6th Floor, Dean Bradley House
52 Horseferry Road, London SW1P 2AF
+ 44 (0)20 7706 5100
www.energynetworks.org

Margaret Coaster
Smart Metering Team
Ofgem E-Serve
9 Millbank
London
SW1P 3GE

28 September 2010

Dear Margaret,

ENERGY NETWORKS ASSOCIATION RESPONSE TO THE SMART METERING PROSPECTUS (JULY 2010)

Thank you for the opportunity to comment on the prospectus and associated documents released in July 2010.

Energy Networks Association (ENA) is the industry body representing the UK's electricity and gas transmission and distribution network companies and has been directly engaged with the process leading up to the prospectus release and contributed with the production of a number of comprehensive 'networks' related reports. ENA is pleased therefore to note that the Prospectus has recognised our contribution both in its content and specific recognition within the Prospectus text.

ENA is now fully represented at the Ofgem E-Serve Expert Groups and associated sub-groups and are also represented at the DECC/ Ofgem Implementation Coordination Group. ENA is therefore directly engaged with the detailed review of the Prospectus within these groups and this fact has been reflected in the drafting of this response.

Specific responses to the prospectus questions requiring a response by 28th September 2010 are detailed in Appendix 1. These comments are submitted in addition to and in support of individual responses which may have been sent to you from ENA member companies.

Yours sincerely,

[redacted]

[redacted]

Appendix 1

ENA response - Smart Metering Implementation Programme Prospectus (27 July 2010)

CHAPTER 2

Question 3*: Do you have any comments on the proposed approach to ensuring customers have a positive experience of the smart meter rollout (including the required code of practice on installation and preventing unwelcome sales activity and upfront charging)?

ENA believes that a 'positive customer experience' is essential for the success of the smart metering implementation programme. The work of the gas and electricity ENA Smart Metering Operations Group (SMOG) in liaison with the Health and Safety Executive and the Association of Meter Operators is making good progress in identifying the practical issues on-site that could prevent the efficient installation of the smart meter. Procedures are being established as to the remedial actions required in different situations and in liaison with the National Skills Academy for Power (NSAP) this work will be reflected in installer training programmes. ENA is represented on the Ofgem E-Serve expert groups and sub-groups as part of this consultation process.

As the roll-out has been specifically allocated to the Energy Suppliers, it will be important to continually recognise the role that the gas and electricity network companies will fulfil in supporting the programme. A coordinated approach to meter installation is therefore essential.

ENA would support the development of a 'code of practice' and the associated governance that would need to be put in place. ENA is represented at the forthcoming workshop to discuss this on 30th September. There is ongoing engagement between network companies, metering services providers and energy suppliers under ENA/AMO governance, supported by Ofgem. We strongly recommend that the industry develop a single set of rules; our preference would be to continue to develop MOCOPA and MAMCOP to define the interface with the network companies.

ENA has also responded to the smart metering implementation programme roll out information request which is related to this question.

CHAPTER 3

Question 6*: Do you have any comments on the functional requirements for the smart metering system we have set out in the Functional Requirements Catalogue?

ENA has welcomed the inclusion of the link between smart metering and smart grids within the Prospectus.

ENA commissioned Engage Consulting to document the comparison of ENA's requirements as detailed in the five previously issued ENA reports against those documented in the Prospectus. This comparison document is entitled: DECC / Ofgem Prospectus and ENA Requirements Comparison. Document Ref: ENA-ENACR012-001-1.0 and is attached to this consultation response. As this will form material for the Ofgem E-Serve sub-groups to consider, this report has been separately forwarded to Ofgem E-Serve In advance of the ENA consultation response submission.

Appendix 2 to this paper contains a table of ENA comments on the materiality of the variances identified in the Engage Report EAN-ENACR012-001-1.0.

The functions specified may not provide a direct replacement for the existing Radio Teleswitch System (RTS) which is due to be switched off in 2014 as part of the Digital Britain project. A number of network operating companies use the existing RTS to manage network load/constraint at specific notified locations; these are known as load managed areas (LMA). This issue is being discussed at the SMDG technical issues sub group and ENA will fully support this work.

Question 7*: Do you see any issues with the proposed approach to developing technical specifications for the smart metering system?

ENA supports the approach to developing technical specifications and is actively engaged in this work.

Question 16*: Do you have any comments on the proposals for requiring suppliers to deliver the rollout of smart meters (including the use of targets and potential future obligations on local coordination)?

The answer to question 3 refers to ENA views on a coordinated approach to the roll-out of smart metering. It is anticipated that smart metering installers will be subject to an incentive scheme for productivity purposes – ENA would be concerned if such a scheme encouraged either unsafe practices or incomplete checks and compliance with procedures to report network defects etc.

All meter installers should be competent to complete the range of duties associated with the smart metering installation which includes the network related checks and procedures to follow when defects are identified. Non compliance of this requirement will have the potential for the smart metering roll-out to impact on network activities in particular the gas emergency service.

An ENA member has suggested that their employees are experienced, competent and have the geographical coverage to install smart metering and could support the roll-out programme where they were available. This suggestion does not reflect the collective view of ENA members but is included in this response to highlight a potential opportunity for further consideration.

ENA would support the need for a coordinated roll-out plan with targets against the requirement to install smart meters by 2020 or before, particularly if the Implementation Programme will be tracking progress of installations to review progress against the plan.

ENA has been advised that approximately 10% of properties are ‘hard to access’ – and unless this is recognised and tackled through a coordinated approach during the rollout planning stage there is likely to be a large number of ‘hard to access’ properties that are left until the end of the process. It is also likely that the easier installations will be tackled first leaving the more complex and costly installations until the end of the programme. This may be an inevitable outcome but it would suggest that a managed approach to completing these more challenging installations would prevent an accumulation of this type of installation at the tail-end of the programme.

CHAPTER 4

Question 17*: Do you have any comments on our implementation strategy? In particular, do you have any comments on the staged approach, with rollout starting before DCC services are available?

The staged approach has been driven by the need to accelerate the programme but as the additional costs and benefits associated with this two stage approach have not been fully quantified in the Prospectus, ENA is neutral with regards to this approach.

As mentioned in our response to question 6, there is an issue with developing a replacement for the existing Radio Teleswitch System (RTS). It is important that a long term solution is developed to manage this issue through the DCC but it is unlikely that any smart metering installed as part of an accelerated roll out will be able to operate in the same way as the existing RTS. This is a significant risk which may impact upon the ability of network companies to operate their networks designated in Load Management Areas.

It is unlikely that network companies will be able to have access to network related data before the establishment of the DCC in 2013 unless suppliers and network companies make ad-hoc arrangements before the establishment of the DCC. Network Companies would start to see ‘benefits’ in receiving network related smart metering data before the DCC is operational and ENA would welcome support from Ofgem and DECC in obtaining this data (pre DCC) especially where that would support Low Carbon Network Fund (LCNF) projects.

It is likely that with a two stage approach to roll out that interim IT/data solutions will be implemented by Suppliers. Any such arrangements must ensure that network operating companies continue to receive the data they require to enable them to continue with their business as usual activities.

With the technical requirements of smart metering systems due to be finalised in autumn 2011; and the DCC not due to go-live until autumn 2013. Suppliers will be responsible for procuring their own communications contracts in this interim period and, subject to certain conditions, it is proposed that these contracts are novated to the DCC when it goes live.

A result of this staged implementation approach is that the DCC will be heavily shaped on day one by the contracts that Suppliers put in place between now and then. Furthermore, this influence on shape could be long lasting as the WAN communication module installed by Suppliers in the interim will be aligned with the pre DCC communications.

As a consequence, there is a risk that networks' requirements of the DCC will not be adequately supported on day one, and that addressing this and being able to respond effectively to evolving network requirements could be limited, at least to some extent, for some considerable time thereafter.

Question 18*: Do you have any other suggestions on how the rollout could be brought forward? If so, do you have any evidence on how such measures would impact on the time, cost and risk associated with the programme?

As previously mentioned, ENA members will support the smart metering roll-out through the clearance of network defects and issues that prevent the installation of the smart meter. The need for a coordinated approach is essential as there will be a need to ensure that appropriate network resources are made available to support this work. A steady workload would help to meet this resource requirement as a concentrated peak of work in a local area may cause resourcing difficulties and therefore potential delays.

Network Companies have not been funded for a compressed period of asset replacement at service terminations and would seek assurances that this accelerated workload would be appropriately funded.

Question 19*: The proposed timeline set out for agreement of the technical specifications is very dependent on industry expertise. Do you think that the technical specifications can be agreed more quickly than the plan currently assumes and, if so, how?

ENA has completed seven comprehensive reports to support the smart metering implementation programme and has generated a considerable amount of detail that is being considered within the expert groups and sub-groups. This along with the previously published documents from the Energy Retail Association (ERA) will help move the programme to the delivery of technical specifications.

ENA recognises that getting the technical specification of the Smart Metering System correct prior to implementation is vital to the success of the Smart Metering programme and the future operation of Smart Grids. We feel that the current timeframe is challenging but achievable and we will continue to fully support this aspect of the programme.

Question 20*: Do you have any comments on our proposed governance and management principles or on how they can best be delivered in the context of this programme?

ENA supports the proposed governance and management principles and will be fully engaged with the DECC/ Ofgem Implementation Co-ordination Group (ICG) for the Smart Metering Programme.

<u>Responses to supporting documents:</u>

DESIGN REQUIREMENTS

Q1* Should the HAN hardware be exchangeable without the need to exchange the meter?

ENA does not have a response to this question.

Q2* Are suitable HAN technologies available that meet the functional requirements?

ENA does not have a response to this question.

Q3* How can the costs of switching between different mobile networks be minimised particularly in relation to the use of SIM cards and avoiding the need change out SIMs?

ENA does not have a response to this question.

Q4* Do you believe that the catalogue is complete and at the required level of detail to develop the technical specification?

Answered in Chapter 3; Question 6.

Q5* Do you agree that the additional functionalities beyond the high level list of functional requirements are justified on a cast benefit basis?

Answered in Chapter 3; Question 6.

Q6* Is there additional or new evidence that should cause those functional requirements that have been included or omitted to be further considered?

Answered in Chapter 3; Question 6.

Q7* Do you agree that the proposed approach to developing technical specifications will deliver the necessary technical certainty and interoperability?

ENA supports the current approach.

Q8* Do you agree it is necessary for the programme to facilitate and provide leadership through the specification development process? Is there a need for an obligation on suppliers to co-operate with this process?

ENA agrees to the programme providing facilitation and leadership through the specification development process.

Q9* Are there any particular technical issues (e.g. associated with the HAN) that could add delay to the timescales?

ENA does not have a response to this question.

Q10* Are there steps that could be taken which would enable the functional requirements and technical specifications to be agreed more quickly than the plan currently assumes?

ENA does not have a response to this question.

ROLL OUT STRATEGY

Q1* Do you believe that the proposed approach provides the right balance between supplier certainty and flexibility to ensure the successful rollout of smart meters? If not, how should this balance be addressed.

ENA does not have a response to this question.

Q2* Would the same approach be appropriate for the non-domestic sector as for the domestic sector?

ENA does not have a response to this question.

IMPLEMENTATION

CHAPTER 3

Q2* Are there other cross-cutting activities that the programme should undertake and, if so, why?

ENA does not have a response to this question.

CHAPTER 5

Q3* Do you agree with our proposal for a staged approach to implementation, with the mandated rollout of smart meters starting before the mandated use of DCC for the domestic sector?

ENA has previously commented on the staged implementation approach.

Q4* Do you have any comments on the risks we have identified for staged implementation and our proposals on how these could best be managed?

ENA has previously commented on the staged implementation approach.

Q6* Do you agree with our planning assumption that a period of six months will be needed between the date when supply licence obligations mandating rollout are implemented and the date when they take effect?

ENA does not have a response to this question.

CHAPTER 3

Q4* What is the best way to promote consumer engagement in smart metering? As part of broader efforts, do you believe that a national awareness campaign should be established for smart metering? If so, what do you believe should be its scope and what would be the best way to deliver it?

ENA believes that consumer awareness campaigns will be essential to ensure the energy efficiency benefits identified through smart metering and IHDs have an opportunity to be realised. A national awareness campaign supported by regional initiatives would appear a logical approach.

Q5* How should a code of practice on providing customer information and support be developed and what mechanisms should be in place for updating it over time?

ENA does not have a response to this question.

Appendix 2

ENA Comments on the materiality of the variances identified in the Engage Report EAN-ENACR012-001-1.0
24 September 2010

Table 1 – Smart Metering System Requirement Variances

Variance	Issue	Fuel	ENA Comment
Potentially Material Variances			
Storage of loss of supply data for a configurable period.	Prospectus Omission	E	Loss of Supply Data needs to be stored locally for to allow it to be uploaded to the DCC and DNO. The information is required for accurate regulatory reporting.
Storage of physical and network locational information along with the ability to maintain the latter remotely upon network configuration changes.	Prospectus Omission	E	Locational information is now considered more likely to reside in the DNO systems rather than in the Smart Meter System provided that each meter is uniquely identified.
Notification when loss of supply is restored.	Prospectus Omission	E	This is required to provide the DNO confirmation that all customer supplies have been restored following post fault restoration actions.
Storage of voltage profile data for 3 months.	Prospectus Omission	E	Voltage and (four quadrant) demand / consumption data needs to be stored for a sufficiently long period that it can be successfully uploaded to the DCC and DNOs. ENA's discussion with Manufacturers has indicated that the memory requirements to store such data for 3 months are reasonable.
Calculation and storage of power factors.	Prospectus Omission	E	Some Supply tariffs require power factor to be calculated. Provided that four quadrant measurements are included in the Smart Meter System, power factor could be calculated from the raw data by the

Variance	Issue	Fuel	ENA Comment
			DCC / Supplier / DNO rather than calculating it locally.
Calculation and storage of maximum kVA for import and export polyphase meters.	Prospectus Omission	E	Some Supply tariffs require max KVA data. Provided that four quadrant measurements are included in the Smart Meter System, max kVA in a half hour period could be calculated from the raw data by the DCC / Supplier / DNO rather than calculating it locally.
Identification and storage of Guaranteed Standards of Service (GSS) failures for 3 months.	Prospectus Omission	E	It would be helpful for regulatory reporting for GSS failures to be identified locally in the Smart Meter System reported to the DCC and DNO. However provided time stamped data loss of supply / restoration of supply information is stored in the Smart Meter System and uploaded to the DCC / DNO, GSS failures could be assessed centrally by the DNO..
Provision of positive confirmation when a gas valve closure has been requested.	Prospectus Omission	G	When a command has been issued to close the gas valve, there is a need to confirm that the command has been carried out successfully.
Noteworthy Areas			
Composition of default mode functionality.	Prospectus Omission	E & G	This is not an explicit ENA requirement, but it seems reasonable for the Smart Meter System to be 'reset' to a default operational configuration.
Meter display of valve / cut-off switch status and disconnection information.	Prospectus Omission	E & G	This would provide useful information to the customer in the event of a loss of supply particularly when the meter operates in PPM mode.
Display of scheduled outage information to the customer on the IHD.	Prospectus Omission	E	As an alternative to posting letters informing customers of planned supply outages these could be provided more efficiently via the IHD. This functionality is also included in the ERA SRSM.
Self registering to the network and notification to the network operator.	Prospectus Omission	E	Part of the initial registration process should include notification to the DNO

Variance	Issue	Fuel	ENA Comment
Detection, configuration, storage and / or notification of: • loss of supply; • extreme / average, max , min voltage; • reserve polarity; • extreme temperatures; and • load limiting.	Prospectus Omission	E	There is a need to develop and agree a definitive list of events / alarms / logs that should be included as part of the minimum functional requirements. Loss of supply; extreme / average, max, min voltage; and load limiting events should be included within this list. Following further discussion with meter manufacturers, ENA are now of the view that reserve polarity and extreme temperature detection are optional requirements because of the implications on cost
Definitive set of electricity orientated quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored – including the set of quantities referred to as “power quality information”.	Prospectus Clarity	E	Clarity of these parameters is essential if the Smart Meter System is to deliver the data that DNOs require to manage network investment more efficiently and deliver smart grids. We have clarified our detailed requirements via the SMDG Technical Assessment WG. In summary these are half hourly readings of kWh import, kWh export, kVArh import, kVArh export, maximum import kVA, maximum export kVA, power factor, rms voltage. Power quality events (under / over voltage, extreme under / over voltage and voltage sag / swell) are also required. The half hourly export (kWh and kVArh) of electricity generated from microgeneration is also required to build network models and assess latent demand. The process for capturing this information needs to be confirmed.

Table 2 – ENA Use Case / Prospectus Service Variances

Variance	Issue	Fuel	ENA Comment
Potentially Material Variances			
Elec_UC_15 (verify restoration of supplies after outage): the Prospectus did not state any service linked to informing the DNO that restoration of the outage has occurred; thus the benefits associated with this Use Case are not achievable.	Prospectus Omission	E	This is required to provide the DNO confirmation that all customer supplies have been restored following post fault restoration actions.
Elec_UC_18 (manage meter safety alarm): stated parts of the ENA requirements have either been rejected (for temperature sensing) or not mentioned specifically (reverse polarity detection) by the Prospectus thus reducing the benefits of this Use Case.	Prospectus Omission	E	Following further discussion with meter manufacturers, ENA are now of the view that reserve polarity and extreme temperature detection are optional requirements because of the implications on cost
Noteworthy Areas			
Outage alarms being sent to DNOs.	Prospectus Omission	E	In order the enable the DNO to locate network faults and more effectively restore supplies to customers, there is a requirement for information re customer outages to be available to the DNO from the Smart Meter System. The Prospectus calls for Last Gasp functionality, however following discussions between ENA and Manufacturers, the ENA concluded that the likely costs of providing Last Gasp functionality meant that it should be considerer to be an optional requirement. This issue has been discussed at length in the SMDG WG1 meetings. Irrespective of whether the decision is made to provide Last Gasp functionality, there is a need for ensure that the DNO has the ability to check the energisation status of selected meters (commonly referred to as pinging) on demand.

Variance	Issue	Fuel	ENA Comment
Use of the IHD to provide the customer with outage information.	Prospectus Omission	E	As an alternative to posting letters informing customers of planned supply outages these could be provided more efficiently via the IHD. This functionality is also included in the ERA SMSR.
WAN latency requirements.	Uncertainty of Future Network Requirements	E	The WAN latency requirements need to be developed taking into account the end to end services to be available to the Supplier / DNO via the WAN and Smart Meter System.
Definitive set of electricity orientated quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored – including the set of quantities referred to as "power quality information".	Prospectus Clarity	E	Clarity of these parameters is essential if the Smart Meter System is to deliver the data that DNOs require to manage network investment more efficiently and deliver smart grids. We have clarified our detailed requirements via the SMDG Technical Assessment WG. Refer to comments above.

