. Decisions on the role of DCC, governance and data protection and access arrangements will need to promote a level playing field for small firms.

3. Legal Aid

The proposals would not introduce new criminal sanctions or civil penalties for those eligible for legal aid, and would not, therefore, increase the workload of courts or demands for legal aid.

4. Sustainable Development

An objective of the roll-out is to reduce energy usage and consequently achieve carbon emissions.

Smart metering will provide consumers with the tools with which to manage their energy consumption, enabling them to take greater personal responsibility for the environmental impacts of their own behaviour.

The roll-out can also contribute to the enhanced management and exploitation of renewable energy resources. The proposals would particularly contribute to the need to live within environmental limits, but would also help ensure a strong, healthy and just society (see health IA) and would put sound science in metering and communications technology to practical and responsible use. The proposals would promote sustainable economic development, both in terms of enhancing the strength, and improving the products, of meter and display device manufacturers, and by increasing employment and raising skills levels in the installation and maintenance of meters and communications technologies.

These benefits would also apply at a regional level, including regions with higher levels of economic deprivation.

5. Carbon assessment

We have valued the avoided costs of carbon from energy savings to show whether the UK is introducing cost-effective policies to reduce carbon emissions and report on the impact of the smart meters policy.

Following DECC guidance[22], we have carried out cost effectiveness analysis of the two policy options in addressing climate change. The existence of traded (electricity) and non-traded (gas) sources of emissions means that the impact of a tonne of CO_2 abated in the traded sector has a different impact to a tonne of CO_2 abated in the non-traded sector. Traded sector emissions reductions lead to a reduction in UK territorial greenhouse gas (GHG) emissions, but do not constitute an overall net reduction in global emissions since the emissions will be transferred elsewhere to member countries in the EU-ETS. The UK benefits from purchasing fewer emissions allowances, but these allowances will be bought up by other member states – the total size of the EU-wide 'cap' on emissions does not change during each phase of the EU-ETS. Non-traded sector emissions reductions will reduce both UK and global emissions.

Cost effectiveness analysis provides an estimate of the net social cost or benefit per tonne of CO_2 reduction in the ETS and non-ETS sectors.

We calculate the cost-effectiveness of traded and non-traded CO_2 separately:

Cost-effectiveness (traded sector) = (PV costs – PV non- CO_2 benefits – PV traded carbon savings)/tonnes of CO_2 saved in the traded sector

Cost-effectiveness (non-traded sector) = (PV costs – PV non- CO_2 benefits – PV non-traded carbon savings)/tonnes of CO_2 saved in the non-traded sector

The table below presents the present value of costs and non- CO_2 benefits of each option as well as the tonnes of CO_2 saved in the traded and non-traded sectors, the corresponding cost effectiveness figures and the traded and non-traded cost comparators (TPC and NTPC). The Cost Comparators are the weighted average of the discounted traded and non-traded cost of carbon values in the relevant time period. If the cost per tonne of CO_2 saving of the policy (cost-effectiveness) is lower than the TPC/NTPC, the policy is cost effective.

Table 12: Cost-effectiveness

Option	PV costs	PV Non-CO_2benefits (£million)	Millions of tonnes of CO_2 saved – traded sector	Millions of tonnes of CO_2 saved – non-traded sector	Traded sector cost comparator	Cost-effectiveness – traded sector	Non-traded sector cost comparator	Cost-effectiveness – non-traded sector
1	596	2,303	4.9	10.9	20	-367	41	-202
2	595	2,294	4.9	10.9	20	-366	41	-201

Table 12 shows how both policy options would save 4.9 million tonnes of CO_2 in the traded sector and 10.9 million tonnes of CO_2 in the non-traded sector over a 20-year period. Both options are cost-effective: in both the traded and non-traded sector, the cost per tonne of CO_2 of abating emissions (cost-effectiveness) is lower than the cost comparator for both the traded and non-traded sector. Both policies are not only cost-effective, but produce a net benefit of £366-7 per tonne of CO_2 saved in the traded sector and of £201-2 per tonne of CO_2 saved in the non-traded sector.

There is no significant difference in cost-effectiveness terms between the two policy options and hence it is not possible to determine whether one option is preferable to the other in its cost-effectiveness in reducing carbon emissions.

