SP Energy Networks 2015–2023 Business Plan

Updated March 2014

Annex

Smart Meter Strategy

SP Energy Networks

March 2014

SP ENERGY NETWORKS

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Smart Meter Strategy

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Issue Date	Issue No.	Document Owner	Amendment Details
17th March 2014	1.00	Fiona Fulton	First Issue

1. Scope

In our business plan we set out our intended expenditure on and benefits from smart meters. This annex explains our strategy for the use of smart meter information within network operations which will incur these costs and achieve the benefits. We explain our ambition to create a future proofed data infrastructure that will allow us to take full advantage of smart meter information in a range of different areas. This annex is closely aligned with the smart grid strategy annex

but does not specifically address that area.

2. Table of linkages

This strategy supports our ED1 Business Plan. For ease of navigation, the following table links this strategy to other relevant parts of our plan.

Document	Chapter / Section
SP Energy Networks Business Plan 2015-2023	Chapter C7 – Business Readiness
SP Energy Networks Business Plan 2015-2023	Chapter C8 – Risk and Uncertainty
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C7 – Smart Grid Strategy - Creating a Network for the Future – SPEN
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C7 – Innovation Strategy – SPEN
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C5 – Losses Strategy – SPEN
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C6 – Non-Operational IT and Telecoms Strategy – SPEN
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C6 – Operational IT and Telecoms Strategy – SPEN
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C6 – Cost Benefit Analysis – SPEN
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C6 – Expenditure Supplementary Annex – SPEN
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C6 – Expenditure Supplementary Annex – SPEN

3. Introduction

The government has mandated the rollout of smart meters to domestic and SME properties by the end of 2020. Although this is supplier led, we expect it to provide a significant opportunity to improve SPEN’s business processes. Although many aspects of the smart meter operations remain unclear this annex will explain our current strategy about the use of smart meter information within our business and further explain the associated costs and benefits.

Our strategy for smart meters is to fully exploit the information that they provide and maximise the opportunities for the crossover between smart grids and smart meters to create an intelligent ecosystem.

4. Our strategy

4.1. Our approach

Our strategy for smart meters is to achieve the following goals:

- *Provision of day to day operational support for the smart meter installation process*
- *Improve the customer experience*
- *Improve our outage management and fault resolution processes*
- *Improve our design and management of the network*
- *Improve our understanding and management of losses*

Our approach to achieving these goals is to identify aspirational business initiatives in the areas associated with these goals. We will then run iterative and incremental improvement projects that allow us to begin to use and adapt smart meter information as the roll out progresses. This allows us to ensure we make progressive investment in smart meter solutions which can take account of the operational changes that might arise in the new smart metering system and minimises our exposure to the risks associated with any significant changes.

4.2. Our initiatives

In order to achieve this in the most cost effective way we have prioritised 5 business initiatives as below:

- *Proactive Customer Contact – improving how we communicate with customers and the information we provide*
- *Network Property Linking – improving our network connectivity model*
- *Supply Restoration – improving our processes here, including fault identification and prediction*
- *Network Intelligence – longer term trend information which informs design, load and asset decisions*
- *Business Reporting –improving our regulatory and internal reporting on the status of the network*

These initiatives have been prioritised according to their contributions to the most relevant outputs (see Table 1) and their reliance on a certain level of smart meter penetration e.g. network intelligence and reporting requires near full coverage and so occurs later.

Business Initiative	Customer Satisfaction	Reliability	Connections	Environment	Safety
Proactive Customer Contact	High	Low	Low	Low	Low
Property Linking	High	High	High	High	Low
Supply Restoration	High	High	Low	Low	Medium
Network Intelligence	High	High	High	High	High

Business Reporting	High	Medium	Low	Low	Low

Table 1: Smart Meter Initiative mapped to ED1 Outputs

5. Process

5.1. Smart meter strategy development

In order to identify the business initiatives that achieve our goals we used the strategy process shown in Figure 1.

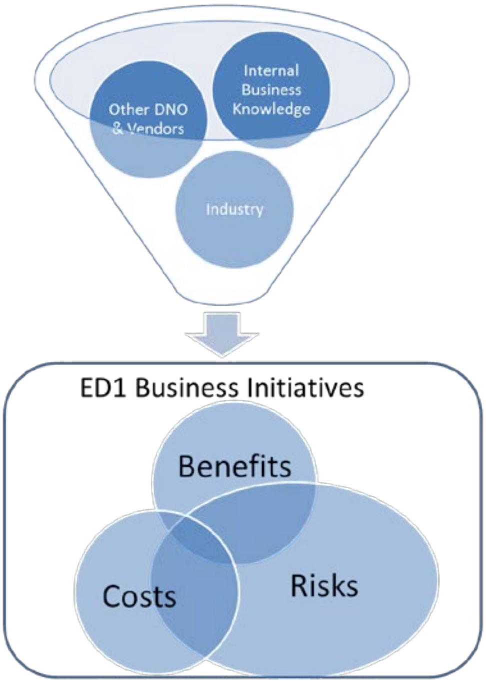

Figure 1: Strategy Development Process Overview

Our smart meter strategy development, represented in Figure 1, follows a number of key steps:

- *Industry: Through attendance at industry events, discussions with suppliers via the ENA and on a bilateral basis we have developed an understanding of what will be required from our systems and processes during and after smart meter rollout.*

- *Other DNO: working with the other DNO within the ENA we have developed a consistent understanding of some of the basic principles surrounding the potential use and storage of smart meter data. This is reflected in our current joint analysis work for a Data Communications Company (DCC) interface solution.*

- *Vendors: In order to understand the technical requirements for supporting smart meters we have engaged with a number of key infrastructure vendors to understand the optimum methods of handling both smart meter and smart grid data. This involved a series of workshops where each vendor was provided with the same brief and asked to present a potential solution.*

- *Internal Business Knowledge: Through a series of workshops we have been able to consolidate potential infrastructure solutions presented by vendors into an infrastructure blueprint which supports both smart grids and smart meters within our business environment. These findings are outlined in our "Roadmap for delivery".*

- *ED1 Business Initiatives: We have identified business processes we intend to modify as a result of smart meter data becoming available and indicative timescales for when these processes will be available within the business. At this stage we also evaluated the benefits we estimated will ensue from these modifications both to ourselves and our customers. These findings are outlined in "Outputs &*

Long Term View".