DECC / Ofgem Prospectus and ENA Requirements Comparison

For: ENA

September 2010

Engage Consulting Limited

Document Ref: ENA-ENACR012-001-1.0

Restriction: ENA Members

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Executive Summary

Background

The Department of Energy and Climate Change (DECC) and Ofgem issued their GB Smart Metering Prospectus, for consultation, on 27th July 2010. Certain matters require consultation responses by 28th September 2010; others require responses by 28th October 2010. Ofgem has also convened a series of Expert Groups and Sub-groups through Phase 1a of their Smart Metering Implementation Programme (SMIP). These will provide further rationale and input to the final policy statements.

The Energy Networks Association (ENA) and its Members will be responding to the Prospectus consultations, and attending and contributing to the relevant SMIP Expert Groups and Sub-groups. It is therefore important for the ENA and its Members to have appropriate and comprehensive supporting documentation.

As a result, the ENA commissioned Engage Consulting to undertake a short, 10 day, assignment to deliver a Comparison Report that highlights the key differences between the Prospectus and the current ENA Smart Metering documentation.

The principal purpose of this report is to:

- enable Members to better understand the differences between the DECC / Ofgem Prospectus and the ENA's requirements; and have a common understanding of these differences;
- assist Members with their Prospectus consultation responses; and to facilitate a more consistent set of responses; and
- assist Members' participation in the Ofgem SMIP Expert Groups and Sub-groups.

Key Findings

Smart Metering System Requirements

We compared the ENA Smart Metering System Requirements[1] with the Prospectus Smart Metering System Functional Requirements Catalogue in the Statement of Design Requirements and commented on any variance. The materiality of the variance was highlighted using a simple "traffic light" colour coding and these results are presented in Section 2.

Most of the requirements align satisfactorily and, where there are variances, this is often because one or other of the Prospectus / ENA requirements is more detailed than the other, rather them necessarily being contradictory. The key variances / areas of variance we identified are listed in the table below.

[1] As set out in the ENA Smart Metering System Requirement Update (April 2010) and any updates including in the ENA High Level Smart Metering Cost Benefit Analysis (July 2010).

Table 1 – Smart Metering System Requirement Variances

Variance	Issue	Fuel
Potentially Material Variances		
Storage of loss of supply data for a configurable period.	Prospectus Omission	E
Storage of physical and network locational information along with the ability to maintain the latter remotely upon network configuration changes.	Prospectus Omission	E
Notification when loss of supply is restored.	Prospectus Omission	E
Storage of voltage profile data for 3 months.	Prospectus Omission	E
Calculation and storage of power factors.	Prospectus Omission	E
Calculation and storage of maximum kVA for import and export polyphase meters.	Prospectus Omission	E
Identification and storage of Guaranteed Standards of Service (GSS) failures for 3 months.	Prospectus Omission	E
Provision of positive confirmation when a gas valve closure has been requested.	Prospectus Omission	G
Noteworthy Areas		
Composition of default mode functionality.	Prospectus Omission	E & G
Meter display of valve / cut-off switch status and disconnection information.	Prospectus Omission	E & G
Display of scheduled outage information to the customer on the IHD.	Prospectus Omission	E
Self registering to the network and notification to the network operator.	Prospectus Omission	E
Detection, configuration, storage and / or notification of: • loss of supply; • extreme / average, max , min voltage; • reserve polarity; • extreme temperatures; and • load limiting.	Prospectus Omission	E
Definitive set of electricity orientated quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored – including the set of quantities referred to as "power quality information".	Prospectus Clarity	E

Use Cases

We compared the ENA Use Cases and the Prospectus Smart Metering System Services in the Statement of Design Requirements and commented on any variance. As with the Smart Metering System Requirements, the materiality of the variance was highlighted using a simple "traffic light" colour coding and these results are presented in Section 3.

Most of the ENA Use Cases align satisfactorily with the Prospectus services. The key variances / areas of variance we identified are listed in the table below.

Table 2 – ENA Use Case / Prospectus Service Variances

Variance	Issue	Fuel
Potentially Material Variances		
Elec_UC_15 (verify restoration of supplies after outage): the Prospectus did not state any service linked to informing the DNO that restoration of the outage has occurred; thus the benefits associated with this Use Case are not achievable.	Prospectus Omission	E
Elec_UC_18 (manage meter safety alarm): stated parts of the ENA requirements have either been rejected (for temperature sensing) or not mentioned specifically (reverse polarity detection) by the Prospectus thus reducing the benefits of this Use Case.	Prospectus Omission	E
Noteworthy Areas		
Outage alarms being sent to DNOs.	Prospectus Omission	E
Use of the IHD to provide the customer with outage information.	Prospectus Omission	E
WAN latency requirements.	Uncertainty of Future Network Requirements	E
Definitive set of electricity orientated quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored – including the set of quantities referred to as "power quality information".	Prospectus Clarity	E

Data Traffic Analysis

We compared the ENA Data Traffic Analysis and the detailed services in the Prospectus Statement of Design Requirements (SDR) for each of the ENA Use Cases. Again, the materiality of the variance was highlighted using a simple "traffic light" colour coding and these results are presented in Section 4.

There were many differences in the service levels. Some of these were attributable to the method of definition; but others were indicative of genuine and material differences in requirements. In general, the ENA Use Cases that relate to acquisition of planning data fell into the former category – although there were some that fell into the latter; and almost all of those that relate to active network management fell into the latter category. This is consistent with the Prospectus' approach of delivering initial support for some Smart Grid functions and a design that can accommodate other less certain requirements at a later date.

In addition, we compared the ENA Data Traffic Analysis and the high level data traffic analysis in the Prospectus SDR and these results are also presented in Section 4. This analysis was limited by the fact that the SDR document only has a high level snapshot of its own analysis which does not support any detailed comparison with the ENA's analysis.

However, the SDR makes it clear that the ENA's analysis has been taken into consideration and reviewed; the ENA document has been referenced within the SDR; and the SDR also notes that the ENA's analysis aligns to its own analysis. Whilst comfort can be taken from this alignment, it would be prudent to undertake a more complete comparison when more detailed SDR analysis is available.

Cost Benefit Analysis

We compared the ENA Cost Benefit Analysis (CBA) and the Prospectus Impact Assessment (IA). A direct financial comparison was not possible though as the Prospectus IA does not include the underlying disaggregated detail. Again, the materiality of the variance – to the extent that this could be assessed – was highlighted using a simple "traffic light" colour coding and these results are presented in Section 5.

The key variance identified is that the "Identification of Network Issues and Forecasting of Reinforcement Need" benefits of £8.6m per annum are not included at all in the Prospectus IA.

There are a number of less clear cut variances between the benefits identified in the Prospectus IA and those identified within the ENA CBA. Many of these are attributable to the DECC documentation being focused primarily on supplier and consumer benefits and the ENA CBA being focussed on DNO benefits.

Smart Grid Definition

We compared the Prospectus Smart Grid definition and the corresponding ENA definition. The Prospectus Statement of Design Requirements quotes the definition provided by the ENSG[2] Smart Grid Working Group and this is more detailed than the ENA's definition. However, the ENA has made a significant contribution to the ENSG group and its definition of a Smart Grid, and so it is reasonable to assume that the respective interpretations of what a Smart Grid is align.

DCC Requirements

We assessed proposals in the Prospectus for the DCC with respect to: initial support for smart grid requirements; and evolution to support future smart grid requirements.

The Prospectus indicates that the initial scope of the DCC will be limited to functions that are essential for the transfer of Smart Metering data such as secure communications, access control and scheduled data retrieval; and that it subsequently takes on board meter registration (thus impacting network operators for electricity). Other activities, such as certain settlement functions, are currently out of scope but may be included in the future if there is a business case for them.

[2] Energy Networks Strategy Group.

T 0207 4050740 **W** www.engage-consulting.co.uk **E** info@engage-consulting.co.uk

There will be initial support for some Smart Grid functions – primarily those associated with provision of data to network operators to inform planning and investment decisions. It notes that there is a business case for building this functionality into the design at this initial stage.

The Prospectus also states that the DCC will be a procurement and service management entity (rather than a communications provider itself). The key rationale for this is so that it can re-procure communications contracts periodically – allowing competitive responses to: changing requirements, not least of which are Smart Grid requirements and other industry developments; as well as changing technology.

This design is intended to enable future Smart Grid requirements (such as remote management of Smart appliances, active demand side management, and active system balancing) to be accommodated incrementally if and when required.

However, the Prospectus also makes provision for smart meters to be rolled out significantly in advance of the DCC being implemented. Suppliers would be responsible for procuring their own communications contracts in this interim period and, subject to certain conditions, it is proposed that these contracts are novated to the DCC when it goes live.

A result of this staged implementation approach is that the DCC will be heavily shaped on day one by the contracts that Suppliers put in place between now and then. Furthermore, this influence on shape could be long lasting as the WAN communication module installed by Suppliers in the interim will be aligned with the pre DCC communications. As a consequence, there is a risk that networks' requirements of the DCC will not be adequately supported on day one, and that addressing this and being able to respond effectively to evolving network requirements could be limited, at least to some extent, for some considerable time thereafter.

Conclusions

In general, the DECC/Ofgem Prospectus broadly aligns with the ENA's work. However, as noted above, there are a number of areas where there are variances. Often, these variances are due to different levels of detail rather than positions necessarily being contradictory. Regardless, in order to ensure that smart grid requirements are represented appropriately, ENA Members should be mindful of them when responding to the DECC / Ofgem consultations and when contributing through the Ofgem SMIP Expert Groups and Sub-groups.

Document Control

Authorities

Version	Issue Date	Author	Comments
0.1	8th Sept 2010	[redacted]	Initial draft for subsections of report
0.2	9th Sept 2010	[redacted]	Updates following internal review
0.3	13th Sept 2010	[redacted]	Updates following internal review
0.4	14th Sept 2010	[redacted]	Updates following third internal review
0.5	15th Sept 2010	[redacted]	Updates following internal review & addition of Executive Summary
0.6	16th Sept 2010	[redacted]	Updates following internal review
0.8	20th Sept 2010	[redacted]	Client comments addressed
Version	**Issue Date**	**Reviewer**	**Comments**
0.1	8th Sept 2010	[redacted]	For structure / against brief
0.2	9th Sept 2010	[redacted]	For adherence to brief
0.3	14th Sept 2010	[redacted]	For fitness for purpose
0.4	15th Sept 2010	[redacted]	For fitness for purpose
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Version	**Issue Date**	**Authorisation**	**Comments**
0.7	16th Sept 2010	[redacted]	Formal draft for client review
1.0	21st Sept 2010	[redacted]	First issue for use

Related Documents

Reference 1	Engage Proposal (Ref: ENG-PROPO-087-2.0)
Reference 2	Engage Assignment Plan (Ref: ENA-CR012-001-1.0)
Reference 3	ENA Smart Metering System Requirements Update (Ref: ENA-CR006-002-1.1)
Reference 4	ENA Smart Metering System Use Cases (Ref: ENA-CR007-002-1.1)
Reference 5	ENA High-level Smart Meter Data Traffic Analysis (Ref: ENA-CR008-001-1.4)
Reference 6	ENA High Level Smart Metering Cost Benefit Analysis (Ref: ENA-CR009-004-1.1)
Reference 7	DECC/Ofgem Prospectus and Statement of Design Requirements

Change History

Version	Change Reference	Description
1.0	N/A	Initial version.

Distribution

Recipient 1: [redacted]
Recipient 2: ENA Members
Recipient 3: Engage Files

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T 0207 4050740 **W** www.engage-consulting.co.uk **E** info@engage-consulting.co.uk

1 Introduction

1.1 Background

The Department of Energy and Climate Change (DECC) and Ofgem issued their GB Smart Metering Prospectus, for consultation, on 27th July 2010. Certain matters require consultation responses by 28th September 2010; others require responses by 28th October 2010.

In addition, Ofgem is convening a series of Expert Groups and Sub-groups through Phase 1a of their Smart Metering Implementation Programme (SMIP). These will provide further rationale and input to the final policy statements that are due to be published in January 2011.

From an Energy Networks Association (ENA) perspective, the DECC/Ofgem Prospectus makes a number of statements on smart grid developments and includes: initial smart grid requirements in the minimum set of functional requirements for the Data Communications Company (DCC) go-live; and enablers to accommodate smart grid requirements as they evolve over time.

The ENA and its Members will be responding to the Prospectus consultations, and attending and contributing to the relevant SMIP Expert Groups and Sub-groups. It is therefore important for the ENA and its Members to have appropriate and comprehensive supporting documentation.

As a result, the ENA commissioned Engage Consulting to undertake a short, 10 day, assignment to deliver a Comparison Report that highlights the key differences between the Prospectus and the current ENA Smart Metering Documentation.

1.2 Purpose

The purpose of this Comparison Report is to:

- enable Members to better understand the differences between the DECC / Ofgem Prospectus and the ENA's requirements; and have a common understanding of these differences;
- assist Members with their Prospectus consultation responses; and to facilitate a more consistent set of responses; and
- assist Members' participation in the Ofgem SMIP Expert Groups and Sub-groups.

1.3 Scope

The scope of this report is to:

- compare (in both directions) the:

  - ENA Smart Metering System Requirements[3] and the Prospectus Smart Metering System Functional Requirements Catalogue in the Statement of Design Requirements;
  - ENA Use Cases and the Prospectus Smart Metering System Services in the Statement of Design Requirements;
  - ENA Data Traffic Analysis and the Prospectus Statement of Design Requirements;
  - ENA Cost Benefit Analysis and the Prospectus Impact Assessment[4]; and
  - ENA Smart Grid Definitions and statements in the Prospectus, where they exist;
- assess and comment on proposals in the Prospectus for the DCC with respect to:
  - initial support for smart grid requirements; and
  - evolution to support future smart grid requirements.

1.4 Structure

The remaining sections of the report are structured as follow:

- Section 2 – details a comparison of the ENA's Smart Metering System Requirements against the Prospectus documents;
- Section 3 – details the impact of the Prospectus on the ENA Use Cases;
- Section 4 – captures the impact of the Prospectus Example Service Levels and High Level Assumptions on the ENA Data Traffic Analysis;
- Section 5 – compares the ENA Cost Benefit Analysis with the Prospectus Impact Assessment;
- Section 6 – compares the ENA Smart Grid definition to the Prospectus' definition; and
- Section 7 – provides assessment and commentary on the DCC requirements.

1.5 Copyright and Disclaimer

[3] As set out in the ENA Smart Metering System Requirement Update (April 2010) and any updates including in the ENA High Level Smart Metering Cost Benefit Analysis (July 2010).
[4] For functional requirements where it exists and can be split out.

2 Smart Metering System Requirements comparison

This section compares the functional areas specified in the Prospectus Statement of Design Requirements Appendix Two (Reference 7) with the ENA smart metering system functional requirements stated in the April 2010 document, ENA Smart Metering System Requirements Update (Reference 3).

Some of the ENA functional requirements were downgraded to be optional during the Cost Benefit Analysis carried out in July 2010 (Reference 6). These requirements have still been included in the comparison below but highlighted as being optional.

A traffic light key has been used to highlight the degree to which the requirements align. This key is as follows:

No Differences / differences have minimal network impact
ENA should be aware of the variances, although minor or definitional
Potentially material variances between Prospectus and ENA functional requirements

2.1 Installation and Maintenance Requirements

The following table compares the Prospectus and ENA functional requirements for the Smart Metering System on initial installation and ongoing maintenance:

Prospectus Functional Requirements		ENA Functional Requirements	Variance	Comments	Use Case
IM.1	The smart metering system components shall be installable in current existing meter locations in consumer premises	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	Where the meter is situated is between the customer and the Supplier. Network businesses only have a requirement for a meter to be installed at	n/a

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
					consumer premises	
IM.2	The smart metering system shall enable remote firmware upgrades	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	Although not explicitly stated in the ENA requirements the ability to upgrade, Smart Metering system firmware remotely will be beneficial as smart grids develop requiring extra functionality at the meter	n/a
IM.3	The smart metering system shall support in situ exchange of WAN communication technology (without removal of meter)	COM 01.05	The meter WAN interface will allow alternative and future communications options to be utilised	COM 01.05 further defines and clarifies IM.3	In situ exchange of WAN technology enables future technology to be used and enables the potential for alternative existing technologies to be used where required	n/a
IM.4	The smart metering system shall resume normal operation without technician intervention after a failure in the metering system power supply	DNO 05.05	Metering system shall be able to issue a notification when the meter loss of supply has been restored	DNO 05.05 requirement is in excess of IM.4 but is enabled by IM.4	Important functionality for network outage management	Elec UC 15
IM.5	The smart metering system components shall be uniquely identifiable electronically where applicable	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	The ability to track the meter and communications modules may be of use to Network Operators	n/a

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
IM.6	The smart metering system components shall be uniquely identifiable mechanically where applicable	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	The ability to identify the meter and communications modules may be of use to Network Operators	n/a
IM.7	The smart metering system components' batteries shall only be exchangeable by authorised personnel	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	Networks support limiting access to meter components by non-authorised individuals	n/a
IM.8	The smart metering system components shall support local access and configurability by authorised personnel	DNO 01.01	The meter shall provide functionality to set location information in the meter after the meter is physically installed or changed but before the meter is deployed	DNO 01.01 is further developed and adds additional clarity of purpose over IM.8. The requirement to allow the meter to record and store location information has not been captured in the Prospectus	Location is one possible parameter amongst a suite of parameters that could be configured. ENA requirements envisage a set of configurable settings such as configurable reading intervals, thresholds, load limiting, etc. It is, however, unknown whether the Prospectus has considered what those parameters are. Smart network management requires the Network Operators to know the position of the meter on their network. This information enables various activities described in the Use	Elec UCs 01, 02, 03, 04, 05, 06

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
					Cases. There was discussion amongst the ENA members that the location information could be held in the DNO systems rather than the meter	
		GDN 05.06	Meter valve will be configurable to close and enable controlled opening of gas flow remotely	The Prospectus confirms the requirement for a gas valve. Local access is necessary to configure it	Network Operators could use the gas valve as part of responding to local gas emergencies before the Emergency Control Valve is operated	Gas UC 02
IM.9	The smart metering system shall allow in situ maintenance for non safety critical maintenance	No coverage		Prospectus requirements are outside of the scope of the ENA requirements – requirement beneficial to ENA	The ability to change components without interrupting supply will prevent false outage information being sent to ENA members	n/a
IM.10	The smart metering system shall support remote identification (by authorised parties) of devices attached to the HAN	COM 02.01	The meter will support a secure 2 way communication between Metering System and Local Devices	The Prospectus and ENA requirements are complementary. To support messaging between the Authorised Party and devices connected to the HAN, the Authorised Party must know what is connected	The Network operator needs to understand the mix of equipment (e.g. microgen, Electric Vehicles, etc.) connected to the Metering System for network planning as they contribute to different load profiles. If a Network Operator can remotely identify attached	Elec UCs 08, 09, 10
		COM 02.02	The HAN interface shall support messaging between the meter and other devices connected to the HAN			Elec UCs 08, 09, 10