[22] DECC Greenhouse gas policy evaluation and appraisal in Government departments – June 2010 http://www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx

6. Other Environment

A smart metering Programme would have some negative environmental impacts. The first is the costs of legacy meters. Most significant among these would be the cost of disposal of mercury from gas meters, estimated at around £1 per meter. These costs would have to be met under usual meter replacement Programmes, but would be accelerated by a mandated roll-out. The smart metering assets will consume energy and after discussions with meter specialists we continue with the assumption that a smart meter would consume 1W, and a display 0.6W and the communication equipment 1W. These assumptions are unchanged. Gas meters would require batteries for transmitting data and some display devices may also use batteries. The batteries would be subject to the Directive on Batteries and Accumulators.

The Government's view is that the positive environmental impacts of smart meters clearly outweigh any negative impacts.

7. Health

The likelihood is that any health impacts of a smart meter roll-out will be positive. In so far as smart meters enable suppliers better to target energy efficiency measures, which confer health benefits to individuals – particularly vulnerable individuals – deriving from greater thermal comfort, the proposals would ultimately promote better public health, reduce GP appointments and hospital visits etc.

The communications technologies which are selected to support smart metering may produce radiofrequency signals (e.g. from mobile communications technologies). Some consumers have concerns about the impacts of these. We will keep under review any evidence related to the effects of radiofrequency signals on individuals health.

8. Human Rights

The smart meter roll-out may engage the following Convention rights: Article 1 of the First Protocol (protection of property); Article 8 (right to privacy); and Article 6 (right to a fair trial).

Article 1, Protocol 1 may be engaged because a Government mandate will entail changes to the existing market structure, which might constitute an interference with supplier licenses, and current meter owners' and providers' possessions. DECC's view is that any interference would be in the general interest and proportionate to the benefits that this policy would accrue.

Article 8 will be engaged because smart technology is capable of recording greater information about a consumer's energy use in his property then existing dumb meters.

In addition, to roll out smart meters, installers will have to enter consumers' property. As the preparatory work under the smart meter Implementation Programme progresses the Government will need to continue to be satisfied that any interference with privacy is justified, proportionate and necessary, in accordance with human rights and European law.

Ofgem is responsible for enforcing the conditions of gas and electricity supply licences. DECC's view is that the existing enforcement regime under the Electricity Act 1989 and the Gas Act 1986 (which, for example, give licensees the opportunity to apply to the court to challenge any order made, or penalty imposed, by Ofgem), which would continue to apply during a roll-out of smart meters, is compliant with Article 6. In addition, as a public authority, Ofgem is bound by section 6 of the Human Rights Act 1998 to act compatibly with the European Convention on Human Rights. Article 6 may also be engaged in relation to the grant of any new licences under a centralised model. DECC's view is that a new licensing regime in the Energy Act 2008 would be compliant with Article 6.

9. Equality IA (EIA)

The Government is subject to general duties for disability, race and gender equality. The current duties are:

- the Race Equality Duty is designed to ensure that public sector organisations actively promote equality of opportunity between persons of different racial groups, and to promote good relations between persons of different racial groups;
- the Disability Equality Duty is designed to ensure that public sector organisations promote equality of opportunity between disabled persons and other persons; promote positive attitudes towards disabled persons; encourage participation by disabled persons in public life and take steps to take account of disabled persons' disabilities, even where that involves treating disabled persons more favourably than other persons.
- the Gender Equality Duty is designed to eliminate unlawful discrimination and harassment and to promote equality of opportunity between women and men.

This IA:

- sets out the background to smart metering policy;
- sets out the evidence gathered to date and the potential equality issues identified; and
- describes the measures proposed to deal with these issues.

Assessing the impact of the policy

The 2008 IA recognised that a roll out of smart meters has the potential to adversely affect certain consumer groups. Responses to the 2007 Billing and Metering Consultation and the May 2009 Consultation on Smart Metering for Electricity and Gas by a number of consumer organisations, such as the National Consumer Council, confirmed that there are a range of potential consumer related issues. DECC and Ofgem has continued to explore these issues with relevant stakeholders and the Consumer Advisory Group. Our work with stakeholders has identified the following as the main areas of concern:

- issues associated with the physical design and location of the smart meter/visual display and its usability for certain consumers.
- issues in relation to the provision of information to consumers.
- this potential impact on certain vulnerable consumers of the installation of the smart meter which will require entry to all homes.
- the potential for the functionality of the metering system to be used in such a way that would be considered unfair or discriminatory (e.g. potential abuse of remote disconnection facilities)
- the potential for consumer confusion (particularly amongst the elderly) as a result of the greater range of energy tariffs and energy related information which will be provided with smart metering.