- *Costs & Benefits: In the final stage of our strategy development we aligned our infrastructure investment plans to our changing business processes so that we continue to develop our business in a cost efficient, timely manner to support the evolving smart meter base. These findings are outlined in "Roadmap for delivery". This timing aspect is also highlighted in the "Efficient Expenditure" section and the Cost Benefit Analysis (CBA).*

- *Risks: We have identified that the smart metering project carries a high degree of risk for network operators. As the service is not yet operational and some key service aspects, such as outage notification, remain undefined. Many of our predicted benefits heavily rely on the information arriving from smart meters both in the expected format and in a timely manner. This is explained further in the "Uncertainty & Risk" section, together with our mitigation approach.*

5.2. Validating the Strategy

In order to continue to evaluate our proposed strategy and mitigate risks we have instigated an Innovation Funding Initiative (IFI) trial which is focused on simulating the use of smart meter data in our internal business processes. This will help us verify if predicted benefits can be achieved with smart data use and also if our infrastructure can cope with different types of scenarios which may occur with smart meters. For example, risks to benefits achievable from smart meters are linked to the timeliness and breadth of content in the information we receive. This will be simulated in our test environment to assess the impact on back office systems. In our current trial we will simulate up to 30,000 smart meters interacting with our outage management system, PowerOn. We will share results from these tests with the other DNO, many of whom share similar outage management systems.

Figure 2 shows a screenshot of our smart meter simulator with an example of how the smart meter scenario is created. This example shows a common LV fault scenario where multiple fuses blow causing a range of different alerts to be generated by the simulated smart meters.

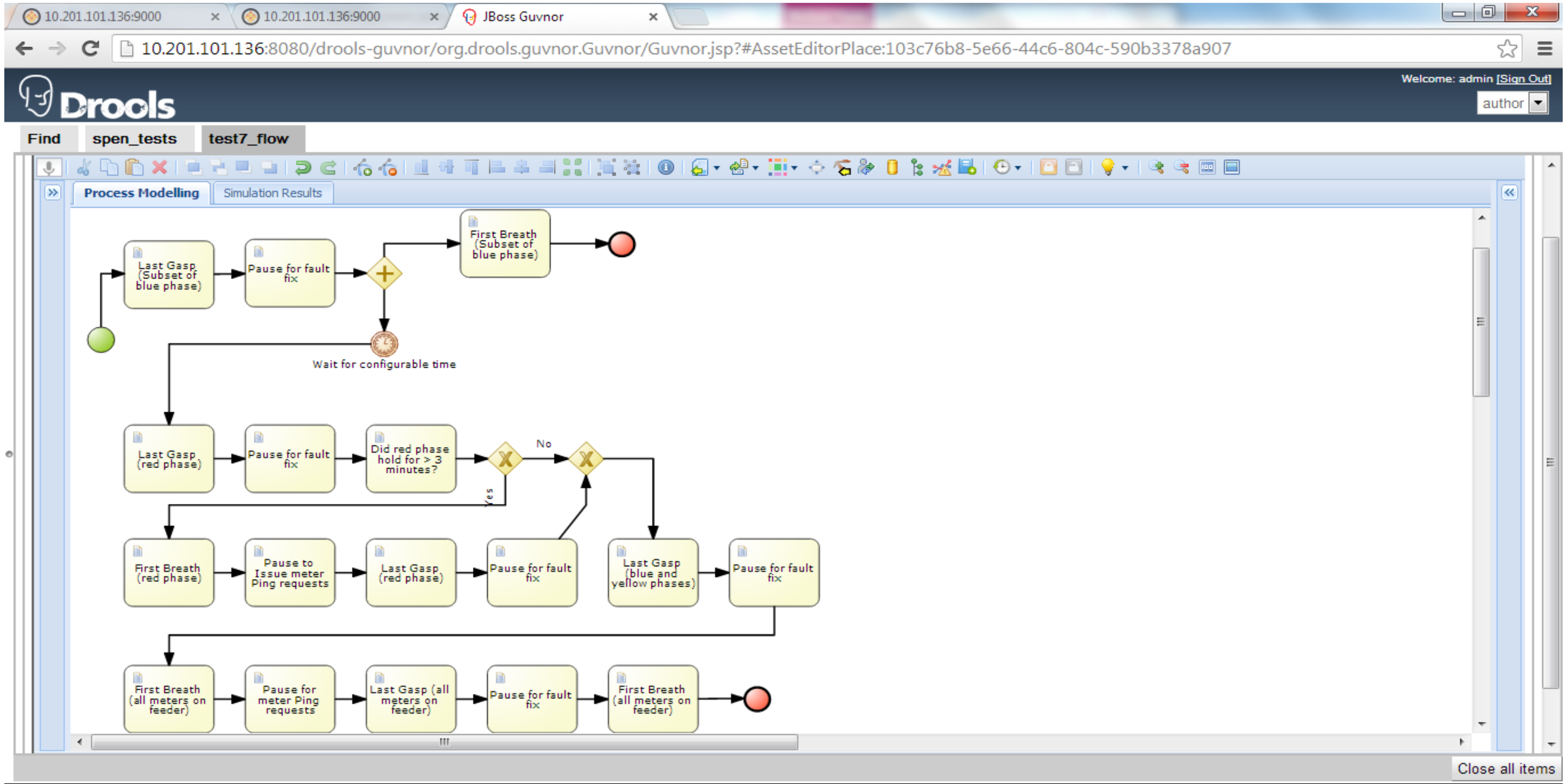

Figure 2: IFI trial smart meter simulator screenshot with example scenario

6. Outputs & long term view

6.1. Our track record

Smart metering is a new area for all DNO and hence, comparison of previous activities and policies is not appropriate. However, we have actively engaged in all stages of the national smart meter implementation programme in order ensure we have the best opportunity to succeed in this area.