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				to the HAN	devices, it will aid in network management	
IM.11	The smart metering system shall self configure on installation without the need for manual data entry to the system components	DNO 01.02	Upon installation, self register and issue a signal to the grid	ENA requirement is in excess of Prospectus requirement. The requirement to signal the grid that the meter is connected has not been captured	If the meter signals to the grid that it is connected, it can be included in network maps and hence smart grid activity. This is linked to DNOs maintaining meter locational information within their systems	Elec UCs 01, 02, 03, 04, 05, 06
IM.12	The smart metering system shall be installed and maintained in a manner that protects public safety	DNO 04.02	The metering system shall be configurable to detect reverse polarity at the meter position (Optional)	DNO 04.02 is in excess of that stated in IM.12 but complies with the aspiration to protect public safety. The ENA requirement was determined to be optional and hence not included in the Cost Benefit Analysis	Reverse polarity can occur at meter installation and can provide a safety risk. Functionality that identifies unsafe conditions on installation is to the benefit of the consumer	Elec UC 18

2.2 Operational Requirements

The following table compares the Prospectus and ENA operational functional requirements for the Smart Metering System in relation to aspects such as timing, power consumption, minimum modes of operation and fault recovery:

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
OP.1	The smart metering system components necessary for remote reading in the consumer premise shall operate independently (normal operating conditions) of any consumer interaction (including provision of energy supply and communications).	No coverage		Prospectus requirements are in excess of ENA requirements	It is essential for smart grid requirements that the meter functionality is unaffected by consumer's energy supply being interrupted due to credit issues, or similarly that the communications are not reliant on the consumer communications infrastructure	n/a
OP.2	The smart metering system shall use UTC[5] for all timing functions/date & timestamps	No coverage		Prospectus requirements are in excess of ENA requirements. The Prospectus requirement enables ENA requirement for time-stamped data	Standard use of GMT allows consistency in time stamped data output for network usage by preventing errors introduced by time changeovers during the year	n/a
OP.3	The smart meter shall support "last gasp" communications to notify loss of energy supply	DNO 05.03	The meter will issue an alarm when loss of supply is identified (Optional)	ENA requirements build on OP.3 and add clarity. The Prospectus specifies that a Supply Fault Alarm will be sent to the DCC when the meter loses supply. There seem to be a	The Prospectus supports "Last gasp" functionality that is required to improve outage management	Elec UC 14
		DNO 05.04	The metering system shall be able to communicate the meter loss of supply duration information			Elec UC 16

[5] UTC is Coordinated Universal Time (another name for GMT)

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				discrepancy in the cost estimation as the ability to issue an alarm was deemed optional for the ENA CBA due to it adding extra costs, whereas Ofgem analysis stated that "last gasp" would not add extra costs		
OP.4	The smart metering system components in the consumer premises shall consume less than 2.6W average combined	No coverage		Prospectus requirements are in excess of ENA requirements	The party that is responsible for the power used by the Smart Metering System has yet to be decided. There is a potential risk that it could add to distribution losses if the power comes from the network side of the meter	n/a
OP.5	The smart metering system shall be accurate to within 20 seconds of UTC	DNO 11.01	Capable of remote accurate synchronisation	Prospectus requirements are in excess of ENA requirements as captured. The ENA requirement does not define the level of error that is considered	Accurate time-stamping of data is required for accurate network planning and management as well as regulatory reporting	Elec UC 20

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				accurate. However, it is likely that the +/- 20 second accuracy is acceptable for network purposes.		
OP.6	The smart metering system shall support a default mode of operation (reset to minimum functionality)	No coverage		Prospectus requirements are in excess of ENA requirements, which at present does not specify the details of what a default mode would include.	Various functionality required by the ENA needs to be included in the minimal default mode of operation, such as safety features (over/under voltage detection, etc.), outage alarms, outage duration measurement, etc.	n/a
OP.7	The smart metering system shall support firmware upgrades while maintaining normal metrology functionality	No coverage		Prospectus requirements are in excess of ENA requirements as captured	It is important that normal metrology that provides data for smart grids is not affected by firmware upgrades so that the provision of that data is not interrupted	n/a
OP.8	The smart metering system shall enable robust and reliable local (in consumer premise) user interaction to re-enable energy supply in the event of activation	GDN 08.01	Where meter has a valve, the meter shall provide a visual display of the time remaining before the Valve Switch will automatically switch to the on	ENA requirements are in excess of the customer focused Prospectus requirements. The ENA did not state OP.8 as a	The meter needs to inform the user of the status of the valve as well as require confirmation that it is safe to re-enable	Gas Elec UC 04

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
	of the enablement mechanism		(closed) or off (open) position	requirement directly as they believed it to be covered by ERA requirements	supply	
		GDN 08.02	Where meter has a valve, the meter will display the status of the valve switch			Gas UC 04
		DNO 09.05	The meter will display status of the Supply cut-off switch			n/a

2.3 Display and Storage Requirements

The following table compares the Prospectus and ENA functional requirements for the Smart Metering System in relation to the visual interfaces of the smart metering system within the consumer premises as well as data storage within the metering system:

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
DS.1	The smart metering system shall display any billing information using £ and pence (but be Euro compatible)	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
DS.2	The smart metering system shall be capable of storing 12 months of half hourly consumption data	DNO 02.06	The metering system will record and store energy consumed and exported to the grid using configurable time periods for at least 3 months	Prospectus requirements are in excess of ENA requirements as captured. However access to the stored data is subject to	Consumption data can be used to analyse consumer load profiles	Elec UCs 02, 03, 04, 05

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				consumer approval over and above what is required for billing. Further clarity is required in the Prospectus regarding the full set of quantities that are included in the term "consumption data".		
		GDN 02.06	The metering system will store recorded gas consumption using configurable time periods for at least 3 months	Prospectus requirements are in excess of ENA requirements as captured. However, access to the stored data is subject to consumer approval over and above what is required for billing	Consumption data can be used for network planning	Gas UC 01
DS.3	The smart metering system shall support display of mode of operation (credit or Prepayment)	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
DS.4	The smart metering system shall display energy supply status (enabled or disabled)	DNO 05.01	The metering system shall detect loss of supply to meters	ENA requirement must be in place to enable DS.4	This requirement is all about Display. The ENA requirement is for the meter to detect loss of supply and issue an alarm to the network operator. A follow on from this could be display supply status on the meter	Elec UC 14
		DNO 06.05	The metering system shall be able to receive and display to customer scheduled outage information sent by network operators	ENA requirement in excess of Prospectus requirement	The ENA requirement is a natural progression from DS.4 improving consumer experience	Elec UC 12
		GDN 08.01	Where meter has a valve, the meter shall provide a visual display of the time remaining before the Valve Switch will automatically switch to the on (closed) or off (open) position	ENA requirement in excess of Prospectus requirements	The ENA requirement is a natural progression from DS.4 improving consumer experience	Gas UC 04
		GDN 08.02	Where meter has a valve, the meter will display the status of the valve switch	Complementary requirements	The meter display should state the status of the valve switch and translate that for the consumer into whether the supply is enabled/disabled	Gas UC 04
		GDN	The metering system shall be	The ENA requirement	The ENA requirement is a	Gas UC

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
		08.03	able to receive and display to customers scheduled gas disconnection information sent by network operators	is in excess of the Prospectus requirement but is of benefit to consumers and is an extension of the use of the functionality rather than new functionality	natural progression from DS.4 improving consumer experience	04
DS.5	The smart metering system shall display local time unambiguously (where it is displayed)	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	Network operators require the meter to have the correct time to date stamp metered data and events. A clear display of local time could be beneficial in allowing early identification of inaccurate time settings at the meter	n/a
DS.6	The smart metering system shall support erasure of any consumption data stored locally	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	Functionality allows consumer to delete consumption history before Change of Tenancy. Risk of data for network operators being lost if data is not collected at sufficient intervals. The DNO would want to ensure they have received the data before it is erased	n/a

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
DS.7	The smart metering system shall support the provision of information in a manner that takes account of the requirements of persons with disabilities	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
DS.8	The smart metering system shall support English and Welsh language for any human communication	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
DS.9	The smart metering system shall unambiguously identify all of its registers	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	The requirement refers to the user being able to differentiate the display for each meter register therefore no network impact	n/a
No coverage		DNO 04.11	Meter will store voltage profile data for 3 months	The Prospectus has a requirement to store 12 months of consumption data, voltage profile data is in excess of this requirement	Allows Network Operators to analyse the history of voltage fluctuations at a meter and track the efficacy of corrective action	Elec UCs 01, 02, 03, 04, 05, 06
No coverage		DNO 05.02	The metering system will store loss of supply information for a configured period	PC.7 suggests the use of non volatile memory which would be ideal	To allow facilitation of outage management on the network	Elec UC 16

Prospectus Functional Requirements	ENA Functional Requirements		Variance	Comments	Use Case
			to store loss of supply information		
No coverage	DNO 08.03	The metering system will store occurrences of "over 18 hour loss of supply" GSS failures for 3 months	The Prospectus SDR does not mention identifying or storing GSS failures	Authorised Parties need to be able to capture detail to verify claims for payments and for regulatory reporting purposes	Elec UC 16

2.4 Interoperability Requirements

The ENA have no interoperability requirements. The functional requirements from the Prospectus Statement of Design Requirements are included for completeness in the following table:

Prospectus Functional Requirements		ENA Functional Requirements	Variance	Comments	Use Case
IN.1	The smart metering system shall be capable of supporting two different suppliers (i.e. for gas and electricity) in the same premise as well as switching between any licensed suppliers	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
IN.2	The smart metering system shall allow for change of supplier remotely without premise visit	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a

Prospectus Functional Requirements		ENA Functional Requirements	Variance	Comments	Use Case
IN.3	The smart metering system shall support non proprietary data formats for information exchange with consumers	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a

2.5 Prepayment and Credit Requirements

The following table compares the Prospectus functional requirements with the ENA requirements in relation to smart metering system functionality associated with credit tariffs and pre-payment:

Prospectus Functional Requirements		ENA Functional Requirements	Variance	Comments	Use Case
PC.1	The smart metering system shall be remotely switchable between prepayment and credit mode of operation	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
PC.2	The smart metering system shall support "tokenless" prepayment mode of operation via remote top ups	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
PC.3	The smart metering system operating in prepayment mode shall support remote configuration of	No coverage	Prospectus requirements are outside of the scope	No network impact	n/a

Prospectus Functional Requirements		ENA Functional Requirements	Variance	Comments	Use Case
	emergency/friendly credit		of the ENA requirements		
PC.4	The smart metering system operating in prepayment mode shall support remote configuration of debt recovery	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
PC.5	The smart metering system operating in prepayment mode shall be capable of maintaining supply to premise independent of WAN communications	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	In emergencies, or where the WAN is unreliable, the smart metering system should maintain power supply to the premise in prepayment mode. This is beneficial to networks as it will prevent false outage signals	n/a
PC.6	The smart meter operating in prepayment mode shall store top up, debt recovery, and emergency credit history for the last 3 months	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
PC.7	The smart metering system shall store data used for billing and settlement purposes for at least 3 months in non volatile memory	No coverage	Prospectus requirements are outside of the scope of the ENA	Non volatile memory is memory that stores data without power – this will be useful to store outage duration	n/a

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				requirements	information, and GSS failures as well as consumption data required for networks	
PC.8	The smart metering system shall support real time remotely configurable tariff structures	DNO 03.01	Operate as a multi-rate meter capable of supporting ToU, Time of Day, Critical Peak, Dynamic Pricing	The requirements align as the Prospectus recognises the need for flexible tariff structures	This will allow the use of various rates and load profiling by registering, recording and time stamping the data thus facilitating network balancing and constraint management. This will also facilitate demand side management and would allow DNOs to offer ancillary services to NETSO[6]	UCs 08, 09, 10, 11
		DNO 03.02	Support configurable combination of register types		This will allow the use of various rates and load profiling by registering, recording and time stamping the data thus facilitating the network balance and manage constraints. This will also facilitate demand side management and would allow DNOs to offer ancillary services to GB System operator	UCs 08, 09, 10, 11

[6] National Electricity Transmission System Operator (NETSO)

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
PC.9	The electricity smart meter shall support at least 48 configurable time of use periods for its consumption registers	DNO 02.07	The metering system will support meter reading schedules configurable by Authorised Parties	Prospectus requirements are in excess of ENA requirements as captured – the ENA did not specifically mention 48 per day	Allows data to be measured half-hourly which is required by networks	UC 20
PC.10	The smart metering system operating in prepayment mode shall support local credit top up	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
PC.11	The smart meter system shall support prompt and timely register of remote top ups	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a

2.6 Electricity Specific Requirements

The following table compares the Prospectus functional requirements with the ENA stated requirements for electricity smart metering systems:

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
ES.1	The smart metering system shall	DNO	The meter shall be configurable to	ENA requirement is a	The Prospectus requirement	Elec

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
	support remote connect and disconnect of supply into the consumer premise	04.14	automatically disable supply at the meter on detection of extreme under or over voltage	specific example of the more general Prospectus requirement	relates to suppliers disconnecting consumers for credit reasons, the same functionality could be used to disable the supply in unsafe conditions	UC 19
ES.2	The smart metering system shall support at least one register for import kWh	COM 01.03	The electricity metering system shall be able to send imported and exported energy data as captured by meter system on demand	ES.2 enables some import aspects of COM 01.03 and DNO 02.01. The meter may need more than one import register to measure energy from several devices attached to the HAN. However, more generally, further clarity is required in the Prospectus regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length	Allows DNOs to receive data on demand	Elec UC 05
		DNO 02.01	Measure import/export active energy		Will allow the assessment of import / export at each supply point and will facilitate system management and load flow monitoring. Supports energy demand, load profiling and voltage profiling	Elec UCs 01, 02, 03, 04, 05, 06

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				of time they are each stored.		
ES.3	The smart metering system shall support at least one register for export kWh	COM 01.03	The electricity metering system shall be able to send imported and exported energy data as captured by meter system on demand	ES.3 enables export aspects of COM 01.03 and DNO 02.01. However, more generally, further clarity is required in the Prospectus regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored.	Allows DNOs to receive data on demand	Elec UC 05
		DNO 02.01	Measure import/export active energy		This will support distributed and micro-generation and will allow the measurement of energy exported to the grid to be measured which is a requirement of Feed-in Tariffs (FiT). This requirement will also allow the assessment of export at each supply point and will facilitate system management and load flow monitoring. Supports energy demand, export profiling, load profiling and voltage profiling However, the Prospectus lacks clarity in relation to how FiT metered data will be accessed through the smart metering	Elec UCs 01, 02, 03, 04, 05, 06

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
					system and whether it will be stored within the smart meter or a separate Fit meter.	
ES.4	The smart metering system shall support import kVArh measurement	COM 01.03	The electricity metering system shall be able to send imported and exported energy data as captured by meter system on demand	ES.4 enables COM 01.03 and DNO 02.02. The Prospectus specifies ES.4 as a Smart Grid requirement. However, more generally, further clarity is required in the Prospectus regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored.	Allows DNOs to receive data on demand.	Elec UC 05
		DNO 02.02	Measure import/export reactive energy		This helps to establish the reactive demand placed on an electrical system caused by certain home appliances such as devices with induction motors (typically 'wet' appliances and refrigerators) and ultimately supports grid optimisation by providing a measure of the reactive flows and prevailing power factor. It will also allow the assessment of import / export at each supply point and will facilitate system management and load flow monitoring. Supports energy demand, export	Elec UCs 01, 02, 03, 04, 05, 06

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
					profiling, load profiling and voltage profiling	
ES.5	The smart metering system shall support export kVArh measurement	COM 01.03	The electricity metering system shall be able to send imported and exported energy data as captured by meter system on demand	ES.5 enables COM 01.03 and DNO 02.02. The Prospectus specifies ES.5 as a Smart Grid requirement. However, more generally, further clarity is required in the Prospectus regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored.	Allows DNOs to receive data on demand	Elec UC 05
		DNO 02.02	Measure import/export reactive energy		This helps to establish the reactive demand placed on an electrical system caused by certain home appliances such as devices with induction motors (typically 'wet' appliances and refrigerators) and ultimately supports grid optimisation by providing a measure of the reactive flows and prevailing power factor. It will also allow the assessment of import / export at each supply point and will facilitate system management and load flow monitoring. Supports energy demand, export profiling, load profiling and	Elec UCs 01, 02, 03, 04, 05, 06

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
					voltage profiling	
ES.6	The smart metering system shall support import kW measurement	COM 01.03	The electricity metering system shall be able to send imported and exported energy data as captured by meter system on demand	ES.6 enables import kW aspects of COM 01.03 and DNO 02.01. The Prospectus specifies ES.6 as a Smart Grid requirement. However, more generally, further clarity is required in the Prospectus regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored.	Allows DNOs to receive data on demand	Elec UC 05
		DNO 02.01	Measure import/export active energy		Will allow the assessment of import / export at each supply point and will facilitate system management and load flow monitoring. Supports energy demand, load profiling and voltage profiling	Elec UCs 01, 02, 03, 04, 05, 06
ES.7	The smart metering system shall support export kW measurement	COM 01.03	The electricity metering system shall be able to send imported and exported energy data as captured by meter system on	ES.7 enables export kW aspects of COM 01.03 and DNO 02.01. The Prospectus	Allows DNOs to receive data on demand	Elec UC 05

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
			demand	specifies ES.7 as a Smart Grid requirement. However, more generally, further clarity is required in the Prospectus regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored.		
		DNO 02.01	Measure import/export active energy		This will support distributed and micro-generation and will allow the measurement of energy exported to the grid to be measured which is a requirement of Feed-in Tariffs (FiT). It will also allow the assessment of export at each supply point and will facilitate system management and load flow monitoring. Supports energy demand, export profiling, load profiling and voltage profiling	Elec UCs 01, 02, 03, 04, 05, 06
ES.8	The smart metering system shall support import kVAr measurement	COM 01.03	The electricity metering system shall be able to send imported and exported energy data as captured by meter system on demand	ES.8 enables import kVAr aspects of COM 01.03 and DNO 02.02. The Prospectus specifies ES.8 as a Smart Grid requirement. However, more generally, further clarity is required in	Allows DNOs to receive data on demand	Elec UC 05
		DNO 02.02	Measure import/export reactive energy		This helps to establish the reactive demand placed on an electrical system caused by certain home appliances such as devices with induction	Elec UCs 01, 02, 03, 04,

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				the Prospectus regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored.	motors (typically 'wet' appliances and refrigerators) and ultimately supports grid optimisation by providing a measure of the reactive flows and prevailing power factor. It will also allow the assessment of import / export at each supply point and will facilitate system management and load flow monitoring. Supports energy demand, export profiling, load profiling and voltage profiling	05, 06
ES.9	The smart metering system shall support export kVAr measurement	COM 01.03	The electricity metering system shall be able to send imported and exported energy data as captured by meter system on demand	ES.9 enables export kVAr aspects of COM 01.03 and DNO 02.02. The Prospectus specifies ES.9 as a Smart Grid requirement. However, more generally, further clarity is required in the Prospectus	Allows DNOs to receive data on demand	Elec UC 05
		DNO 02.02	Measure import/export reactive energy		This helps to establish the reactive demand placed on an electrical system caused by certain home appliances such as devices with induction motors (typically 'wet'	Elec UCs 01, 02, 03, 04, 05, 06