The evidence collected to date indicates the policy has the potential to impact most on the visually impaired and the elderly. Discussions with stakeholders lead to a compelling case for ensuring the design and location of the meter is suitable for all consumers, that risks to vulnerable consumers in relation to the installation of smart meters are minimised and that consumers are well informed both before and after the installation of smart meters. These themes are explored in the 'Consumer Protection' Annex to the main Prospectus document.

Next Steps.

As we move towards the roll out of smart meters an element of the implementation work will be to ensure that all consumers' experience of the roll out and of smart metering in the long term is positive. An aspect of that work will be to ensure appropriate protections are in place to safeguard consumers especially the vulnerable. This EIA identifies some of the issues that are addressed in the Annexes to the main Prospectus. It also shows that significant regulatory and consumer protection regimes are already in place, which will need to be reviewed and where appropriate regulation updated in light of the wider decisions on the smart metering roll out

10. Data and Privacy

Smart metering will result in a step change in the amount of data available from electricity and gas meters. This will in principle enable energy consumption to be analysed in more detail (e.g. half-hourly) and to be 'read' more frequently (e.g. daily, weekly or monthly). This will allow consumers to view their consumption history and compare usage over different periods. We believe it is essential consumers can readily access the information available from their meters. They should be free to share this information

with third parties, for example to seek tailored advice on energy efficiency or which supplier or tariff is best for them.

The frequency with which meters are read and the level of detail of data to be extracted will vary according to the mode of operation (i.e. prepayment or credit) and the type of tariff the customer has chosen. For example, as now, suppliers will need regular meter readings to provide accurate bills. For many credit customers, meter readings every month or so are likely to be sufficient. Where suppliers offer innovative tariffs, such as those based on time of use, they will need more detailed consumption information.

There is clear sensitivity of data on consumers' energy usage and the potential to raise privacy concerns for individuals and concerns over commercial confidentiality for businesses. The Programme has taken a rigorous and systematic approach to assessing and managing the important issue of data privacy. It is intended to build on safeguards already in place, notably the Data Protection Act 1998, to develop a privacy policy for smart metering data.

The Programme has listened to the views of a broad range of stakeholders on this key issue. In light of our discussions, we propose that the customer shall choose in which way consumption data shall be used and by whom, with the exception of data required to fulfil regulated duties. This aligns our approach to that being proposed by ERGEG in guidance being developed for smart metering

This reflects the important principle that data control rests with the consumer, while recognising that there are a range of instances when there will be legitimate need to access that data, for billing by energy suppliers for example. In other areas, industry would be able to obtain access to the data subject to the customer giving customer consent.

We will be undertaking a detailed exercise to establish the different data requirements of industry participants and whether data collected needs to be personal or aggregated, for example. This will allow us to set out in more detail how this principle would work in practice in terms of fulfilling regulatory duties and where consent needs to be obtained (including whether this should be on an opt-in or opt-out basis for different uses).

In order to guarantee data privacy, it is imperative that the smart metering system is secure. Building on best practice we have looked at the privacy and security issues across the end-to-end metering system. We will now be looking to develop the more detailed requirements for how these risks should be addressed, which will then be reflected in the technical specification that the industry will be required to adopt.

To support our work in this crucial area, we have held discussions with stakeholders and have established a Privacy and Security Advisory Group, including the Information Commissioner's Office (ICO) and other key agencies, to provide expert advice to the Programme. We will continue to expand and deepen our engagement with stakeholders on these issues. In this context, we are considering broadening the group to include private sector experts.

Data privacy and security issues are explored more fully in the ‘Data Privacy and Security’ Annex to the main Prospectus.

11. Rural proofing

Smart meters will address the problems attached to “difficult to read” meters, which may at present lead to those in rural areas receiving fewer actual meter readings and estimated bills. The scope for introducing different payment methods for smart prepayment meters would assist those in rural areas who find key-charging or token purchase difficult. The opportunity, through smart meters, to provide more targeted and tailored energy efficiency advice would also assist those in rural areas, including those in “hard to reach” dwellings.