6.2. Benefits for our customers

The benefits we will achieve for our customers from smart meters are summarised in the following tables. We show the benefits that would accrue to us in Table 2 followed by the wider societal benefits in Table 3. SPEN's view of the benefits in both cases are largely based on an ENA analysis carried out during the first half of 2013, pro-rated for our share of the market and with any additional SPEN specific benefits included. For comparison, we have included the original ENA analysis figures and have extrapolated the DECC Impact Assessment "Smart meter roll-out for the domestic and small and medium non-domestic sectors (GB)" from January 2013 to show the indicative benefits allocated to us across ED1 and ED2. The SPEN values in these two tables are used as the basis for our Cost Benefit Analysis (CBA).

Avoided Costs		ED1 (£m)			ED2 (£m)		
Description	Type	SPEN	DECC	ENA	SPEN	DECC	ENA
Better Informed Load Related Investment Decisions	Planning	1.8	5.0	1.8	1.3	6.2	1.3
Avoided Voltage Complaints	Operations	0.7	1.8	0.3	0.6	2.2	0.6
Reduced Investment to serve new connections	Planning	1.5	-	1.4	1.0	-	1.0
Reduction in operational costs to fix faults	Outage Management	2.8	8.4	0	0	10.6	0
Reduction in calls to faults and emergencies lines:	Outage Management	0	1.6	0	0	1.9	0
Reduced guaranteed standard failure payments	Outage Management	0.2	-	0.2	0.4	-	0.4
Active network management	Planning	1.7	-	1.7	11.9	-	11.9
Totals		8.7	18.4	5.4	15.2	20.9	15.2

Table 2: Directly controllable benefits resulting in avoided costs (£m)

In addition to the benefits for the DNO that are directly controlled by us other benefits from smart meters accrue to the customer in terms of improved services and reduced losses. These are shown in Table 3.

Societal Benefits		ED1 (£m)			ED2 (£m)		
Description (£m)	Type	SPEN	DECC	ENA	SPEN	DECC	ENA
	Directly controllable benefits resulting in improved service to the customer						
Improvements in Power Outage handling1	Outage Management	2.7	4.8	2.7	3.6	6.0	3.6
	Benefits assuming access to DSR functionality via Suppliers						
Demand side response (these benefits may avoid future costs)2	Operations	1.2	3.2	1.2	9.4	3.9	9.4
Avoided losses to network operators3	Operations	10.1	23.2	10.1	68.6	28.9	68.6
Totals		14.0	31.2	14.0	81.6	38.8	81.6

Table 3: Societal and Indirect Benefits

The following sections elaborate on how we believe the benefits set out in these tables will be achieved for our end customers and hence, how we intend to innovate over the course of ED1 and ED2. However, a common theme is that most benefits will accrue as a critical mass of smart meter coverage is achieved in our networks towards the end of ED1. Hence, our ED1 benefits are calculated to start from around 60% coverage of smart meters and ramp up from that point until the end of ED1[4]. Our ED2 benefits are assumed to be in line with the lower end of the range of estimates from the ENA analysis.

6.3. Smart meter data use in SPEN operations

As described in the strategy development process, Figure 1, SPEN has used its own experience, the wider DNO community's expertise and the views of the vendor community to determine the various applications for smart meter data within our business. It is this fundamental use of the data that drives both the costs we will incur and the benefits to the customer. Although the use of available smart meter data is entirely within the control of SPEN, all of the resulting actions, and associated benefits, are not. In addition, some benefits directly drive cost reductions whilst other are a direct benefit to the customer in the improved service they receive. Hence, we have separated out these areas for clarity.

6.4. Directly controllable benefits resulting in SPEN avoided cost

Better Informed load related investment decisions

As mentioned in our Load Related Investment Strategy, with a statistically significant dataset of load profile information from smart meters we can both enhance our existing processes for network investment decisions and create new, more proactive processes. Within our infrastructure investment we have allocated funds to deploy the data storage and analytics that will enable these improvements to our design and asset management processes not only for smart meter data but for the wider smart grids concept, incorporating monitoring

[1] These figures are based on customer willingness to pay and no direct benefits accrue to us via incentives or reduced costs.

[2] Although these benefits will directly apply to us we do not have control over their implementation.

[3] As in 1, these benefits will not accrue to us and no incentives currently exist.

[4] This is the assumption used in the ENA analysis.

information from multiple levels in the network. All data storage will conform to our data privacy and security polices which are discussed later. We believe accurate information on consumer voltage profiles could be particularly useful in the case of modelling the impacts of emerging Low Carbon Technologies (LCT) in the LV network, hence helping us achieve our environmental outputs (see our Network Monitoring Strategy). From a customer perspective, these enhancements should result in a more resilient network delivered on a more cost efficient basis.

Avoided voltage complaints

In this area SPEN believe we can become proactive in logging and addressing voltage anomalies before they become an inconvenience to the customer. Whilst these issues only affect a small proportion of our customers we anticipate cost savings and benefits by removing the need for site visits or use of specialist logging equipment whilst improving customer service. Using recent volumes of voltage complaints within our networks as a basis we estimate this benefit to be slightly higher than in the original ENA analysis. In addition, this is also an area where we could see a growing impact with the widespread introduction of LCT which could lead to significant variation in LV voltage profiles. Smart meter voltage monitoring will help ensure this does not become an issue for customers by enabling proactive management of both upper and lower-bound voltage issues.

Reduced investment to serve new connections

With improved information on loading in the LV network, where monitoring is currently most limited, the customer connection process can be improved with more connections being facilitated on existing infrastructure and required reinforcement more specifically targeted. This area of improvement was not specifically considered by the ENA analysis. Hence, we have added some additional benefit based on our predicted time savings in this area.