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored.	appliances and refrigerators) and ultimately supports grid optimisation by providing a measure of the reactive flows and prevailing power factor. It will also allow the assessment of import / export at each supply point and will facilitate system management and load flow monitoring. Supports energy demand, export profiling, load profiling and voltage profiling	
ES.10	The smart metering system shall support measurement of other power quality data including: voltage, frequency and sag and swell information, harmonic distortion	DNO 04.01	Detect under and over voltage levels	Prospectus requirements are in excess of ENA requirements as captured. It specifies that Supply Fault Alarm will be sent to DCC when over or under voltage conditions are detected	To avoid equipment damage and reduce risk of fire hazard	Elec UCs 08, 10, 11
		DNO	Record half hourly average RMS	Requirements align	To support DNOs' statutory	Elec

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
		04.04	voltages		obligation to maintain voltage levels at customers' terminals within prescribed limits	UCs 01, 02, 03, 04, 06
		DNO 04.05	The metering system will be configurable to provide the average, max and min voltage on-demand	ENA requirement in excess of Prospectus	For the maintenance of the network, planning activities, voltage optimisation to minimise losses and system monitoring. Not all ENA requirements are covered	Elec UCs 08, 20
		DNO 04.06	Provide power quality information as configured and on demand	There are variances in the quantities that constitute "power quality information". Frequency is not a requirement (as it is obtained from elsewhere); harmonic distortion would be ideal but is unlikely to be cost effective; sag and swell information is a key requirement. Again, more generally,	The DNO wishes to know when specific power quality issues have been breached	Elec UC 06

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				further clarity is required in the Prospectus regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored.		
		DNO 04.07	The meter shall provide configurable parameters to support extreme under or over-voltage detection	ENA requirement in excess of Prospectus	To support DNOs' statutory obligation to maintain voltage levels at customers' terminals within prescribed limits. Not all ENA requirements are covered	Elec UC 19
		DNO 04.12	Meter will store a specified number of Under and Over voltage events	ENA requirement in excess of Prospectus	This will allow DNOs to store specific information related to under and over voltage events to use in their planning of their infrastructure and in the active management of their network. Not all ENA requirements are covered	Elec UC 06

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
		DNO 04.15	The meter shall record power quality events	Requirements align	The DNO wishes to know when specific power quality events have occurred	Elec UC 06
ES.11	The smart metering system shall support capture of consumption and demand data at 5 second intervals	DNO 02.07	Support configurable meter reading schedules	Requirements align	Prospectus requirement is to provide real time info on the IHD – it could also be used for network management	Elec UC 20
ES.12	The smart metering system shall allow the supply switch to be configurable to be open or closed for a range of non safety critical events	DNO 06.04	The meter shall be configurable to enable and disable Meter Load limit Exceeded Switching	Requirements align. By default the Prospectus requirement also allows the supply switch to be configurable for safety critical events as well	Can be used as a safety or simple load limiting feature. The threshold may be set to a level where the switch would not operate for normal short-term peaks of demand	Elec UCs 08, 09, 10, 11
ES.13	The smart metering system shall support auxiliary switching and load control commands from remote third parties	DNO 06.01	Support remote load management via communication with relevant load management devices and generation	Requirements align	Allows Authorised Parties to constrain the demand on the network by control of smart consumer appliances (e.g. wet 'appliances', EV charging systems, air coolers) and in-premise generation (e.g. photovoltaic or micro-CHP) in order to support statutory requirements for voltage and	Elec UCs 08, 09, 10, 11

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
					frequency levels and optimise grid operation	
		DNO 06.02	Support basic load control functions	Requirements align	Allows Authorised Parties to control consumer appliances to effect load control. This is used in cases of network constraints and/or when providing network balancing services	Elec UCs 08, 09, 10, 11
		DNO 06.03	Support Emergency Override Command	ENA requirements in excess of Prospectus	To help in dealings with emergencies	Elec UCs 08, 09, 10, 11
		DNO 06.04	The meter shall be configurable to enable and disable Meter Load limit Exceeded Switching	Requirements align	Can be used as a safety or simple load limiting feature. The threshold may be set to a level where the switch would not operate for normal short-term peaks of demand	Elec UCs 08, 09, 10, 11
No coverage		DNO 01.03	Configurable to automatically update the system to adapt to grid network system changes	This requirement has not been captured in the Prospectus. Similar to location this information could also be stored in DNO	ENA require the smart metering system to store its geographic location on installation and its position on the network. This network position needs to be automatically remotely	Elec UCs 01, 02, 03, 04, 05

Prospectus Functional Requirements	ENA Functional Requirements		Variance	Comments	Use Case
			systems	updateable as grid network systems change.	
No coverage	DNO 02.04	Capable of calculating and reporting power factors	Although kW and kVA is stated as being measured in the Prospectus functional requirements, the calculation of power factor is not	Power factor helps to indicate how efficient the electricity usage is. The higher the power factor the more efficient is electricity usage. This will help networks to optimise electricity redistribution	Elec UCs 01, 02, 03, 04, 05
No coverage	DNO 02.05	Capable of deriving and recording maximum kVA for import export for polyphase meters	Not included in Prospectus functional requirements	This satisfies the requirement within existing MD tariffs to record maximum demand in kVA	Elec UCs 01, 02, 03, 04, 05

2.7 Gas Specific Requirements

The following table compares the Prospectus functional requirements with the ENA stated requirements for gas smart metering systems:

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
GS.1	The smart metering system shall support local storage of calibration data (calorific value, conversion factors, etc.)	GDN 02.03	Configurable to receive CV and correction values from Authorised Party	Requirements align	To provide accurate billing information on the meter display	Gas UC 05
		GDN	Use calorific values to calculate	Extra detail compared	Not specifically stated but meter	Gas

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
		02.04	energy values	to Prospectus	must perform this calculation to display kWh on IHD	UC 02
		GDN 02.05	Configure to use CV from specific start date and time	Extra detail compared to Prospectus	Not explicitly stated but CV must be time bounded to be used in calculating energy	Gas UC 05
		GDN 02.07	Gas meter will be capable of supporting the measurement and storage of calorific values within the metering system (Optional)	Prospectus states store not measure CV. The measurement functionality was deemed to be optional for the ENA CBA	To provide accurate billing information on the meter display. The solution whereby CV was measured at each smart meter would fulfil the need to measure CVs. The largest benefit is that CV "shrinkage" would be minimised, reducing the costs applicable to Suppliers and that billing would be equitable for all domestic consumers	Gas UC 05
GS.2	The smart metering system shall support at least one total register for gas consumption	GDN 02.01	Record meter reads at configurable time intervals	Requirements align	This will provide valuable information to network operators for gas related planning data	Gas UC 02
GS.3	The smart metering system shall support at least 48 wake up events per 24 hour period	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	For battery life reasons the gas meter cannot be in permanent listening mode	n/a

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
GS.4	The smart metering system shall support capture of gas consumption data at 5 second intervals	GDN 02.01	Record meter reads at configurable time intervals	Prospectus requirements are in excess of ENA requirements as captured	This data could be provided to Network Operators if stored in the meter	Gas UC 02
GS.5	The smart metering system shall support a valve for enablement and disablement of gas supply	Partial coverage via GDN 05.06; GDN 08.01; GDN 08.02		Prospectus requirements are in excess of ENA requirements as captured	ENA have no direct requirement for a valve but will make use of it if fitted	n/a
GS.6	The smart metering system shall continue normal operation in the event of a gas supply interruption	GDN 08.03	The metering system shall be able to receive and display to customers scheduled gas disconnection information sent by network operators	Aligns with ENA requirements to continue recording relevant information and send messages to the meter during supply interruption	Smart metering system needs to continue to operate normally during gas supply interruptions so it can communicate relevant messages from/to the Network Operator	n/a
GS.7	The smart metering system valve shall be configurable to be open or closed in the event of battery failure	GDN 05.06	Configurable valve	Requirements align	This could be used to manage local system emergency maintenance	Gas UC 02
GS.8	The smart metering system shall support 20 valve operations per year within the 15 year battery life	No coverage		Prospectus requirements are outside of the scope	Ensures suitable battery life reducing need to replace	n/a

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
	requirement			of the ENA requirements		
GS.9	The smart metering system shall support measurement of peak demand for gas supply	GDN 02.01	Record meter reads at configurable time intervals	Requirements align	This will provide valuable information to network operators when analysing peak flow days	Gas UC 02
Implied coverage		GDN 02.02	Configurable to upload reads to central storage facility at defined times	Gas reads will be transmitted so can be assumed that they can be uploaded	This will provide valuable information to network operators when analysing peak flow days	Gas UC 02
No coverage		GDN 05.05	Positive response from meter where a valve closure has been requested	ENA requirement in excess of Prospectus	Allows a GDN to receive confirmation that a new operation mode has been successfully implemented by the metering system or identify any failures	Gas UC 03

2.8 Diagnostic Requirements

The following table compares the Prospectus functional requirements with the ENA stated requirements for diagnostic functionality within smart metering systems.

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
DI.1	The smart metering system shall support logging of the following	DNO	Store a configurable minimum number of power quality event	Requirements align	This will allow DNOs to store specific information related to	Elec UC

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
	diagnostic, fault and tamper information, including date stamping of the information: meter faults, supply faults, communications faults, cover removal, clock resets and faults, improper running of the registers, unauthorised logical access, energy flow exceeding agreed extreme levels, interruption to neutral supply of meter (electricity only), bridging of internal switches (electricity only), remote enablement, disablement events, etc.	04.13	recordings		power quality to use in the planning of their infrastructure or in the active management of the network	06
		DNO 04.15	Record power quality events	Requirements align	The DNO wishes to know when specific power quality events have occurred	Elec UC 06
		DNO 05.01	Detect loss of supply	Requirements align	To manage outages and network failures.	Elec UC 14
		DNO 05.02	The metering system will store loss of supply information for a configured period	Requirements align	PC.7 suggests the use of non volatile memory which would be ideal to store loss of supply information. The ENA requirement is to allow facilitation of outage management on the network.	Elec UC 16
		DNO 08.01	The meter shall be configurable to identify GSS (>18 hour) failures	Extension of Prospectus requirements	To allow the authorised party to configure the information that will be captured, within the allowed parameters such as duration (trigger for GSS)	Elec UC 16, 20
		DNO	Configurable to detect and record	Extension of	Authorised party needs to	Elec UC

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
		08.02	GSS failures	Prospectus requirements	know when a configurable failure has occurred	16, 20
		DNO 08.03	The metering system will store occurrences of "over 18 hour loss of supply" GSS failures for 3 months	Extension of Prospectus requirements	Authorised Parties need to be able to capture detail to verify claims for payments and for regulatory reporting purposes.	Elec UC 16
		DNO 10.01	Detect physical tamper events	Requirements align	Fraud prevention (and detection) is a fundamental requirement, and the introduction of smart metering cannot be a retrograde step.	Elec UC 18
DI.2	The smart metering system shall support remote configuration of logs, alarms and thresholds	DNO 02.12	Configurable to notify Authorised Party of a meter event	Requirements align	Allows DNOs to be notified of the metering system event	Elec UC 20
		DNO 04.07	Configurable parameters to support extreme under or over voltage detection	Extension of Prospectus requirement	To support DNOs' statutory obligation to maintain voltage levels at customers' terminals within prescribed limits.	Elec UC 19
		DNO 04.08	Issue an alarm when Over or Under Voltage is detected – configurable thresholds	Prospectus requirements are in excess of ENA requirements as captured. Prospectus states that the meter will issue a Supply	Allows DNOs to configure specific voltages levels and be informed via an alarm that their limits have been breached.	Elec UC 08

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				Fault Alarm to the DCC when over or under voltage is detected		
		DNO 04.10	The meter will issue an alarm when it detects reverse polarity (Optional)	Extension of Prospectus requirement. This requirement was deemed optional for the ENA CBA	To reduce safety issues	Elec UC 18
		DNO 05.03	Issue alarm on detection of loss of supply (optional)	Prospectus requirements are in excess of ENA requirements as captured. Included in DCC services. This requirement was deemed optional for the ENA CBA	To allow facilitation of outage management on the network	Elec UC 14
DI.3	The smart metering system shall support configuration of alarms associated with usage thresholds	DNO 06.04	Configurable to enable and disable Meter Load Limit Exceeded Switching	ENA requirement in excess of Prospectus	Can be used as a safety or simple load limiting feature. The threshold may be set to a level where the switch would not operate for normal short-	Elec UC 08, 09, 10 ,11

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
					term peaks of demand	
DI.4	The smart metering system shall store its configuration data in non volatile memory	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	Storage of configuration in non volatile memory means it is retained after the meter loses power	n/a
DI.5	The smart metering system components shall be identifiable within any diagnostic log information	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	May be of use to Network Operators	n/a
DI.6	The smart metering system shall communicate battery status for metrology related functionality	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
Rejected, listed as excluded		DNO 02.10	Support temperature sensing in an external device i.e. connector block (optional)	ENA requirement specifically excluded as rejected in Prospectus – was deemed to be optional for ENA CBA	This functionality may be able to militate against a less frequent inspection regime due to the discontinuation of manual meter reading coupled with the possibility of increased loading on the service equipment due to new	Elec UC 18
No coverage		DNO	Where meter has an in built temperature sensor it will enable	ENA requirement not covered in Prospectus		

Prospectus Functional Requirements	ENA Functional Requirements		Variance	Comments	Use Case
	02.11	the detection of an overheating condition (optional)	– was deemed to be optional for ENA CBA	types of load – for example Electric Vehicle charging equipment	
No coverage	DNO 04.02	The metering system will be configurable to detect reverse polarity at the meter position (optional)	ENA requirement not covered in Prospectus – was deemed to be optional for ENA CBA	To reduce the possibility of this dangerous condition remaining undetected.	Elec UC 18
Partial coverage	DNO 05.04	Communicate loss of supply duration information	DI.1 states that loss of supply duration will be logged so logical assumption that it will then be communicated	To allow facilitation of outage management on the network	Elec UC 16
No coverage	DNO 05.05	Issue notification of when loss of supply is restored	ENA requirement not covered in Prospectus. However, it is implied in Prospectus Service 1.73 (on loss of supply DCC is notified)	To allow facilitation of outage management on the network	Elec UC 15

2.9 Security and Privacy Requirements

The following table compares the Prospectus functional requirements with the ENA stated requirements for security and privacy functionality within smart metering systems

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
SP.1	The smart metering system shall support strong mechanisms for authentication, authorisation and access control	COM 01.01	The meter will support a secure 2 way communication between the metering system and the Authorised party	Requirements align	Two way communications will allow DNOs and GDNs to receive configured data or data on demand directly from meters when needed thus allowing for network optimisation, load forecasting and balancing planning. It will also help to notify distributors of any events that have occurred that they need to respond to e.g. alarms, etc.	n/a
SP.2	The smart metering system shall support secure data communication to ensure the confidentiality, integrity and availability of the data and commands					
SP.3	The smart metering system shall be protected from physical tampering or interference, e.g. security seals, tamper switches, etc.	DNO 10.01	The meter will detect physical tamper attempts	Requirements align	To allow the detection of physical tampering	Elec UC 18
		DNO 10.02	The metering system shall be immune to magnetic fields from normal magnets (one specific example from ENA requirements of Prospectus more general requirement in this area)	Requirements align	The meters shall not be susceptible to magnetic fields up to 200 mT; stronger magnets cause a tamper alert	Elec UC 18
SP.4	The smart metering system	No coverage		Prospectus	Security of smart metering systems	n/a

Prospectus Functional Requirements		ENA Functional Requirements	Variance	Comments	Use Case
	components shall be inaccessible to unauthorised parties		requirements are outside of the scope of the ENA requirements	of benefit to Network Operators to ensure consistency of received data	
SP.5	The smart metering system shall ensure that keys and certificates used for access control and secure communications are securely stored	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	Security of smart metering systems of benefit to Network Operators to ensure integrity of received data	n/a
SP.6	The smart metering system encryption keys and certificates shall be remotely manageable in a secure manner	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	Security of smart metering systems of benefit to Network Operators to ensure integrity of received data	n/a
SP.7	The smart metering system shall be appropriately robust to prevent local or remote electronic attack of unauthorised use	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	Prevention of local or remote electronic attack is essential to maintain smart grid security	n/a
SP.8	The smart metering system shall ensure that firmware upgrade is secure	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	Security of smart metering systems of benefit to Network Operators to ensure consistency of received data	n/a

Prospectus Functional Requirements		ENA Functional Requirements	Variance	Comments	Use Case
SP.9	The communication interfaces of the smart meter shall be secure and robust	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	Security of smart metering systems of benefit to Network Operators to ensure consistency of received data	n/a
SP.10	The security smart metering system shall be demonstrated to be fit for purpose through rigorous independent testing	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	Security of smart metering systems of benefit to Network Operators to ensure consistency of received data	n/a
SP.11	The smart metering system functionality that can affect the supply of energy (e.g. remote disconnect or demand side management) shall be appropriately protected from unauthorised use by access control measures	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	Security of smart metering systems of benefit to Network Operators to ensure consistency of received data	n/a
SP.12	The smart metering systems shall ensure that only authorised devices may connect to the smart meter	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	Security of smart metering systems of benefit to Network Operators to ensure consistency of received data	n/a
SP.13	The smart metering system	No coverage	Prospectus	Preventing meters from being able to	n/a

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
	communications shall be designed and implemented to restrict the numbers of smart meters that are visible to each other to prevent one meter being able to attack other meters			requirements are outside of the scope of the ENA requirements	attack each other is required to maintain smart grid security	
SP.14	The smart metering system shall incorporate security logging for physical tampering and electronic security events	DNO 10.01	The meter will detect physical tamper attempts	Requirements align	To allow the detection of physical tampering	Elec UC 18
SP.15	The smart metering system shall follow the principle of least privilege	DNO 06.03	The meter will support an Emergency Override Command	Requirements align	The emergency override facility will be of benefit to Network Operators especially when dealing with emergencies	Elec UCs 08, 09, 10, 11
SP.16	The smart metering system shall follow a secure development lifecycle for software	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	Security of smart metering systems of benefit to Network Operators to ensure integrity of received data	n/a

2.10 HAN Requirements

The following table compares the Prospectus functional requirements with the ENA stated requirements for HAN functionality within smart metering systems:

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
HA.1	The HAN interface shall be based on open and non proprietary standards	COM 02.03	The LAN interface will allow alternative and future communications options to be utilised	Requirements align	This will allow the use of various current and future developments of communication technology in this area	n/a
		COM 02.04	The HAN interface standard shall support secure two way communications with the meter allowing alternative and future communications options to be utilised	Requirements align	Two way HAN communication will allow DNOs and GDNs to carry out load management functions and balance grid. DNOs and GDNs will be able to switch off home appliances when grid load becomes too high or facilitate demand side management	n/a
HA.2	The HAN interface shall only support authorised devices (i.e. no unauthorised linking of devices)	COM 02.01	The meter will support a secure 2 way communication between Metering System and Local Devices	Requirements align	For communication between the Metering System and Local Devices to be secure only authorised devices can be linked to the HAN	n/a
HA.3	The HAN interface shall support real-time two way communication from mains powered nodes (5s delay/update)	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	Maintains communication between the Metering System and the IHD. No network impact	n/a
HA.4	The HAN interface shall support network coordinator functionality	No coverage		Prospectus requirements are	No network impact	n/a