In addition to customer connections, we intend to use accumulated power flow information from Smart Meters to help determine the capacity headroom on LV to permit connection of additional LCTs as part of our overall network planning and design process and hence, avoiding the costs and delays of unnecessary reinforcement. These benefits were assessed in the ENA analysis and we concur with the results.

This is a first step in gaining a greatly improved understanding of our LV network. Further information from substation monitoring and industrial and commercial sites is expected to become available over the course of ED1 to help complete the picture. We are positioning our smart meter data infrastructure to evolve to use all of these information streams, in addition to our existing data sources, to seamlessly evolve our connections service.

These improvements will result in :

- *faster connection time as smart meter data improves the accuracy of analysis and further improves the capabilities of Active Network Management (ANM)*
- *improved information to end customers. The improved accuracy of information available means that much more specific information should be available to customers about their connection options.*
- *Improved management of network energy losses (see "Avoided losses to network operators" section)*

Reduction in operational costs to fix faults

We believe that smart meters will allow us to identify the location and nature of a fault with a much greater degree of accuracy than is currently the case. We therefore believe we can reduce the number of abortive site visits that are made each year. These benefits were not included in the original ENA analysis.

In the longer term we hope to build up smart meter voltage profiles and analytics that allow us to identify anomalies which are often a precursor to faults and hence proactively address these issues before a fault occurs.

Reduced guaranteed standard failure payments

Smart meters will allow us to identify when an individual customer's power has not been restored allowing us to ensure we act swiftly to rectify outstanding faults that may have been previously difficult to detect e.g. nested faults.
This will help us ensure that no customer remains without power beyond our guaranteed service limits.

We feel this will be of enormous benefit to the customer in the improved service they will receive. However, the financial benefit to SPEN is relatively low.

Active Network Management (ANM)

Active Network Management (ANM) uses real time information to manage the power flow and voltage on the network and hence more effectively utilise all the available capacity. We expect smart meter information will contribute to the use of ANM by providing information on the status of the LV network that was not previously available and hence, will help with the management of the introduction of LCT. We are already trialling ANM via LCNF projects, such as Accelerating Renewable Connections, and view smart meter data as an evolution path for this technology. The ENA analysis compared ANM use with and without smart meter data to estimate an ANM benefit. We concur with this approach, although we also concur with their finding that there is potential for a large variation in the size of this benefit depending on the LCT scenario chosen.

6.5. Directly controllable benefits resulting in improved service for customers

Improvements in power outage handling

A key benefit of smart meters will be the ability to accurately determine when a customer has lost supply, potentially before the customer themselves have realised. This will be achieved via the "last gasp" message and a check the customer's supply via the "supply status" message. Given that we can experience a significant number of outages in the course of a year the ability to track the status of a customer's supply in near real time will yield significant savings and improved customer service:

- *Using smart meter data to help build accurate network connectivity models will allow us to accurately determine the type and extent of a fault.*
- *From an on-going customer service perspective the ability to proactively check customers' status when outage occurs will ensure the customer obtains a more accurate indication of the situation and estimated repair time, particularly in storm situations*
- *We will be able to ensure that customers are back on supply automatically via "first breath" messages*

These solutions will need to be trialled to ensure they offer adequate benefit for the investment that is required and will emerge towards the end of ED1 which significant sets of smart meter data become available.

6.6. Benefits requiring the participation of suppliers

DNOs can no longer directly access the load control features of smart meters. This means that the benefits described in this section, which are reliant on load control, will require the assistance of suppliers to be realised.

Demand Side Response (ToU tariffs and load control)

Lowering peak demand via Time of Use (ToU) tariffs and directly controlling customer loads for demand response is potentially one of the largest benefits that smart meters can provide and supports our Smart grid strategy in exploiting this capability. These mechanisms can both free capacity to allow the introduction of Low Carbon Technologies and avoid the need for expensive network reinforcement. The benefits analysis undertaken by the ENA, with which we concur, shows that whilst a significant benefit may be achieved during ED1, the main benefit will occur during ED2 as LCTs become more prevalent. However, while we remain committed to engaging with these mechanisms, given the unknowns surrounding how we will be able to work with suppliers in obtaining this benefit, we have allocated it an extremely high level of uncertainty. This is reflected by an uncertainty factor in our CBA. A further uncertainty that will be important for the whole supply chain to address, is the use of these services by suppliers for balancing their trading positions. There is the potential for network companies, suppliers and other parties to make conflicting calls for upward or downward demand response.

Once operations for smart meters commence, and processes are clearly understood, we will engage actively with suppliers, via the ENA and other appropriate fora, to identify a common way of working to enable this.

Avoided losses to network operators

Losses are a specific area of focus for SPEN, and we see smart meters enabling us to identify and manage losses, as alluded to in the Losses Strategy **Annex C5 – Losses Strategy – SPEN**. Network losses are, to a certain extent, closely related to the Responsive Demand benefits detailed previously. Electricity networks which exhibit a lot of peaks in demand often exhibit higher losses overall as assets are run in a less efficient way. Both ToU and load control, as described previously, can smooth this demand profile, avoiding peaks and so reducing losses. The loss reduction benefit we currently attribute to smart meters is based on the ENA analysis of peak smoothing effects. However, given the additional risk of our reliance on suppliers in order to achieve this benefit we show an uncertainty factor on this benefit in our CBA analysis.

Losses may also occur from multiple other sources in the LV network such as energy theft, faulty equipment or indeed the unmetered energy used by smart meters themselves. Within SPEN we see this area of loss analysis closely linking to the preparatory work we are doing with substation monitoring in the Flexible Networks LCNF project. Flexible Networks supervisory level of metering compliments the domestic monitoring of smart meters allowing spurious losses in LV lines to be identified. As smart meter rollout nears full coverage we will be able to improve our monitoring and management of these losses.

6.7. DNO Interventions during Smart Meter Rollout

We have implemented a number of capex asset modernisation projects in DPCR5, which continue into ED1 and will help to address potential problems in smart meter rollout, reducing interventions and improving the customer experience. For example, replacement of lateral mains on both networks and mural wiring in SPM should reduce the occurrence of problematic meter installations and reduce the need for intervention on our part. Early engagement with British Gas, amongst others, supports this view.