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
	for smart meter system components			outside of the scope of the ENA requirements		
HA.5	The HAN interface shall be independently certified and tested for interoperability	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
HA.6	The HAN interface shall support operation over the radio frequency physical layer	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
HA.7	The HAN interface shall support appliance control events (minimum 100 events per 24 hour period, minimum response rate of 5s once signal sent from HAN interface)	COM 02.02	The HAN interface shall support messaging between the meter and other devices connected to the HAN	Requirements align	The HAN interface shall support display of all relevant data from other devices to the smart metering system and appropriate messaging associated with actions instigated	Elec UC 08, 09, 10
HA.9	The HAN interface shall support the use of repeaters, boosters, etc. to extend range	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a

Prospectus Functional Requirements		ENA Functional Requirements	Variance	Comments	Use Case
HA.10	The HAN interface shall support acknowledgement of signals	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
HA.11	The HAN interface shall support 30 minute update (wake up) frequency from battery powered nodes	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
HA.12	The HAN interface shall be remotely upgradeable	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
HA.13	The HAN interface shall support gateway/bridging devices to access data made available on the HAN	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
HA.14	The HAN shall support a defined application profile for devices that connect to the HAN	No coverage	Prospectus requirements are outside of the scope of the ENA	No network impact	n/a

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
				requirements		
HA.15	The HAN shall support alphanumeric messaging	COM 02.02	The HAN interface shall support messaging between the meter and other devices connected to the HAN	Requirements align	The HAN interface shall support display of all relevant data from other devices to the smart metering system and appropriate messaging associated with actions instigated	Elec UC 08, 09, 10
		DNO 06.05	Display outage notifications to customers	This is a specific example of the Prospectus requirements	To keep the customer informed of network maintenance and other activities requiring a planned outage	Elec UC 12
		GDN 08.03	Display scheduled gas disconnection messages to customers	This is a specific example of the Prospectus requirements	To keep the customer informed	Gas UC 04
HA.16	The HAN shall support the security and privacy requirements	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	A secure HAN aids the integrity of data for network operators	n/a
HA.17	The HAN shall be capable of supporting other utility meters where the data requirements do not exceed those of gas and	DNO 07.01	Support microgeneration via communication with generation meters	Requirements align	Allows DNOs to manage micro and distributed generation	Elec UC 08, 09, 10, 11

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
	electricity smart meters					
HA.18	The HAN shall be capable of being physically switched on and off by authorised personnel	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	Authorised personnel switching on and off the HAN reduces disruption of data collection	n/a
HA.19	The HAN shall support addition of new device classes	DNO 06.01	The metering system will be able to support remote load management via communication with relevant load management devices and generation.	Requirements align	Network Operators will want the HAN to connect to new device classes that contribute load profiles onto the grid	Elec UCs 8, 9, 10, 11
HA.20	The HAN shall be backwards compatible	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
HA.21	The HAN shall be used by all smart metering system components in a consumer premise	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
HA.22	The HAN shall not interfere with existing accredited premise	No coverage		Prospectus requirements are	No network impact	n/a

Prospectus Functional Requirements		ENA Functional Requirements	Variance	Comments	Use Case
	HANs		outside of the scope of the ENA requirements		

2.11 WAN Requirements

The following table compares the Prospectus functional requirements with the ENA stated requirements for WAN functionality within smart metering systems:

Prospectus Functional Requirements		ENA Functional Requirements		Variance	Comments	Use Case
WA.1	The WAN interface shall be based on open and non proprietary standards	COM 01.05	The meter WAN interface will allow alternative and future communications options to be utilised	Requirements align	Allows the use of alternative and future communication methods in the WAN	n/a
WA.2	The WAN interface shall support real-time interrogation of WAN enabled devices with response rate of 1 minute or better	DNO 02.08	Provide configurable on demand information	Requirements align so long as a latency of 1 minute meets ENA current and future requirements.	Allows Authorised Parties to request ad hoc read information from the meter	Elec UC 20
WA.3	The WAN interface shall support acknowledge signals	DNO 04.03	Support remote energisation status check	Requirements align – Energisation status check is specifically listed as a DCC service	Could be used to check energisation status	Elec UC 13

Prospectus Functional Requirements		ENA Functional Requirements	Variance	Comments	Use Case
WA.4	The WAN interface shall be independently certified and tested for interoperability	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
WA.5	The WAN shall support the security and privacy requirements – set out in the earlier section of the Catalogue	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	A secure WAN aids the integrity of data for network operators	n/a
WA.6	The WAN shall be capable of being physically switched on and off by authorised personnel	No coverage	Prospectus requirements are outside of the scope of the ENA requirements	Authorised personnel switching on and off the WAN reduces disruption of data collection	n/a
WA.7	The WAN shall support simultaneous communication with a large number of meters within a short timescale	No coverage	Prospectus requirements are in excess of ENA requirements. Although not stated explicitly within ENA requirements, this is implied via outage management activity. Stated as a Smart grid requirement in the Prospectus	Supports network outage management by conveying outage signals to DNOs, as well as supply restored signals or mass remote energisation checks	n/a

Prospectus Functional Requirements	ENA Functional Requirements		Variance	Comments	Use Case
Implied coverage	COM 01.02	The metering system will be able to remotely communicate meter interval readings as configured by Authorised Parties	Not explicitly stated in Prospectus functional requirements. However, there is implied coverage across a number of requirements in the Prospectus: SP.1, SP.2, ES.2, ES.3, ES.4, ES.5, ES.6, ES.7, ES.8, ES.9	Allows DNOs to receive meter readings as scheduled remotely. Supports energy demand, export profiling, load profiling and voltage profiling	Elec UCs 01, 06, 07 & Gas UC 01
Implied coverage	COM 01.04	The electricity metering system will be able to send cumulative imported and exported energy data within time schedules as configured by Authorised Parties	Not explicitly stated in Prospectus functional requirements. However, there is implied coverage across a number of requirements in the Prospectus: SP.1, SP.2, ES.2, ES.3, ES.4, ES.5, ES.6, ES.7, ES.8, ES.9	Allows DNOs to receive cumulative energy import and export data thus allowing profiling and demand side management based on the data received. Supports energy demand, export profiling, load profiling and voltage profiling	Elec UC 01

2.12 IHD Requirements

The ENA have no functional requirements in relation to the In Home Display (IHD). The functional requirements from the Prospectus Statement of Design Requirements are included for completeness in the following table:

Prospectus Functional Requirements		ENA functional requirements		Variance	Comments	Use Case
IH.1	The IHD shall support mains power operation	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a
IH.2	The IHD shall show the following information for gas and electricity: • Indicative real-time usage in kW; • Indicative real-time rate of consumption in pence per hour; • Accurate cumulative consumption in kWh and £ for current day/week/month/billing period; • A high-level requirement that historical data should be presented in a meaningful way so as to allow a consumer to compare current usage with past usage; • Accurate account balance	DNO 06.05	The metering system shall be able to receive and display to customer scheduled outage information sent by network operators	The ENA's requirement to notify customers of outage information via the IHD is not included in the Prospectus	Networks' requirements of the IHD need to be included	n/a

Prospectus Functional Requirements		ENA functional requirements		Variance	Comments	Use Case
	information (amount in credit or debit) in real time for prepayment customers and on at least a monthly basis for credit customers; • Current tariff (i.e. cost per unit in pence per kWh); • Local time; and • Status of communication link. All information will be displayed in digital numerical format as a minimum. In addition, information on real-time energy rate (kilowatt) and cost of current level of consumption (pence per hour) will, as a minimum, be displayed in a visual (non numerical) way which allows a consumer to easily distinguish between low and high current consumption. Minimum real time update for electricity is 5 seconds, for gas it					

Prospectus Functional Requirements		ENA functional requirements		Variance	Comments	Use Case
	is 15 minutes					
IH.3	The average IHD power consumption shall be less than 0.6W	No coverage		Prospectus requirements are outside of the scope of the ENA requirements	No network impact	n/a

3 Impact on ENA Use Cases of Prospectus

This section compares the services specified in the Prospectus Statement of Design Requirements Appendix Two (Reference 7) with the ENA Use Cases stated in the April 2010 document, ENA Smart Metering System Use Cases (Reference 4).

A traffic light key has been used to highlight the degree to which the services and ENA Use Cases align. This key is as follows:

Differences have minimal network impact/or no network impact
ENA should be aware of the impact, although minor or definitional
Potentially material functionality has been omitted from the Prospectus impacting the ENA Use Cases

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
Elec_UC_01	Monitor Power Flows and Voltage Levels to Identify Thermal Capacity and Voltage Headroom	Smart Metering Systems must provide: • Real and reactive / import and export power flow data (in terms of half-hourly averaged values) • Real and reactive / generation power flow data (in terms of half-hourly averaged values) • Voltage data (in terms of half-hourly averaged values) • Phase connectivity	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.79 Read Distributed Generation Data	Prospectus uses the term "power quality" to refer to measuring values such as peak/average voltage, frequency, peak/average power, etc." Prospectus Services section does not specifically mention measuring active/reactive and import/export energy flow measurement capability, but these are stated under 'Electricity Specific Requirements' ES.2, ES.3, ES.4 and ES.5. More generally, further clarity is

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		information Smart meter sends data according to a pre agreed schedule. Smart meter sends data upon DNO request. Notification if data cannot be obtained.	1.83 Electricity Quality Read.	required in the Prospectus regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored – including the set of quantities referred to as "power quality information".
Elec_UC_02	Determine network impact of proposed new demand / generation connections	The DNOs needs to acquire measurements of exported and imported electricity from smart metering in the same area of the network as the proposed new connection (two - three years worth of half-hourly real and reactive power flow and voltage data is suggested as suitable to give confident assessment). Smart meter sends data according to a pre agreed schedule. Smart meter sends data upon DNO request. Notification if data cannot be obtained.	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.79 Read Distributed Generation Data 1.83 Electricity Quality Read.	Prospectus uses the term "power quality" to refer to measuring values such as peak/average voltage, frequency, peak/average power, etc." Prospectus Services section does not specifically mention measuring active/reactive and import/export energy flow measurement capability, but these are stated under 'Electricity Specific Requirements' ES.2, ES.3, ES.4 and ES.5 The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement.

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
Elec_UC_03	Determine network impact of proposed increased in demand / generation at existing connection points	The DNO requires two to three years worth of half-hourly real and reactive power flow and voltage data. This data will be used alongside the knowledge of the proposed new connection and data from the DNO's Supervisory Control and Data Acquisition (SCADA) system to assess the requirements of the new connection. The data should be available to the DNO at the latest a week after the date the last data item has been recorded. Smart meter sends data according to a pre agreed schedule. Smart meter sends data upon DNO request. Notification if data cannot be obtained.	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.79 Read Distributed Generation Data 1.83 Electricity Quality Read.	Prospectus uses the term "power quality" to refer to measuring values such as peak/average voltage, frequency, peak/average power, etc." Prospectus Services section does not specifically mention measuring active/reactive and import/export energy flow measurement capability, but these are stated under 'Electricity Specific Requirements' ES.2, ES.3, ES.4 and ES.5 The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement.
Elec_UC_04	Monitor demand and generation profiles for network load forecasting	As part of the routine load forecasting procedure, DNOs will require to be notified of proposed significant future demand or generation connections in order to identify whether the historic power	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings	Prospectus uses the term "power quality" to refer to measuring values such as peak/average voltage, frequency, peak/average power, etc." Prospectus Services section does not specifically mention measuring

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		and voltage profile data stored in their archived data stores can be used for forecasting or the Smart Metering Systems needs be configured to begin recording the half-hourly real and reactive power flow, generation export profiles and voltage profiles. Smart meter sends data upon DNO request. Notification if data cannot be obtained.	1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.79 Read Distributed Generation Data 1.83 Electricity Quality Read.	active/reactive and import/export energy flow measurement capability, but these are stated under 'Electricity Specific Requirements' ES.2, ES.3, ES.4 and ES.5 The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement.
Elec_UC_05	Determine latent demand due to embedded generation	Smart Metering Systems are installed and configured to receive and respond to messages from the DNO The DNO's system maintains information relating to the location of the Smart Meter and can position it on a network connectivity model The distributed generation meter data is accessible through the Smart Metering System in the form of half-hourly average power readings (real and reactive power flow from each individual premise, and the half	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.79 Read Distributed Generation Data	Prospectus uses the term "power quality" to refer to measuring values such as peak/average voltage, frequency, peak/average power, etc." Prospectus Services section does not specifically mention measuring active/reactive and import/export energy flow measurement capability, but these are stated under 'Electricity Specific Requirements' ES.2, ES.3, ES.4 and ES.5 The UC does not specifically mention need to synchronise clock to obtain

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		hourly generation output from the generation meter if fitted). The DNO is aware of micro-generation installed at the Smart Metering System premises (either through notification or through information received from the FiT meter via the Smart Metering System) The DNO identifies the premises and Smart Metering System it wishes to obtain data from The Smart Metering System has been measuring, recording and storing half-hourly power flow, voltage data for a predetermined period of time and the DNO has received confirmation of this. Smart meter sends data according to a pre agreed schedule or on DNO request. Notification if data cannot be obtained.	1.83 Electricity Quality Read.	appropriate time stamped data, but it is taken as a general requirement.
Elec_UC_06	Identify voltage quality	Smart meters will provide the	1.53 Registration of Smart Meter	The UC does not specifically mention

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
	issues	opportunity to record voltage fluctuations and date / time stamp such events so that DNOs will be able to identify any parts of their networks where poor voltage quality is a recurring issue. Threshold limits for recording of events will be specified. Smart meter sends data according to a pre agreed schedule or on DNO request. Notification if data cannot be obtained.	1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.79 Read Distributed Generation Data 1.83 Electricity Quality Read.	need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement.
Elec_UC_07	Collect data for active network management	DNOs will use Smart Metering System information to monitor real and reactive power flow and voltages within their network to identify, or predict, where actions are required to keep the networks operating within the prescribed limits. Implementing active network management techniques as an alternative, or to supplement, network reinforcement is expected to be used increasingly in the future. The information required will be	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.79 Read Distributed Generation Data	Prospectus uses the term "power quality" to refer to measuring values such as peak/average voltage, frequency, peak/average power, etc." Prospectus Services section does not specifically mention measuring active/reactive and import/export energy flow measurement capability, but these are stated under 'Electricity Specific Requirements' ES.2, ES.3, ES.4 and ES.5 The UC does not specifically mention

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		similar to that in Use Case 01, but the information will be required with a much lower latency. Smart meter sends data on DNO request. Notification if data cannot be obtained.	1.83 Electricity Quality Read.	need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement. More generally, further clarity is required in the Prospectus regarding the full set of quantities measured by the metering system, the granularity of each of these, and the length of time they are each stored – including the set of quantities referred to as "power quality information". This UC is shown as AMBER since it is not clear as yet when this service will be required by DNOs and if the communication system that will be put in place will be able to deal with the required latency.
Elec_UC_08	Active management of network voltage	DNOs will use Smart Metering System information to monitor voltages within their network enabling them to identify, or predict, where actions are required to keep the networks operating within the prescribed limits. Actions may be required that involve	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain	The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement.

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		equipment in consumers households e.g. A Increase or decrease network voltages by decreasing or increasing consumer demand. B Increase or decrease network voltages by increasing or decreasing generation / storage C Change the operating parameters of generation / storage plant This results in the following pre-conditions for this UC: A Smart Metering System is installed and configured to receive and respond to messages from the DNO The DNO is aware of the location of the Smart Meter and can 'position' it on a network connectivity model The DNO has systems that can generate the appropriate Time of Use tariffs and bill the Supplier accordingly The DNO has a contract with the	Reading. 1.80 Feed in Tariff Update 1.83 Electricity Quality Read. 1.89 Load Management	

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		Consumer including the operation of a Time of Use tariff for all, or part, of the consumption at the premises The Smart Metering System has been configured with the Time of Use tariff The Smart Metering System has been configured to provide register readings according to the Time of Use tariff at set periods.		
Elec_UC_09	Perform active management of network power flow	Actions may be requested on equipment within the consumers premises e.g. initiating control actions to: • change the load on the network by decreasing or increasing demand • change the operation of in premises generation Actions A & B in UC 08 specifically mentioned.	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.80 Feed in Tariff update 1.83 Electricity Quality Read. 1.89 Load Management	The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement.

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
Elec_UC_10	Perform system balancing	Actions may be requested on equipment within the consumers premises e.g. initiating control actions to: • change the load on the network by decreasing or increasing demand • change the operation of in premises generation Actions A & B in UC 08 specifically mentioned.	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.80 Feed in Tariff update 1.83 Electricity Quality Read. 1.89 Load Management	The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement.
Elec_UC_11	Check effectiveness of active network management / system balancing measures	Where a near/real-time response is expected the DNO needs to be able to check the efficacy of the action by retrieving power flow and voltage data from the Smart Metering System.	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.79 Read Distributed Generation	The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement.

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
			Data 1.83 Electricity Quality Read.	
Elec_UC_12	Notify consumer of planned outage	If the Smart Metering System is configured to receive messages from the DNO then they will be able to transmit the notification of planned outages to the smart meter and receive confirmation that it has been delivered. The message could be displayed on the Smart Meter display or on the In House Display, or on an alternative presentation device.	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.61 Message to Consumers through the IHD 1.63 Remote Configuration of Settings	The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement. The Prospectus does not reflect the requirement for the IHD to display messages relating to outage information sent by DNOs. This assumes that DCC will pass on messages provided by DNO.
Elec_UC_13	Query meter energisation status to determine outage source and location	This use case describes how the DNOs will use information from, and take actions through, the smart metering population, to identify the reason for an outage and enhance the location of network faults. Querying the energisation status of multiple Smart Metering Systems that have been mapped onto a network connectivity model will enable faster fault location and	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.66 Energisation Status	The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement.

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		awareness of the extent of the fault affected area.		
Elec_UC_14	Send alarm to DNO during network outage	This use case describes how the DNOs will use information from, and take actions through, the smart metering population, in identifying unplanned power outages. The Smart Metering System will be configured to send a power outage alarm to DNOs that will enable them to more accurately assess which customers have lost power and quickly identify the likely location and extent of the outage.	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.61 Message to Consumers through the IHD 1.63 Remote Configuration of Settings 1.73 On loss of supply DCC is notified	The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement. This is AMBER due to: • Not mentioning the possibility of the Smart Metering System sending a message to the In Home Display to inform the Consumer that an outage is in progress and an alarm has been sent to the Distribution Network Operator. • Alarm sent to DCC, not directly to DNO or stated that it would be passed onto the DNO.
Elec_UC_15	Verify restoration of supplies after outage	This use case describes how the DNOs will use information from the smart metering population to verify power supply restoration using Smart Metering Systems. Once a Smart Metering System detects power has been restored at the network side of the meter it will	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.73 On loss of supply DCC is notified	The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement. This is RED since no service stated linked to informing the DNO that restoration of outage has occurred. However, it is implied in Service 1.73.

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		send a power restored message to the DNO.		Furthermore, it is RED rather than AMBER due to fact that this results in the benefits associated with this service shown below not being achievable: • Allows identification and resolution of fault masking • Reducing outage durations, thereby enhancing the customer experience • Positive confirmation of supply restoration, enhancing the customer experience • Better management of Customer Interruption (CI) and Duration (Customer Minutes Lost (CML)) performance through earlier identification of masked faults • Reduce exposure to Guaranteed Standards of Performance failures (e.g. supply restoration exceeding 18 hrs) • Reduced cost to serve through more efficient usage and deployment of field staff

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
				• Enhanced customer experience as DNOs will be confident that supplies have been restored without disturbing customers
Elec_UC_16	Regulatory reporting of outages	DNOs have licence obligations requiring them to report to Ofgem interruptions in the supply of electricity to customers. The ability of Smart Metering Systems to provide DNOs with date and time stamped outage information would significantly improve the quality, accuracy and audit ability of outage information.	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings	This service is not highlighted in the Prospectus, but it is shown only as AMBER since it is a reporting action that can be undertaken in the current way by DNOs.
Elec_UC_17	Restore and maintain supply during outages	In the future it will be important to develop a capability to assess real-time capacity headroom. This will be required to ensure that both thermal ratings of equipment are not exceeded in system intact conditions and also in system depleted conditions during planned and unplanned network outage conditions. A better understanding of the capability of the assets unaffected at	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading. 1.79 Read Distributed Generation Data	The UC does not specifically mention need to synchronise clock to obtain appropriate time stamped data, but it is taken as a general requirement. This UC is AMBER simply because it relies on ability provided through UC 07-10, and a question of required latency was raised for UC 07.

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		the time of the outage, and the expected load on those assets, will enable the DNO to make a more informed decision as to whether there is sufficient network capacity to maintain supplies during a planned outage (by pre-outage transfer), or to restore supplies by rerouting (in the case of an unplanned outage) and that the ER P2/6 requirements for redundant capacity available under network depleted conditions are satisfied. If the additional information available confirmed that the DNO was unable to maintain/restore supplies to all customers, Active Network Management of DNO owned assets and Demand Side Management (DSM), as described in Use Cases 07-10 will provide the opportunity for the DNO to further increase the number of customers whose supply can be maintained under a planned outage scenario or restored under an unplanned outage scenario. An example of this would	1.80 Feed in Tariff update 1.83 Electricity Quality Read. 1.89 Load Management	

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		be to limit the load that could be drawn by customers on the healthy part of the network so as to be able to restore partial supplies to customers directly affected by the fault, i.e. equitably sharing the capacity of the depleted network.		
Elec_UC_18	Manage meter safety alarm	DNOs will benefit from Smart Metering Systems being able to detect tampering and identify unsafe conditions. The Smart Metering System will include diagnostic functionality to detect tampering (including for example terminal cover removal). The Smart Metering System will detect other unsafe conditions at the meter, such as crossed polarity and thermal distress. Conditions that may be detected include: • That the terminal cover has been removed • That the contact/switch has been bridged	1.54 Check Accuracy of Master Clock Data 1.55 Tamper Alarm Triggered 1.63 Remote Configuration of Settings 1.67 Remote Enablement / Disablement of Supply 1.83 Electricity Quality Read.	This UC is shown as RED simply due to fact that stated parts of service required by ENA have either been rejected (temperature sensing) or not mentioned specifically (detect reverse polarity). If these are optional options to ENA then this can be disregarded.

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		• Interruption to the neutral supply of the meter • Detection of crossed polarity at the meter • The presence of a magnetic field stronger than 200 mT • The detection of excessive heat (parameters to be determined) Detection of such conditions will result in messages being sent to the DNO, Supplier, Meter Operator or other stakeholder as appropriate On the detection of certain conditions the DNO may wish to configure the Smart Metering System to automatically disconnect.		
Elec_UC_19	Manage extreme voltage at meter	Some network faults can result in potentially damaging extremes of voltage (either high or low). To guard against this, there is the opportunity to incorporate a safety feature within the Smart Metering System to monitor voltage levels at the meter and send an alarm to the	1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.65 Meter Read (import & export) 1.67 Remote Enablement / Disablement of Supply	Service 1.73 deals specifically with aspects of notifying DCC of conditions such as over and under voltage, and overload conditions, etc. Service 1.67 would allow isolation of supply via disablement until problem has been addressed.

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		DNO when specified tolerances are breached. The alarm message to the DNO will alert them to the requirement to investigate and resolve the cause of the extreme in voltage. Alternatively (or additionally) at the discretion of the DNO, the extreme voltage event will cause the smart meter to automatically isolate the supply via its integral cut-off switch thereby immediately removing the risk of damage to the consumer's appliances.	1.73 Supply Fault Alarm Triggered 1.75 Notification of Failure to Obtain Reading. 1.83 Electricity Quality Read.	
Elec_UC_20	Configure smart metering system	DNOs require the ability to change smart meter configurations related to the data they wish to capture over the life of the meter	1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings	Service 1.63 appears to provide the stated requirements of this service.
Gas_UC_01	Gather information for planning	Smart meters could be configured to provide demand data measurements to Gas Distribution Network Operators.	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings	

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
			1.65 Meter Read (import & export) 1.75 Notification of Failure to Obtain Reading.	
Gas_UC_02	Configure gas smart metering system	Gas Distribution Network Operators will need to change the smart meter configuration over the life of the meter e.g. • Initiating functionality to gather network planning data • Initiating data capture interval (6 min; half hour, etc) and delivery period (daily; weekly)	1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration and Synchronisation of Meter Settings	
Gas_UC_03	Disable supply of gas by GDN	This Use Case assumes that this will be achieved via gas valve in the smart meter which has been accepted within Prospectus conclusions.	1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.67 Remote Enablement / Disablement of Supply	Service 1.67 delivers this and the others merely support this service.
Gas_UC_04	Display messages from GDN	The use case describes how the Gas Distribution Networks (GDNs) will communicate with consumers through the smart metering population to notify them of key	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.61 Message to Consumers to the	This assumes that DCC will pass on messages provided by GDNs.

ENA Use Case		Key Services Required	Prospectus Services	Comments / Variance
		works, issues or progress updates on specific incidents. The smart metering system would be configured to allow the GDN to issue notifications to consumers who have In Home Displays (IHD) or other information receipt devices in order to provide specific updates.	IHD 1.63 Remote Configuration of Settings	
Gas_UC_05	Measure and store Calorific Value (CV)	To accommodate the anticipated need to update CV more regularly due to the system taking on more bio-gas in the future.	1.53 Registration of Smart Meter 1.54 Check Accuracy of Master Clock Data 1.63 Remote Configuration of Settings 1.77 Gas Calorific Value Update	The Prospectus supports the smart metering system storing a monthly CV value but not measuring it at the meter. The functionality to measure the CV at the meter has been recognised as optional by the ENA due to the high costs associated with this. Shown as GREEN here since the 'measuring' part of this UC is optional and the ability to store CV in smart meter delivers the necessary capability.

4 Impact on ENA Data Traffic Analysis of Prospectus Assumptions

4.1 Data Traffic Analysis and Service Levels

This section compares the services detailed within Appendix Two of the Statement of Design Requirements (Reference 7) and the ENA High Level Smart Meter Data Traffic Analysis (Reference 5).

There are a number of services in the Prospectus that are enablers and need to have been provided to allow the smart meter to consider each Use Case. Typically these are the following:

- 1.53 Registration of Smart Meter
- 1.54 Check Accuracy of Master Clock Data
- 1.63 Remote Configuration of Settings (only discussed in Electricity Use Case 20 – Configure smart metering system and Gas Use Case 02 – Configure gas smart metering system)
- 1.75 Notification of Failure to Obtain Reading.

The associated service levels and frequency are not discussed in the comparison below. This considers only the services that are core for each Use Case being discussed.

A traffic light key was used in Section 3 and it is repeated below for completeness. This key is as follows:

Differences have minimal network impact/or no network impact
ENA should be aware of the impact, although minor or definitional
Potentially material functionality has been omitted from the Prospectus impacting the ENA Use Cases

<table>
<tr><th colspan="2">ENA Use Case</th><th>ENA Frequency & Response Requirements</th><th>Core Prospectus Services – Example Service levels & Frequency</th><th>Comments / Issues</th></tr>
<tr><td>Elec_UC_01</td><td>Monitor Power Flows and Voltage Levels to Identify Thermal Capacity and Voltage Headroom</td><td>Scheduled: Every 3 months from each meter

On Demand: 12 hours response

HH average values.</td><td rowspan="4">The following 3 Core Services & Frequencies are common for UC 01 - 07

1.65 Meter Read (import & export)

<u>Service Level</u>

Scheduled: Meter read data from 99% of all meters shall be received within 24 hours.

All meter reads shall be received within 24 hours.

On Demand: 90% of ad-hoc read requests to be received by the DCC within 30 minutes.

The total number of individual meters to be read in any 30 minute period can be up to 0.1% of the installed, operational smart meter population.

<u>Frequency</u>

Scheduled: Meter reads may be required on either a daily, weekly, monthly or quarterly basis, or as configured. Each read</td><td rowspan="4">Prospectus states that 99% of all meters should be read within 24 hours, whereas ENA states 12 hours. Also ENA assumes data collected once every 3 months from the meter, since it is to be used for planning purposes.

Quality related data in Prospectus states 99% of all meters shall be received within 24 hours and for on Demand: 90% of on demand read requests to be received by the DCC within 30 minutes. These response times are much faster than ENA general assumption about 12 hours.

NOTE: ENA need to consider 12 hours response against varying response times in Prospectus for Meter reads and generation reads (24 hours) and quality reads (1 minute on demand and 60 minutes if scheduled). If</td></tr>
<tr><td>Elec_UC_02</td><td>Determine network impact of proposed new demand / generation connections</td><td>On Event: 12 hours response

HH average values.</td></tr>
<tr><td>Elec_UC_03</td><td>Determine network impact of proposed increased in demand / generation at existing connection points</td><td>On Event: 12 hours response

HH average values.</td></tr>
<tr><td>Elec_UC_04</td><td>Monitor demand and generation profiles for network load</td><td>On Event: 12 hours response

HH average values.</td></tr>
</table>

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
	forecasting		shall contain half hourly values and the appropriate aggregate total. On Demand: Likely to be single events per meter per year **1.79 Read Distributed Generation Data** *Service Level* Scheduled: data from 99% of all meters shall be received within 24 hours. On Demand: 90% of on demand read requests to be received by the DCC within 30 minutes. *Frequency* Scheduled: half hourly, daily, weekly, monthly or quarterly On Demand: Likely to be single events per meter per year. **1.83 Electricity Quality Read**. *Service Level* On Demand: Electricity quality data shall be received from 99% of applicable meters	**considered an issue, then this should be raised with the Ofgem SMIP. It is also worth noting that the requirement for DNOs to communicate with large numbers of meters in 5-15min timescales for active network management purposes is not sufficiently drawn out in the Prospectus.**
Elec_UC_05	Determine latent demand due to embedded generation	On Event: 12 hours response HH average values.		
Elec_UC_06	Identify voltage quality issues	On Event: 12 hours response HH average values		

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
			within 1 minute. Scheduled: Electricity quality data shall be received from 99% of applicable meters within 60 minutes *Frequency* On Demand: single events per year per meter Scheduled: daily aggregated download per meter.	
Elec_UC_07	Collect data for active network management	On Event: Once EVs, heat pumps etc. are common, this may need to happen more often and faster than for UC 01 e.g. 5-15 minutes HH average values	***The following 4 Core Services & Frequencies are common for UC 07 - 10*** **1.65 Meter Read (import & export)** *Service Level* Scheduled: Meter read data from 99% of all meters shall be received within 24 hours. All meter reads shall be received within 24 hours. On Demand: 90% of ad-hoc read requests to be received by the DCC within 30	These Use Cases reflect a world where there will be a smart grid requirement and the response times needed will be much shorter than for gathering planning data in earlier Use Cases. ENA requirement of 5-15 minutes was tempered by the fact that other DNO equipment e.g. SCADA can only respond within these timescales. The requirement for DNOs to communicate with large numbers of meters in 5-15min
Elec_UC_08	Active management of network voltage	On Event: Up to 5-15 min. to configure, send to up to 1,000 meters ToU readings – 12 hours Direct Control - 5-15 min for command execution to up to 1,000 meters (may need to be		

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
		repeated across country)	minutes. The total number of individual meters to be read in any 30 minute period can be up to 0.1% of the installed, operational smart meter population. *Frequency* Scheduled: Meter reads may be required on either a daily, weekly, monthly or quarterly basis, or as configured. Each read shall contain half hourly values and the appropriate aggregate total. On Demand: Likely to be single events per meter per year **1.80 Feed in Tariff Update** *Service Level* On Demand: An updated Feed In Tariff shall be received by 95% of meters/IHDs within 2 hours. *Frequency* Feed In Tariff updates will only be required on an infrequent basis.	timescales is not sufficiently drawn out in the Prospectus. First pointer that response is probably not 'real-time' based on this. Feed-in Tariffs: ENA assume 12 hours response linked to ToU tariffs, whereas Prospectus assumes 2 hour response from 95% of meters that ToU has been received. Quality related data in Prospectus states 99% of all meters shall be received within 24 hours and for on Demand: 90% of on demand read requests to be received by the DCC within 30 minutes. ENA assume 5-15 minutes response. Load Management: ENA assume 5-15 minutes for response to direct control command for up to 1,000 meters. Prospectus states an acknowledgement that a command for load management has been successfully received by the smart metering system shall
Elec_UC_09	Perform active management of network power flow	On Event: Up to 5-15 min. to configure, send to up to 1,000 meters ToU readings – 12 hours Direct Control - 5-15 min for command execution to up to 1,000 meters (may need to be repeated across country)		
Elec_UC_10	Perform system balancing	5-15 minutes response time (On localised basis, which is constraining factor, only small subset of meters involved – assume 1,000. However at national level could be millions). Direct Control - 5-15 min for command execution to up to 1,000 meters (may need to be repeated across country)		

ENA Use Case	ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
		1.83 Electricity Quality Read. *Service level* On Demand: Electricity quality data shall be received from 99% of applicable meters within 1 minute. Scheduled: Electricity quality data shall be received from 99% of applicable meters within 60 minutes *Frequency* On Demand: single events per year per meter Scheduled: daily aggregated download per meter. **1.89 Load Management** *Service Level* On Demand/Scheduled: Commands for load management shall be transmitted to 90% of meters within 5 minutes. An acknowledgement that a command for load management has been successfully received by the smart metering system	be received by the DCC from 90% of smart meters within 10 minutes. **NOTE: The Tariff update and acknowledgement of direct control commands in prospectus appear to be more stringent that original ENA service requirements.**

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
			shall be received by the DCC from 90% of smart meters within 10 minutes. The total number of load control commands to individual meters in any 10 minute period can be up to 0.05% of the installed, operational smart meters. *Frequency* On Demand: It is likely that load management will be required for meters within a stressed part of the network on an infrequent basis when load is peaking. Scheduled: Daily events per meter	
Elec_UC_11	Check effectiveness of active network management / system balancing measures	On Event: Within 15 minutes response time	**These are the same 3 Services as for UC 01-07 (See Above).**	This Use Case is linked to active control of the network, so it assumes much faster responses by the ENA. NOTE: Prospectus is focused on gathering reads within a 24 hour period. It does not necessarily recognise the need here to be able to quickly check that responses triggered by specific problems have been addressed by

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
				actions taken by DNOs. **NOTE: Although this is very much linked to an active smart grid 'world', which is difficult to predict when it will be needed, this should be raised with the Ofgem SMIP.**
Elec_UC_12	Notify consumer of planned outage	On Event: Notification of outage to be sent within 10 days to IHD before the outage; message confirmation within 12 hours. 5-10 mins if within hour.	**1.61 Message to Consumers through the IHD** *Service Level* On Demand: Messages to an IHD from the DCC shall be received within 1 hour. *Frequency* On Demand: Variable, from single messages per meter per year to daily.	Prospectus reflects faster response to standard notification of planned outages (1 hour v 12 hours, 10 days before). However, the Prospectus does not reflect much faster notification if event is within the hour. **NOTE: ENA should consider if the within hour point is important and worth raising with the Ofgem SMIP (for example, if it was required as part of triggering customer response in relation to the risk of an unplanned outage).**
Elec_UC_13	Query meter energisation status	On Event: Ability to send energisation queries to 1,000	**1.66 Energisation Status**	Prospectus states a shorter response period of 5 minutes (v

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
	to determine outage source and location	meters in 15 minutes or 100,000 meters in 1 hour in the example of an extreme weather related event. 30secs for one meter	*Service Level* On Demand: Remote checking of supply to a meter shall obtain confirmation or otherwise of supply from 95% of meters within 5 minutes. In any 5 minute period up to 0.001% of meters shall be able to be individually checked. *Frequency* On Demand: Likely to be single events per meter per year.	15 minutes for 1,000 meters and 1 hour for 100,000 meters by ENA) and it qualifies this with a percentage of the meter population that will be involved. **NOTE: Prospectus appears to be more stringent service level and therefore should be accepted.**
Elec_UC_14	Send alarm to DNO during network outage	On Event: Receive alarm within 5 mins for LV faults (1,000 max); up to 15 min for HV faults. Assumed to happen once per year.	**1.61 Message to Consumers through the IHD (Same as UC 12)** *Service Level* On Demand: Messages to an IHD from the DCC shall be received within 1 hour. *Frequency* On Demand: Variable, from single messages per meter per year to daily. **1.73 On loss of supply DCC is notified.**	It is assumed that alarm to DNO would also go to consumer via IHD. Prospectus states 5 minutes to report up to 99.5% of meters which have lost supply, which aligns with ENA. Prospectus qualifies the number of meters at a percentage and not an absolute number such as 1,000 meters. **NOTE: ENA should check if the percentage qualification**

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
			Service Level On Demand: Loss of supply shall be reported by DCC within 5 minutes for 99.5% of the meters detecting a loss of supply. Power restoration shall be reported by DCC within 60 minutes for 90% of the meters affected by loss of supply. *Frequency* On Demand: Likely to be single events per meter per year.	**is better than absolute one and act accordingly.** **Also, it is likely that localised outages would be more challenging for the communications infrastructure – and such a high percentage could have unnecessary implications for the requirements of this infrastructure.**
Elec_UC_15	Verify restoration of supplies after outage	On Event: Receive alarm within 5 mins for LV faults (1,000 max); up to 15 min for HV faults. Assumed to occur once every 6 months.		**NOTE: Prospectus does not deal specifically with a service that aligns with this. Nearest would be some variant on an alarm. If important to ENA, this should be raised with the Ofgem SMIP.**
Elec_UC_16	Regulatory reporting of	Event occurs once every 3 months and requires response	Nothing included in Prospectus that covers this	**NOTE: Not part of services in Prospectus. If this is viewed as important by ENA, then it**