Long term benefits

As can be seen from the benefits tables we expect that the gains from smart meters to accrue largely in ED2. From the DNO perspective there are two reasons for this:

- *Smart meter rollout will be in progress for much of ED1. Many of our aspirations for the use of smart meter data to improve design and asset management decisions will require a viable level of coverage of smart meters across our network and a statistically significant profile of data from the smart meters. This is likely to be at least 12 months' worth of data. This pushes the full realisation of many of these benefits into 2019-22*

- *There will be a cycle of learning and process improvement that must take place to use smart meter information effectively. This will be true for our back office systems, our staff and for our business processes and policies. We expect that by ED2 we will have gained sufficient insight from operational experience to put smart meter information to its optimum use*

7. Roadmap for delivery & efficient expenditure

7.1. Roadmap for delivery

We intend to match our infrastructure investments to the requirements we see emerging from the smart meter testing to go-live lifecycle, and beyond that to the requirements from our business initiatives. Aligned to this will be our estimate of when there will be a sufficient level of smart meter deployment to start obtaining network operation and design benefits. Hence, we assume that many design benefits will come at higher levels of coverage of smart meters which with our currently available information indicating a 2019-22 timeframe. This is illustrated in Figure 3 which shows the low level of smart meter coverage at go-live and hence, why some business initiatives and associated benefits must commence towards the end of ED1.

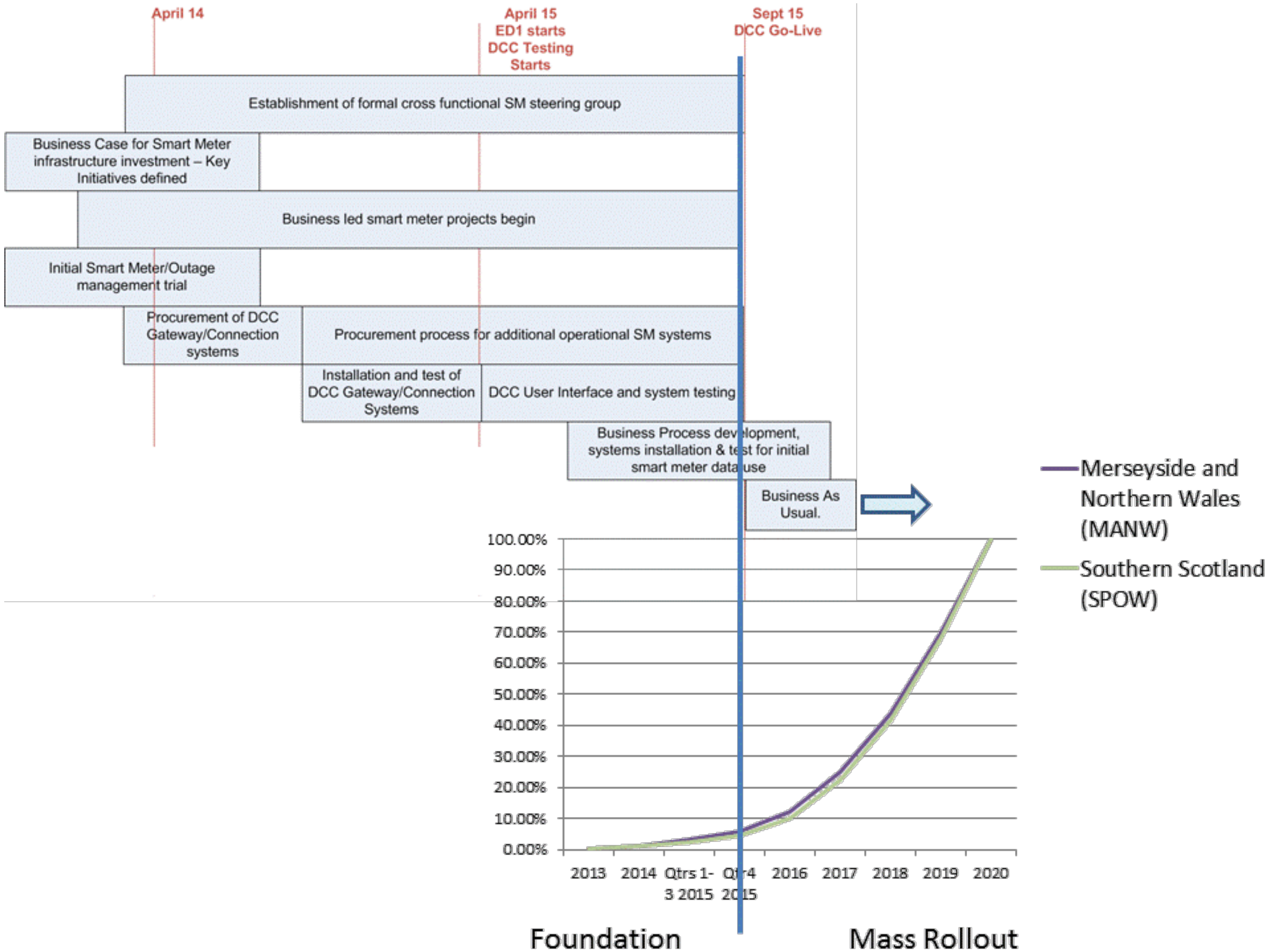

Figure 3: Percentage of licence areas covered by smart meters related to roadmap

7.2. Efficient expenditure

Our approach to maximising efficiency

In order to maximise efficiency we are taking an integrated approach to core infrastructure investment for both smart meters and smart grids. This has led us to create a single blueprint for managing data from both smart meters, a wide range of grid monitoring and ANM activities. This will allow us to invest once in core systems, such as data analytics and storage, but exploit this investment to its fullest potential. This approach is reflected in our cost benefit analysis option 1 scenario.