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
	outages	within 12 hours.		**should be raised with the Ofgem SMIP.**
Elec_UC_17	Restore and maintain supply during outages	1. Smart Metering System sends "power restored" message to the DNO: On Event - Approx. 5 min for command execution 2. DNO activates the maximum power consumption threshold: On Event – 15 minutes response. 3. Smart Metering confirms activation of the maximum power consumption threshold: On Event 15 minute response	**1.65 Meter Read (import & export)** *Service Level* Scheduled: Meter read data from 99% of all meters shall be received within 24 hours. All meter reads shall be received within 24 hours. On Demand: 90% of ad-hoc read requests to be received by the DCC within 30 minutes. The total number of individual meters to be read in any 30 minute period can be up to 0.1% of the installed, operational smart meter population. *Frequency* Scheduled: Meter reads may be required on either a daily, weekly, monthly or quarterly basis, or as configured. Each read shall contain half hourly values and the	**NOTE: Not clear how the Prospectus deals with activating the maximum power consumption threshold. This may need further explanation and discussion with the Ofgem SMIP.**

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
			appropriate aggregate total. On Demand: Likely to be single events per meter per year **1.79 Read Distributed Generation Data** *Service Level* Scheduled: data from 99% of all meters shall be received within 24 hours. On Demand: 90% of on demand read requests to be received by the DCC within 30 minutes. *Frequency* Scheduled: half hourly, daily, weekly, monthly or quarterly On Demand: Likely to be single events per meter per year. **1.80 Feed in Tariff update** *Service Level* On Demand: An updated Feed In Tariff shall be received by 95% of meters/IHDs	

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
			within 2 hours. *Frequency* Feed In Tariff updates will only be required on an infrequent basis. **1.83 Electricity Quality Read.** *Service level* On Demand: Electricity quality data shall be received from 99% of applicable meters within 1 minute. Scheduled: Electricity quality data shall be received from 99% of applicable meters within 60 minutes *Frequency* On Demand: single events per year per meter Scheduled: daily aggregated download per meter. **1.89 Load Management** *Service Level* On Demand/Scheduled: Commands for	

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
			load management shall be transmitted to 90% of meters within 5 minutes. An acknowledgement that a command for load management has been successfully received by the smart metering system shall be received by the DCC from 90% of smart meters within 10 minutes. The total number of load control commands to individual meters in any 10 minute period can be up to 0.05% of the installed, operational smart meters. *Frequency* On Demand: It is likely that load management will be required for meters within a stressed part of the network on an infrequent basis when load is peaking. Scheduled: Daily events per meter	
Elec_UC_18	Manage meter safety alarm	1. Smart Metering System sends alarm to DNOs: On Event – 15 minutes response. 2. DNOs remotely disconnect the supply	**1.55 Tamper Alarm Triggered** *Service Level* On Demand: A meter tamper alarm shall be reported within 60 minutes of tamper detection.	Alarm: Prospectus states 60 minutes, with capability of 0.5% of meters to submit a tamper alarm in any 24 hour period. ENA simply states a 15 minute response.

ENA Use Case	ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
	through the Smart Metering System (where deemed necessary). 3. Smart Metering System sends the confirmation message to DNOs The Smart Metering sends: On Event – 15 minutes responses the confirmation message to the DNO: On Event – 15 minutes response	Capability for 0.5% of meters to submit a tamper alarm within a 24 hour period. *Frequency* On Demand: A tamper alarm will only happen in the event that a meter has been tampered with. Likely to be single events per meter per year. **1.67 Remote Enablement / Disablement of Supply** *Service Level* On Demand: 90% of remote enablement/disablement requests to be received by within 10 minutes. The number of enablement/disablement requests shall be no greater than 0.01% of the installed and operation meters in any 10 minute period. *Frequency* On Demand: Likely to be single events per meter per year. **1.83 Electricity Quality Read.**	Enable / Disablement of meter: Prospectus states 90% of meters population within 10 minutes, whereas ENA simply states 15 minutes. Confirmation to DNO: Can only be considered as similar to alarm and the response is 60 minutes v 15 minutes for ENA. Quality related data in Prospectus states 99% of all meters shall be received within 24 hours and for on Demand: 90% of on demand read requests to be received by the DCC within 30 minutes. ENA assume 5-15 minutes response. **NOTE: Need to consider whether alarm differences in timing is a key issue that needs to be raised with the Ofgem SMIP.**

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
			Service Level On Demand: Electricity quality data shall be received from 99% of applicable meters within 1 minute. Scheduled: Electricity quality data shall be received from 99% of applicable meters within 60 minutes *Frequency* On Demand: single events per year per meter Scheduled: daily aggregated download per meter.	
Elec_UC_19	Manage extreme voltage at meter	1. The Smart Metering System sends alarm of a voltage level outside its configured tolerance levels: On Event – Alarm response within 15 minutes 2. (Optionally) the Smart Metering System auto-disconnects itself	**1.65 Meter Read (import & export)** *Service Level* Scheduled: Meter read data from 99% of all meters shall be received within 24 hours. All meter reads shall be received within 24 hours. On Demand: 90% of ad-hoc read requests to be received by the DCC within 30	Alarm – ENA requires on event alarms within 15 minutes, whereas Prospectus states alarm should be reported to DCC within 5 minutes. Enablement / Disablement of meters – ENA requires confirmation of disconnect within 5 minutes (possibly 30 secs to 2 minutes). Prospectus states 90% of such commands to be received

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
		from the network supply of electricity sending confirmation of disconnection to the DNO On Event – Alarm response within 5 minutes (possible 30 secs to 2 mins) 3. Supply is enabled by DNO after emergency/safety action On Event – Alarm response within 5 minutes (possible 30 secs to 2 mins). Generally assumed to occur once every 6 months.	minutes. The total number of individual meters to be read in any 30 minute period can be up to 0.1% of the installed, operational smart meter population. *Frequency* Scheduled: Meter reads may be required on either a daily, weekly, monthly or quarterly basis, or as configured. Each read shall contain half hourly values and the appropriate aggregate total. On Demand: Likely to be single events per meter per year **1.67 Remote Enablement / Disablement of Supply** *Service Level* On Demand: 90% of remote enablement/disablement requests to be received by within 10 minutes. The number of enablement/disablement requests shall be no greater than 0.01% of the installed and operation meters in any	within 10 minutes. Also restricted to 0.01% of meter population within any 10 minute period. ENA assumed one such event every 6 months, whereas Prospectus assumes once per year Quality related data in Prospectus states 99% of all meters shall be received within 24 hours and for on Demand: 90% of on demand read requests to be received by the DCC within 30 minutes. ENA assume 5-15 minutes response. **NOTE: ENA should consider if Prospectus Service levels and frequency are acceptable, considering that it states a time at least twice what the ENA stated, but it is qualified for a share of the total population of meters.**

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
			10 minute period. *Frequency* On Demand: Likely to be single events per meter per year. **1.73 Supply Fault Alarm Triggered** *Service Level* On Demand: Loss of supply shall be reported by DCC within 5 minutes for 99.5% of the meters detecting a loss of supply. Power restoration shall be reported by DCC within 60 minutes for 90% of the meters affected by loss of supply. *Frequency* On Demand: Likely to be single events per meter per year. **1.83 Electricity Quality Read.** *Service Level* On Demand: Electricity quality data shall be received from 99% of applicable meters	

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
			within 1 minute. Scheduled: Electricity quality data shall be received from 99% of applicable meters within 60 minutes *Frequency* On Demand: single events per year per meter Scheduled: daily aggregated download per meter.	
Elec_UC_20	Configure smart metering system	On Event: Assumed 15 mins up to 12 hours (i.e. confirming meter changes). Assumed to occur once every 3 years.	**1.63 Remote Configuration of Settings** *Service Level* On Demand: Requested configuration or reconfiguration of a setting shall be acknowledged from 90% of meters within 30 minutes. The total number of commands to alter settings in individual meters in any 30 minute period can be up to 0.05% of the installed, operational meter population. *Frequency*	Prospectus focused on total population of meters and states 90% configuration acknowledgement within 30 minutes. ENA much wider response time span, with no link to total meter population. Prospectus assumes this will occur once per year, whereas ENA assumes once every 3 years. **NOTE: Prospectus more finely defined and therefore**

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
			On Demand: Likely to be single events per meter per year.	**probably better than ENA statement.**
Gas_UC_01	Gather information for planning	1. The Smart Metering System sends the recorded gas demand data to the Gas Distribution Network Operator (assumed 6min interval data) – Every 6 minutes every day. Done once per year. 2. The Smart Metering System sends the recorded gas demand data to the Gas Distribution Network Operator (assumed Daily registered data) – every day at 6am. Done once per 6 month period.	**1.65 Meter Read (import & export)** *Service Level* Scheduled: Meter read data from 99% of all meters shall be received within 24 hours. All meter reads shall be received within 24 hours. On Demand: 90% of ad-hoc read requests to be received by the DCC within 30 minutes. The total number of individual meters to be read in any 30 minute period can be up to 0.1% of the installed, operational smart meter population. *Frequency* Scheduled: Meter reads may be required on either a daily, weekly, monthly or	**NOTE: The Prospectus is focused on billing related data, whereas ENA is all about gathering planning data e.g. latency of 5 days to capture data. This needs to be discussed further with the Ofgem SMIP.**

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
		Response time within 5 days for both.	quarterly basis, or as configured. Each read shall contain half hourly values and the appropriate aggregate total. On Demand: Likely to be single events per meter per year	
Gas_UC_02	Configure gas smart metering system	On Event: Confirmation almost real time and it is assumed to occur only once every 3 years.	**1.63 Remote Configuration and Synchronisation of Meter Settings** *Service Level* On Demand: Requested configuration or reconfiguration of a setting shall be acknowledged from 90% of meters within 30 minutes. The total number of commands to alter settings in individual meters in any 30 minute period can be up to 0.05% of the installed, operational meter population. *Frequency* On Demand: Likely to be single events per meter per year.	Prospectus assumes 90% of meters will acknowledge configuration command within 30 minutes, whereas ENA talks about a confirmation being almost real time. Prospectus assumes 1 event per year whereas ENA assume one event every 3 years. **NOTE: Need to consider ENA statement about 'almost real time' versus Prospectus more general statement about 90% of meters within 30 minutes.**
Gas_UC_03	Disable supply of gas by GDN	On Event: 1 hour response (originally was real time).	**1.67 Remote Enablement / Disablement of Supply**	Prospectus requires 10 minute response from 90% of meters,

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
		Assumed to happen once every 3 years	*Service Level* On Demand: 90% of remote enablement/disablement requests to be received by within 10 minutes. The number of enablement/disablement requests shall be no greater than 0.01% of the installed and operation meters in any 10 minute period. *Frequency* On Demand: Likely to be single events per meter per year.	whereas ENA only states 1 hour response. ENA also only assume this will occur once every 3 years, whereas Prospectus assumes single events per meter per year. **NOTE: Prospectus more stringent requirements than ENA**
Gas_UC_04	Display messages from GDN	On Event: 1 hour response (originally was real time). Assumed to occur once every 10 years	**1.61 Message to Consumers to the IHD** *Service Level* On Demand: Messages to an IHD from the DCC shall be received within 1 hour. *Frequency* On Demand: Variable, from single messages per meter per year to daily.	Response time of 1 hour is the same. ENA only assumed it would occur once every 10 years whereas Prospectus assumes on demand, but this covers single messages per meter per year to daily. **NOTE: response the same but Prospectus assumes event will occur more frequently**

ENA Use Case		ENA Frequency & Response Requirements	Core Prospectus Services – Example Service levels & Frequency	Comments / Issues
				than ENA.
Gas_UC_05	Measure and store Calorific Value (CV)	Daily: 1 hour response (originally was real time).	**1.77 Gas Calorific Value Update** *Service Level* The calorific value of gas shall be transmitted to 95% of meters within 12 hours. *Frequency* Calorific value of gas shall be required to be sent to a meter on a monthly basis.	ENA assumed that update would occur each day and be completed within 1 hour. Prospectus states transmit to 95% of meters within 12 hours and this would only be done on a monthly basis. **NOTE: There is a difference that may only be a timing issue, but should be raised with the Ofgem SMIP.**

4.2 Commentary on the Statement of Design Requirements' High Level Analysis

The Statement of Design Requirements (SDR) captures high-level indicative data traffic analysis based on what it refers to as "conservative assumptions and low/high scenarios to gain an order of magnitude estimate for the smart metering system total data volumes". The SDR notes that its figures are illustrative and that further work will be needed in the future. The low and high scenarios include a mix of readings, diagnostics and other commands/alerts. It is worth noting that the high scenario assumes a large penetration of services relating to smart grids while the low one assumes very little smart grid activity.

From an ENA perspective, the SDR actually makes references to previous ENA work on this area and notes that the high estimate (high scenario) is approximately double that of the ENA's estimate. This is acceptable since the Ofgem analysis also contains data required by Suppliers, whereas the ENA analysis only includes those data flows needed to support network operator activities.

The SDR presented a high level view of indicative sizes for smart meter data in graphical format. The document makes further references to the data analysis undertaken by the ENA and Engage in its document (High Level Smart Data Traffic Analysis). It also notes the meter traffic figure for gas and electricity and the ones for smart grids – the smart grid figure of 60 terabytes per annum is the same as the one contained in Engage's report for the ENA.

One of the items mentioned in the SDR is the aggregate daily reads for both gas and electricity meter readings noted at 384 bytes each. These are not captured in the ENA analysis. The SDR mentions them as an indicative size for this data.

The SDR concludes that the analysis of the data volumes and rates sits comfortably in a number of communication solution areas and that the latency requirements will be defined in the technical specification and will be dependent on the agreed service levels as the SMIP develops.

In summary, the SDR makes it clear that the ENA's analysis has been taken into consideration and reviewed – and the ENA document has been referenced within the SDR. Furthermore, the SDR also notes that the ENA's analysis aligns to its own analysis. The SDR document only has a high level snapshot of its own analysis thus not providing the required detail to allow for any form of detailed comparison with the ENA's analysis.

Whilst comfort can be taken from this alignment, it would be prudent to undertake a more complete comparison when more detailed SDR analysis is available[7].

[7] The ENA may want to consider seeking details of the SDR analysis from Ofgem in order to allow for a comprehensive and robust comparison (if deemed necessary).

5 Comparison of ENA Cost Benefit Analysis with the Prospectus Impact Assessment

5.1 DECC High-Level Functionality Requirements for the Smart Metering System

The DECC Prospectus Impact Assessment (IA) sets out the high-level minimum functional requirements for the smart metering system that are required to deliver a wide range of anticipated benefits. The prospectus IA does not include an assumption about how the functionality is delivered i.e. whether it should be delivered within a "meter", through a standalone module or through some other technical solution. This is with the exception of the WAN communications on the consumer premises, which needs to be separate from the meter.

The table below sets out the high level functionality that DECC believe should comprise the electricity and gas smart metering systems.

High Level Functionality	Electricity	Gas
A - Remote provision of accurate reads/information for defined time periods - delivery of information to customers, suppliers and other designated market organisation.	✓	✓
B - Two way communications to the meter system - communications between the meter and energy supplier or other designated market organisation - two way transmission of data through a link to the wider area network, transfer data at defined periods, remote configuration and diagnostics, software and firmware changes.	✓	✓
C - Home area network based on open standards and protocols - provide "real time" information to an in-home display - enable other devices to link to the meter system.	✓	✓
D - Support for a range of time of use tariffs - multiple registers within the meter for billing purposes.	✓	✓
E - Load management capability to deliver demand side management - ability to remotely control electricity load for more sophisticated control of devices in the home.	✓	
F - Remote disablement and enablement of supply - that will support remote switching between credit and pre-pay	✓	✓
G - Exported electricity measurement - measure net export	✓	
H - Capacity to communicate with a measurement	✓	

device within a microgenerator - receive, store, communicate total generation for billing		

DECC state, for electricity, that this level of functionality will deliver the policy objectives and benefits anticipated for smart metering across consumers, suppliers, networks and the environment. In addition, they believe that this level of functionality aligns with wider policy developments around renewables, micro-generation, electric vehicles and smart grids.

5.2 Benefits Included within the ENA Cost Benefit Analysis

The Prospectus IA has not been changed to include more networks benefits since it was issued in December 2009. It should also be noted that a direct financial comparison between the ENA CBA and Prospectus IA was not possible as the Prospectus IA does not include the underlying disaggregated detail. However, benefits that have not been quantified directly have been considered to the extent that this has been possible.

The following two sections use a traffic light key to highlight the degree of difference between the ENA CBA and the Prospectus IA. This key is as follows:

No Differences / differences have minimal network impact
ENA should be aware of the variances, although these maybe minor
Potentially material variances between Prospectus IA and ENA CBA

ENA CBA	Prospectus IA	Comments
Improvement in Quality of Supply Better identification of faults (labour savings). Total benefit across all DNOs is c£2.2m per annum following smart metering roll out in 2020. Better management of customer minutes lost (IIS savings) Total benefit across all DNOs is c£2m per annum following smart metering roll out in 2020.	Partially covered in functionality requirements A and E	Whilst the functionality requirements are partially covered, the financial benefits are not included within the Prospectus IA.
Efficient Network Investment The refinement of the	Partially covered in functionality requirements D and E	The ENA benefits are partly covered within the consumer and

ENA CBA	Prospectus IA	Comments
planning process from the implementation of smart metering utilising the additional data available will help to minimise the cost of LV and HV network reinforcement. Total benefit across all DNOs is c£4.4m per annum following smart metering roll out in 2020. The SEDG report for ENA "Benefits of Advanced Smart Metering for Demand Response based Control of Distribution Networks", highlights the potential avoided cost of HV and LV network reinforcement if smart metering can be used as an enabler for responsive demand. The report estimated the potential avoided distribution networks reinforcement costs to be in the range of £0.5bn to £10bn.	**Consumer Benefits – Energy Demand Shift** Another potential source of change in consumption patterns through smart meters is a shift of energy demand from peak times to off-peak times. The rationale and the underlying assumptions on Time of Use (ToU) pricing have not changed since the December 2009 IA. Ofgem assume a 20% take up by consumers of the ToU tariff (in addition to the existing group using this option) and a resulting overall 3% electricity bill reduction and 5% peak use reduction for these customers; sensitivities are made on the take up at 0% and 40%.	supplier benefits as noted opposite. The DECC Prospectus does not include losses specifically for DNOs.
	Consumer Benefits – Avoided Costs of Carbon from Energy Savings For electricity, reductions in electricity use will mean the UK purchasing fewer EU ETS allowances and this saving is assimilated as a benefit. In our analysis and across all options, it accounts for Present Value (PV) of approximately £350m. For gas, the value of carbon savings from a reduction in gas consumption uses the non-traded carbon prices under DECC's carbon valuation methodology. This corresponds to a net reduction in global carbon	

ENA CBA	Prospectus IA	Comments
	emissions and corresponds to approximately PV £0.60bn for option 1 and £0.65bn for option 2 within the DECC IA.	
	Consumer Benefits – Reduction in Carbon Emissions Over the period covered in the IA, DECC assume that as a result of a reduction in energy consumption, CO2 emissions reductions will take place in the traded and non-traded sectors.	
	Supplier Benefits - Losses (Distribution). Continue to assume that smart meters facilitate some reduction in losses and that the benefits per meter per year will be £0.5 for electricity and £0.1 to £0.2 for gas.	
	Consumer Benefits - Energy Demand Reduction. Assumed that the following gross annual reductions in demand will take place as a result of improved feedback on the use and cost of energy. The reductions are as follows: • 2.8% for electricity (credit and PPM); 2% for gas credit and 0.5% for gas PPM. Also apply sensitivity analysis to these benefits	

ENA CBA	Prospectus IA	Comments
	as follows: • In the higher benefits scenario: 4% for electricity (credit and PPM), 3% for gas credit and 1% for gas PPM. In the lower benefits scenario: 1.5% for electricity (credit and PPM), 1% for gas credit and 0.3% for gas PPM.	
Theft of Electricity DNOs suffer no direct loss of income from stolen units as their allowed revenues are no longer subject to a volume incentive, as such there is no lost revenue. The tamper proofing financial impact is included within the SRSM benefits.	Partially covered in functionality requirements B **Supplier Benefits - Theft of Energy** Information provided suggested that this could reduce theft by 20-33%, equivalent to £0.27 to £0.85 per meter per year. The Prospectus continues to assume that the amount of theft is likely to decrease as suppliers will have access to more accurate and frequent data and will detect theft more quickly; however it also recognises that new methods of theft will arise. The assumption of a reduction of 10% or c. £0.2 per meter per year continues to be used in our central scenario.	Whilst the Prospectus includes theft of energy, the ENA benefits are focussed on the cost of manpower in attending such instances – albeit these are not quantified within the ENA CBA.
Improved Customer Service Whilst there are obvious customer service benefits by having additional information to hand and	**Consumer Benefits - Consumer Time Savings** There are no financial benefits quantified within the IA	The Prospectus benefits are focussed on the reduction in call centre costs and do not pick up any DNO specifics.