Alternative options considered

The option of building a separate, dedicated system to support smart metering was considered. However, in addition to the financial drawbacks, it was felt this would lead a high level of duplication between smart meter and smart grid systems which would lead to longer term operational issues. This is reflected in option 2 of the cost benefit analysis.

Our planned expenditure

In this section we explain how our investment decisions were driven by industry best practice and a need to provide flexibility in a rapidly changing environment.

Data Privacy & Security

Data privacy and security are key concerns within the smart metering programme. SPEN takes its responsibility in this respect very seriously and has been working with the ENA to define a common and consistent approach to data privacy. We will translate this common approach into our internal policy to ensure our full compliance with industry requirements. Security requirements from the DCC will be implemented in a similar manner and become part of our business as usual policies.

IT Systems investment to support Smart Meter data use

In Figure 4 we show a high level, logical representation of our Smart IT infrastructure end-goal for ED1. This represents a subset of our overall IT infrastructure where we believe Smart technology will have an impact and contains a mixture of new (marked with *) and existing equipment. Details of the full IT infrastructure can be found in **Annex C6 – Non-Operational IT and Telecoms Strategy – SPEN** and **Annex C6 – Operational IT and Telecoms Strategy – SPEN**. SPEN's approach has been to define an integrated, future-proofed Smart infrastructure that will handle data management for all aspects of smart grids and smart meters. Our approach to the Smart IT infrastructure is to facilitate:

- *A flexible and extensible approach to smart data management, which will enable a "plug & play" solution. Hence, changes and upgrades to our systems to meet changing requirements over ED1 can be accomplished efficiently and cost effectively*

- *Standards based data exchange which facilitates access to all data by any systems which require its use, avoiding complex and fault prone extracts of data from multiple systems.*

- *Common security and data privacy enforcement, ensuring only authorised processes can ever use data and that current operational systems security is maintained*

As mentioned in our strategy process, we have confirmed the validity of this approach by consulting with multiple IT infrastructure vendors and from experience from other industries.

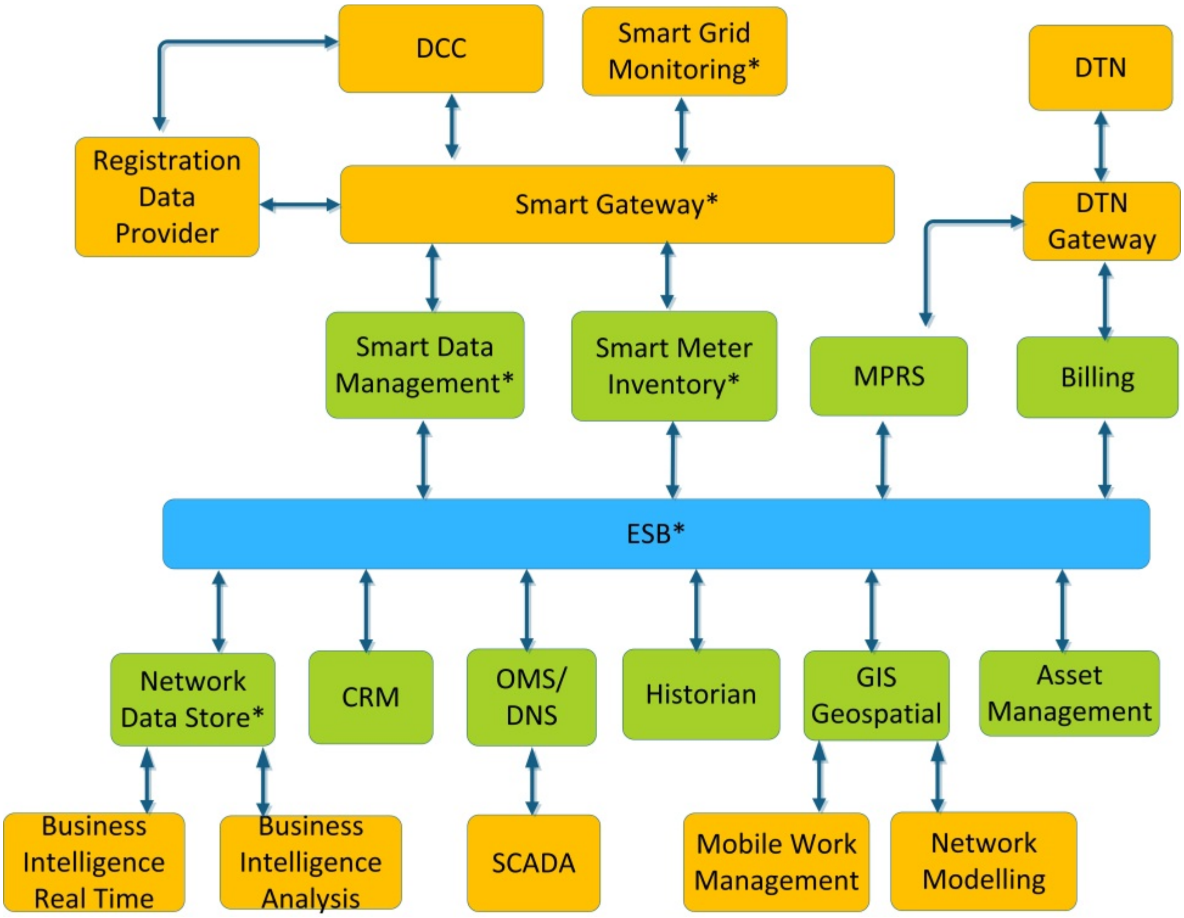

Figure 4: Overview of Smart IT Infrastructure[5]

We have mapped each area of investment to the benefit and output area it would support during ED1. This ensures that we not only make the correct investment but that it is appropriately timed. These mappings are summarised in Table 4 along with descriptions of each of the assets shown above.

[5] Please note the IT infrastructure diagram relates to logical elements of functionality not the physical products in which the functionality may reside i.e. several of the functions shown could reside in a single product we procure.

IT Asset	Description	Business Purpose	Linkage to Outputs & Benefits
Outage Management System (OMS)	Provide Real Time visibility of events from smart grid/ metering. Distributed Resource Management	The OMS will be one of the first operational systems to receive and request smart meter information to help determine the status of customers' supply during faults.	Year on Year Ongoing Business Efficiency GS2 - 18 to 12 Hour Restoration Standard Customer Minutes Lost (CML) Restoration after Storms
Historian	Provide analogue and digital event information from/to back office systems	The historian is the traditional repository for SCADA records but may not be used for smart data. We would look, however, to link this data with smart data to allow fully informed decisions to be made.	Governance, Assurance & Policy Development 1% Year on Year Ongoing Business Efficiency Other areas of benefit (not published in plan): Data Improvement Programme
GIS Geospatial	Provide GIS information to new applications Update maps for Smart Grid components	GIS is a crucial system within smart to allow visualisation and use of smart meter information with other smart data.	1% Year on Year Ongoing Business Efficiency Connections - Improve our communication channels with customers Other areas of benefit (not published in plan): Data Improvement Programme
Mobile Work management	New work orders for Smart Devices and new data	As smart meter operations mature we see the potential for field staff to be able to check the status of smart meters on site to ensure that all our customers have been restored following faults.	1% Year on Year Ongoing Business Efficiency Customer Minutes Lost (CML) - 16% Improvement Customer Service (BMCS) - 20% Improvement in scores
Billing	The introduction of Smart Metering will necessitate changes to the Data Transfer Network (DTN) and potentially the Settlements process. In addition transactional charges incurred via DNO / DCC communication will require to be validated and reconciled prior to payment	We envisage that we will have some new billing requirements driven by smart meters over ED1 that may require new or enhance systems to enable this.	Governance, Assurance & Policy Development

IT Asset	Description	Business Purpose	Linkage to Outputs & Benefits
Meter Point Registration (MPRS)	DTN flow changes for Smart Meters. Need to conform to Registration Data Provider requirements	SPEN must act as a Registration Data Provider (RDP) to the DCC. Functional changes are managed in the existing MPRS update process but we must also ensure secure connection to the DCC.	Regulatory requirement 1% Year on Year Ongoing Business Efficiency
Customer Service (CRM)	Information relating to fault location and network status which is made visible to the CRM agents Confirm customer on/off supply. Direct interaction with smart meters.	With smart meters deployed in domestic properties we have a key additional asset to allow us to improve our communications and where possible be proactive in our communications.	1% Year on Year Ongoing Business Efficiency Customer Service (BMCS) Avoidance of Guaranteed Standards Failures Avoidance of Voluntary Payments Communicate proactively with customers in ways they prefer Social Obligations - Contact Priority Service Register Customers before planned outages and during emergency power cuts Smart Data - future use of smart metering data to proactively manage customers Connections - Improve our communication channels with customers Connections - Time to Connect Incentive Connections - Incentive on Connections Engagement (ICE)
Asset Management	Smart instrumentation and device configuration management	Smart meters, although not our assets, contain information which is the responsibility of the DNO e.g. security keys. To manage our network effectively we need ensure we have a consistent view of the status of smart meters and our other assets.	Governance, Assurance & Policy Development
Smart Gateway	Messaging and Communications Interface (including security) between DNO and DCC. Later to include non-SCADA field data acquisition and management	All external information sources (such as the DCC) and monitoring devices will require a means for the managed and secure collection of information. Where possible, we would like to re-use infrastructure for this data collection role across all smart technologies.	Enabler for all other smart meter benefits Regulatory Requirement 1% Year on Year Ongoing Business Efficiency
Smart Meter	Master Repository for EN	Smart meter information from existing DTN flows, new DCC flows and internal management actions is correlated here to	

IT Asset	Description	Business Purpose	Linkage to Outputs & Benefits
Inventory	Meter Points Audit information for Smart Metering	give a single view of the smart meter.	
Smart Data Management	Manages field data acquisition Data quality and manipulation	Smart meter data is likely to require some manipulation, such as filtering or aggregation, before being used in some business processes. We expect other forms of smart data will require similar manipulation.	Enabler for all other smart meter benefits 1% Year on Year Ongoing Business Efficiency
Network Data Store	Master repository for time series data, Analogue and Digital, SCADA and non-SCADA	With the advent of smart requirements we see a need to extend our storage capabilities for network data beyond the historians we have traditionally used to enable a more sophisticated level of analysis.	Enabler for all other smart meter benefits 1% Year on Year Ongoing Business Efficiency (page 138) Data Improvement Programme Report greater disaggregated Asset Condition data
Network Modelling	Master Repository of network model in CIM compliant form. Standards-based grid model management and reference data exchange	Modelling network impacts using a wide range of smart data will allow us to make much better planning and management decisions. This is demonstrated by our approach to LCT monitoring which will combine multiple streams of data to manage these network impacts.	Governance, Assurance & Policy Development 1% Year on Year Ongoing Business Efficiency Avoidance of Guaranteed Standards Failures Avoidance of Voluntary Payments Connections - Time to Connect Incentive Connections - Incentive on Connections Engagement (ICE) - Data Improvement Programme
Business Intelligence (Real Time)	Decision Support. Demand Response management. Grid engineering and planning Analytics and visualisation. Advanced DMS capabilities and control room decision support - LV network. Advanced Asset Lifecycle management and optimisation	Providing a near real time flow of information from selected monitors, such as smart meters, will allow operational decisions to be made more effectively. However, systems are required to present this information in a readily consumable form.	Supports operational decisions on best course of action 1% Year on Year Ongoing Business Efficiency Customer Minutes Lost (CML) Customer Service (BMCS) Restoration after Storms