ENA CBA	Prospectus IA	Comments
being able to react to outages quicker, to attribute a cost saving to these further analysis would have to be undertaken to identify the full benefits.		
Reduction in Cost to Serve Reduced cost to serve by moving away from letters, effective use of the DNOs workforce in outage management due to the ability to correctly determine the issue and reduce DNO call-outs to attend premises due to dangerous conditions Informed network investment / intervention decisions resulting in reduced capital costs Avoidance of unnecessary reinforcement or active network management costs due to enhanced assessment of capacity headroom	Partially covered in functionality requirement E **Supplier Benefits - Reduction in Customer Service Costs** Call centre cost savings are a result of a reduction in billing enquiries and complaints. Assumption is unchanged since December 2009 and assumes a cost saving to be £2.20 per meter per year in the central scenario (£1.88 for reduced inbound enquiries and £0.32 for reduced customer service overheads).	The Prospectus benefits are focussed on the reduction in call centre costs and do not pick up any DNO specifics.
Improvement in Quality of Supply and Compliance Ability to identify the effectiveness of active network management or system balancing measures. Develop strategies to improve network performance Reduce exposure to Guaranteed Standards of Performance failures More auditable outage	Partially covered in functionality requirement B and E	Whilst the functionality requirements are partially covered the financial benefits are not included within the Prospectus

ENA CBA	Prospectus IA	Comments
notification Improved restoration times for customers affected by unplanned outages Better management of Customer Interruption (CI) and Duration (Customer Minutes Lost (CML) performance. Voltage level and power flow maintenance within the prescribed limits Allows identification and resolution of fault masking		
Additional Demand / Generation and New Connections Support Faster, better informed responses to requests for additional demand / generation and new connections Accurately determine the reinforcement or active network management requirements, together with the associated costs, to allow the proposed new demand / generation connections to be provided. Higher levels of demand / generation to be connected to the network Potentially reduced claims for damage to appliances and avoided bad publicity associated with damage to appliances Providing alternative balancing actions and	Partially covered in functionality requirements G and H **Consumer Benefits – Export Information from micro-generation.** Conservative estimate of the number of units (about 1 million by 2020) and the savings per annum per meter (£0.12).	This is partially covered within the DECC Prospectus, although this focuses on the consumer benefits rather than any DNO benefit.

ENA CBA	Prospectus IA	Comments
sources of short term operating reserve.		
Identification of Network Issues and Forecasting of Reinforcement Need Earlier identification of potential network stresses (i.e. caused by latent demand) – enabling mitigating interventions before thermal loading or statutory voltage transgressions occur. Improved forecasting of future reinforcement need Improved identification of the root cause Improved network load forecasting capability Improved identification of increase in voltage quality issues	**Not Covered**	The DNO benefits are not included within the DECC prospectus.
The above ENA benefits will all be enablers to a Smarter Grid.	**Intangible Benefits - Enabling a Smarter Grid**	

5.3 Additional Benefits within DECC Prospectus Impact Assessment

ENA CBA	Prospectus IA	Comments
The Prospectus IA benefits are not referenced in ENA CBA since not viewed as DNO related.	**Consumer Benefits - Consumer Time Savings** There are no savings quantified within the IA	N/A for DNO benefits.
	Supplier Benefits - Debt Management More accurate energy use information should help	N/A for DNO benefits.

ENA CBA	Prospectus IA	Comments
	consumers better manage their energy expenditure. This reduces supplier costs in managing and recovering debt. The benefit assumed in the Prospectus IA modelling is £2.20 per meter per year, which reflects reduced enquiries related to change of occupier and change of supplier. Suppliers estimate that a 30% fall in inbound calls volume could result in 20% savings in call centres overheads.	
	Supplier Benefits - Meter Reading Costs Assumption unchanged from the December 2009 IA. Assume that "avoided meter reading" will bring in benefit (cost savings) of £6 per (credit) meter per year in the Prospectus IA central scenario taking into consideration both actual and attempted reads. Reductions in the requirements for special site visits are assumed to give a benefit of £0.75 per meter per year.	N/A for DNO benefits.
	Supplier Benefits - Remote Switching and Disconnection Costs The direct benefits associated with these capabilities are the avoided site visits and equipment upgrade costs. These are captured in the debt management and in the pre payment cost to	N/A for DNO benefits.

ENA CBA	Prospectus IA	Comments
	serve savings. The Prospectus IA also continues to include a further benefit of £0.5 per credit meter per year for the benefits of being able to remotely disconnect those consumers.	
	Supplier Benefits - Pre-payment Cost to Serve Savings arise primarily from reduced maintenance and service needs. Assumed that the additional cost to serve consumers with PPMs is£30 for electricity and £40 for gas. The introduction of smart metering would reduce (but not remove all) these additional costs. The Prospectus IA assumption is unchanged from that used in December 2009 and is based upon consideration of the 2009 consultation responses and evidence from DECC. The level of savings attributed to smart meters is 40%, representing an annual saving of £12 for each electricity PPM and £16 for each gas PPM.	N/A for DNO benefits.
	Supplier Benefits - Switching Savings. Trouble shooting teams employed to resolve exceptions or investigate data issues would no longer be needed. Suppliers will be able to take accurate readings on the day of a change of	N/A for DNO benefits.

ENA CBA	Prospectus IA	Comments
	supplier, resolving the need to follow up any readings that do not match and instances of mis-billing would reduce. The Prospectus IA continues to assume savings of £100m per year (any additional systems costs are included in the IT and systems cost estimate).	
	Intangible Benefits - Enabling a Smarter Grid This would include the ability to manage fluctuations in supply from intermittent renewable generation. Smart meters are a key component in the creation of a UK 'smart grid', providing information to improve network management (subject to data, privacy and access controls), facilitating demand shifting, and supporting distributed energy generation. Although potential benefits to GB from a smarter grid are likely to be significant in the long term, it is difficult at this stage to estimate these with confidence, and DECC have not attempted to attribute any smart grid related benefits in the smart meters cost benefit analysis.	The components that underpin a smart grid, such as improved network management and reinforcement planning through demand shifting are included within the ENA CBA.
	Intangible Benefits – Competition In addition the information	N/A to DNO benefits

ENA CBA	Prospectus IA	Comments
	on energy consumption provided to consumers via displays will enable them to seek out better tariff deals, switch suppliers and therefore drive prices down. While DECC judge that greater levels of competition may result in lower prices, they have found it difficult to quantify these competition-related reductions and therefore no attempt has been made to quantify these in this Consultation IA.	
	Intangible Benefits - Future Energy Products This revenue was estimated to be of the order of £100m or more per annum from 2020. The Prospectus was unable to estimate the consumer benefit from these new products, therefore, to avoid a biased adjustment of estimates they have excluded the expected supplier profits from the analysis reported in this IA.	N/A to DNO benefits
	Supplier Benefits - Generation Capacity Investment. The assumed consumer energy demand shift to off-peak load could realise savings in investment in generation capacity. In the model it is assumed that the cost of additional investment in generation capacity is of £600 per	N/A to DNO benefits

ENA CBA	Prospectus IA	Comments
	additional kW of investment. If consumers shift to off-peak consumption some of the investment in generation capacity will be unnecessary, therefore realising savings to energy suppliers.	

5.4 Summary

Whilst it was not possible to undertake a direct comparison between the financial benefits within the ENA CBA and those within the Prospectus IA, there are a number of gaps that have been identified. This is as expected as the DECC documentation is focussed primarily on supplier and consumer benefits whilst the ENA CBA is focussed on DNO benefits.

The Prospectus IA states that *"although potential benefits to GB from a smarter grid are likely to be significant in the long term, it is difficult at this stage to estimate these with confidence, and we have not attempted to attribute any smart grid related benefits in the smart meters cost benefit analysis."*

5.4.1 Cost Benefits Partially Covered

The following cost benefits are partially covered by the ENA CBA and/or the DECC Prospectus IA:

- Efficient network investment – whilst this is covered within the ENA CBA in detail, this is only partially covered within the Prospectus IA and is mainly focussed on supplier and consumer benefits around energy demand shift and reduction. The ENA financial benefits of £4.4m per annum are not included within the DECC Prospectus IA;
- Improvement in quality of supply – whilst this is covered within the ENA CBA in detail, this is only partially covered within the Prospectus IA. The ENA benefits of £4.2m per annum are not included within the DECC Prospectus IA; and
- Additional demand / generation and new connections support; reduction in the theft of electricity; improved customer service; reduction in cost to serve; and compliance – whilst the Prospectus attributes some of these benefits to networks, the ENA CBA does not include them as they are relatively small compared to the benefits brought to consumers and suppliers.

The Prospectus notes that there have been a number of attempts to quantify potential benefits arising from a smarter grid, but DECC points out that they do not necessarily endorse these and emphasis the uncertainty surrounding a future smart grid. However the Prospectus does refer to the CBA undertaken by

Accenture on behalf of DECC and the ENSG (Electricity Networks Strategy Group) which found a positive business case for smart grid investments.

The Prospectus IA has no single smart grid 'solution' and the analysis considers one possible 'path', adopting a two phase approach to take into account the considerable uncertainty post 2020. These are as follows:

- Phase 1 considers the period 2010-2020 and is found to have an NPV of £1.5bn. This includes investment in smart meters on distribution transformers, direct control equipment, smart appliances and IT; and benefits through demand response and system optimisation, reduced need for network reinforcements, lower predictive maintenance, distributed generation, and reduced technical losses and customer minutes lost; and
- Phase 2 (2020-2050) is estimated to have an NPV of £2.6bn. This includes investments in substation automation and enhanced communications; benefits are expected from a greater use of demand side management (due to higher assumed levels of heat pumps and electric vehicles) as well as from more cost-effective management of distributed energy resources.

The DECC Prospectus also refers to the CBA undertaken by Imperial College (SEDG) on behalf of the ENA and the estimated potential network benefits from Smart Meters due to demand side management of between £0.5 - £10bn NPV from 2020 – 2030. However, it does not incorporate these figures in its assessment of benefits.

There are a number of functional requirements that are partially included within the DECC Prospectus IA that underpin the benefits contained within the ENA CBA. These cover the ENA benefits associated with quality of supply, theft of electricity, improvement in quality of supply and compliance, efficient network investment, reduction in cost to serve and additional demand / generation and new connections support. There are also a number of ENA benefits that are not underpinned by functional requirements, such as improved customer service and identification of network issues and forecasting of reinforcement need.

5.4.2 ENA Benefits Not Included within the DECC Prospectus Impact Assessment

The identification of network issues and forecasting of reinforcement need benefit of £8.6m per annum from the ENA CBA is not included in the Prospectus IA at all.

5.4.3 DECC Prospectus Impact Assessment Not Included within the ENA Benefits

There are a number of benefits within the DECC Prospectus IA that could relate to DNOs that are not included within the ENA CBA. This is because they were not considered to offer a significant enough benefit to be assessed in detail.

6 Smart Grid Definition

This section takes the ENA's definition of Smart Grid and compares that to the definition in the Statement of Design Requirements (SDR) document (Reference 7).

6.1 SDR Definition

The document notes that there are a number of definitions for a Smart Grid and that these definitions fall under two categories: describing what a Smart Grid is; and describing what it does. Ofgem is particularly interested in the latter; the SDR document quotes the definition provided by the ENSG[8] Smart Grid Working Group – this definition is as follows:

"*A smart grid, as part of an electricity power system, can intelligently integrate the actions of all users connected to it - generators, consumers and those that do both - in order to efficiently deliver sustainable, economic and secure electricity supplies. A smart grid employs communications, innovative products and services together with intelligent monitoring and control technologies to:*

- *facilitate connection and operation of generators of all sizes and technologies;*
- *enable the demand side to play a part in optimising the operation of the system;*
- *extend system balancing into distribution and the home;*
- *provide consumers with greater information and choice of supply;*
- *significantly reduce the environmental impact of the total electricity supply system; and*
- *deliver required levels of reliability, flexibility, quality and security of supply.*"

6.2 Definition Comparison to the ENA

On its website[9], the ENA defines a Smart Grid as follows:

"*a responsive system that can handle intermittent renewable energy sources and make it possible for users to vary their consumption patterns.*"

It then goes on further to note what Smart Grids will do and could do in future.

The ENSG definition of a Smart Grid is a more detailed one compared to the ENA's definition based on the above extract. However, the ENA has made a significant contribution to the ENSG group and its definition of a Smart Grid, and so it is reasonable to assume that the respective interpretations of what a Smart Grid is align.

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[8] Energy Networks Strategy Group
[9] Source: http://energynetworks.squarespace.com/smart-grids

7 Data Communications Company Requirements

This section provides an assessment and commentary on proposals in the Prospectus for the Data Communications Company (DCC).

7.1 DCC Functions

The SMIP Prospectus mandates that communication of data to and from smart meters will be managed by a central function for both gas and electricity within the domestic market. It notes a number of benefits for this approach; one of these benefits is enabling the development of Smart Grids. The Prospectus comments that users (such as network operators) will have access for specified purposes to the central communications hub.

The Prospectus indicates that the initial scope of the DCC will be limited to functions that are essential for the transfer of Smart Metering data such as secure communications, access control and scheduled data retrieval; and that it subsequently takes on board meter registration (thus impacting network operators for electricity). Other activities, such as certain settlement functions, are currently out of scope but may be included in the future if there is a business case for them.

The Prospectus also states that the DCC will be a procurement and service management entity (rather than a communications provider itself). The key rationale for this is so that it can re-procured communications contracts periodically – allowing competitive responses to: changing requirements, not least of which are Smart Grid requirements and other industry developments; as well as changing technology.

The Statement of Design Requirements captures Smart Grid related services that require information exchanges between the DCC and the Smart Meter as follows[10]:

- electricity quality reads in relation to remote delivery of measurements of the electricity quality values that include data items such as Voltage, Power and Current; and
- load management activities where messages are sent to control appliances and specified premises circuits remotely thus allowing network operators the dynamic management of their network's load.

7.2 Staged Rollout Implications

The Prospectus makes provision for smart meters to be rolled out significantly in advance of the DCC being implemented – with the technical requirements of smart metering systems due to be finalised in Autumn 2011; and the DCC not due to go-live until Autumn 2013. Suppliers will be responsible for procuring their own communications contracts in this interim period and, subject to certain conditions, it is proposed that these contracts are novated to the DCC when it goes live.

[10] However, it goes on to say that "this is based on assumptions to date. The programme awaits additional justification with cost benefits from ENA".

A result of this staged implementation approach is that the DCC will be heavily shaped on day one by the contracts that Suppliers put in place between now and then. Furthermore, this influence on shape could be long lasting as the WAN communication module installed by Suppliers in the interim will be aligned with the pre DCC communications.

As a consequence, there is a risk that networks' requirements of the DCC will not be adequately supported on day one, and that addressing this and being able to respond effectively to evolving network requirements could be limited, at least to some extent, for some considerable time thereafter.

7.3 Initial Support for Smart Grid Requirements

Notwithstanding the risks associated with the staged implementation, the Prospectus does make initial provision for some Smart Grid functions to provide data for network operators in order to inform planning, investment decisions and manage its operations. The Prospectus notes that there is a business case for building this functionality into the design at this initial stage.

The Government has proposed a number of items that facilitate Smart Grid development which it believes balances "*the risk of costly over-specification of the smart metering system against insufficiently addressing future needs, which could lead to the loss of significant opportunities*."

These proposals are:

- setting functionality requirements that support a wide range of potential smart grid requirements;
- future proofing WAN communications modules to be exchanged without having to change the meter, initially designing its specifications to provide a range of potential Smart Grid applications, and allowing flexibility for different WAN technologies;
- allowing flexible service levels to be offered by the DCC and the requirement for it to set out plans for enhancing communications as the network requirements evolve over time when they will be more certain;
- network operators will be allowed a direct relationship with the DCC to enable the negotiation of appropriate service levels; and
- arrangements will be considered to ensure Suppliers take account of network operators' requests to install Smart Meters in specific geographical locations (the example of supporting Smart Grid initiatives was cited).

Reasonable steps have been taken within the Prospectus to accommodate current ENA requirements of the DCC. However, it is important to ensure that the staged implementation approach does inhibit the delivery of these requirements. Shaping of the DCC is at an early stage within the SMIP and more detailed work will be required going forward.

7.4 Evolution to Support Future Smart Grid Requirements

The initial design is intended to enable future Smart Grid requirements (such as remote management of Smart appliances, active demand side management, and active system balancing) to be accommodated incrementally if and when required – if a business case exists.

The Communications Business Model (CBM) document notes that these requirements are likely to comprise two types of service that will evolve over time:

- regular electricity quality data for operational planning; and
- "near real-time" services such as supply status alarms and "large scale, fast response" load management messages that interact with appliances in the premises.

However, the Prospectus acknowledges the uncertainty over the business case for future requirements and the likely extent of Smart Grid adoption, and states that projects funded by Ofgem's Low Carbon Networks Fund will provide valuable information in this respect.

Again, reasonable steps have been taken within the Prospectus to accommodate the uncertainty associated with future ENA requirements of the DCC. As with the current ENA requirements, it is important to ensure that the staged implementation approach does inhibit this.