IT Asset	Description	Business Purpose	Linkage to Outputs & Benefits
Business Intelligence Analytics	New combined analytics using all data sources Grid engineering, planning analytics, visualisation, Trending, planning	As well as near real time decision support longer term trending and analytics can direct our investment and planning decisions by helping us understand the behaviour of the network.	1% Year on Year Ongoing Business Efficiency Customer Minutes Lost (CML) Customer Service (BMCS) Restoration after Storms
Enterprise Service Bus (ESB)	Communications bus to share information between main platforms.	With an expectation of large volumes of data, both from smart meters and other smart monitoring devices, we require to invest in a more robust and manageable data management infrastructure that will allow efficient data sharing between systems.	Technology enabler supports all other SM benefits 1% Year on Year Ongoing Business Efficiency
Information Security Management	End-to-end Security and policy management for Smart Metering and Smart Grid.	Data privacy and security is a key aspect for smart meters. We believe our approach to IT investment gives us the best platform to ensure security policies are applied consistently throughout the business.	Regulatory Requirement Governance, Assurance & Policy Development

Table 4: Extract of benefit / IT mapping

Given that for ED1 we have defined a single solution for smart grids and smart meters, with a total investment of £23.7m[6], we have made some assumptions about how much of this cost should be directly attributable to smart meters. The cost directly attributable to smart meters is given in Table 5. These are the costs that we incur due to the presence of smart meters that would not be required for other aspects of smart data handling. These costs are submitted in business plan table CV109, namely £4.3m and £3.3m in our SPD and SPM licence regions respectively. This gives a total of £7.6m. The remaining Smart IT costs are assumed to be shared amongst the rest of the business.

Item	Predicted Cost (£m)
Smart gateway & Security– connection to DCC	1.6
Registration data (MPRS) enhancements	0.8
Smart Meter Data Management systems (including OMS modification)	4.5
Network Data Store	0.7
Total	**7.6**

Table 5: Smart Meter IT costs for ED1

Alternative expenditure scenarios considered

Although we have taken a holistic approach in specifying our IT requirements for all SMART solutions we have identified a subset of the IT infrastructure which would meet our minimum requirements set out in the Smart Energy Code at the expense of achievable benefits.

This minimum investment that would support a basic smart meter implementation would be without the meter data management system and would hence be approximately £3.1m. We believe this basic case would jeopardise the majority of our benefits but we have included it as the baseline scenario in the CBA.

DCC Charges

We have assumed the costs of DCC fixed charges to be 20p per meter during ED1, based on estimates from DECC in 2013. Variable charges are assumed to range from 0.002 – 0.2p based on message size and again based on DECC estimates. Our message volumes are based on ENA estimates refined for SPEN and provided to DECC in 2013 as part of the DCC sizing process. As part of our sensitivity analysis within the CBA we have shown the impact of increases in this pricing structure.

Long term value for money

In the longer term we believe our approach will provide the optimum benefit from our investments whilst maintaining operational efficiency.

[6] See IT & Telecoms Strategy Annexes for a full breakdown of this figure

8. Uncertainty & risk

8.1. Short term uncertainties and risks

This section summarises the risks associated with smart meter deployment. Full details of these risks can be found in **Chapter C8 – Risk and Uncertainty** and **Annex C8 – Risk and Uncertainty – SPEN**. It is SPENs view that the risks associated with smart meters remain significant even with mitigation actions in place. We summarise our mitigation mechanisms in a single later section.

Meter Installation

As explained in the Uncertainty & Risk chapter and annex, there are various uncertainties surrounding the volume and unit cost of interventions we will be required to manage. Even a small variation in our predictions could result in a significant extra cost.

There is also uncertainty in the detailed supplier rollout plans. Combined with the risk above this will make resource planning extremely difficult and may lead to additional costs being incurred.

Meter functionality

The current lack of SMETS2 meters means that as a DNO we have no certainty over the operational accuracy, reliability and timing of measurements. Therefore the benefits that these network measurements, particularly voltage, will provide are also uncertain. Investment in infrastructure to exploit this data therefore becomes a higher risk undertaking.

DCC

There remains a degree of uncertainty around the final specification and operation of the DCC service to support DNO specific services, such as outage notification.

8.2. Medium term uncertainties and risks

Meter functionality

Should any further delays occur to the SMETS2 standards and meter manufacture there is a risk that a larger number of SMETS1 meters are deployed which provide significantly less benefit to DNO.

DCC

Should DCC charges rise significantly from the indicated range, the benefits in the ED1 will quickly be eroded. This is demonstrated in the CBA sensitivity analysis.

8.3. Long term uncertainties and risks

Our long term risk is that the smart meter data proves to be of insufficient quality and coverage to provide the benefits.

8.4. Mitigation of uncertainties & risks

SPEN has endeavoured to mitigate all areas of risk identified and these are detailed in our Uncertainty & Risk chapter and annex and referenced here for completeness.

Meter Installation

Modernisation programme – during DPCR5 and continuing in ED1 we have invested in modernisation of lateral mains which should ease smart meter installation for suppliers

Engagement with stakeholders – to ensure we understand roll out profiles and methodologies. We will also rely on the Central Delivery Body to ensure that customers are fully informed of the realistic capabilities of smart meters at initial rollout and our requirement to use the data.

Volume driver above 2% callout threshold- this helps mitigate the risk should a larger number of interventions be required

Meter functionality

Stakeholder engagement – we engage actively via the ENA with the SMETS specifications and with manufacturers to ensure our requirements are reflected in final designs.

Testing & initial rollout – we actively engage in testing of smart meters and reviewing their operational performance in network related services during the early stages of rollout

DCC

DCC Charges pass through – the risk of higher charges is mitigated by the pass through mechanism being applied until roll out in complete at the end of 2020.

Engagement in technical specification process – we have engaged in the technical specification and consultation processes with the DCC to ensure our requirements are reflected in final designs.

Engagement in DCC testing phase – we will engage in the DCC testing phases to help de-risk both the DCC system but the operation of our own systems

9. Glossary

A

ANM – Active Network management

C

CBA – Cost Benefit Analysis

CRM – Customer relationship management

D

DCC – Data Communications Company

DTN – Data Transfer Network

E

ENA – Energy Networks Association

G

GIS – Geographic Information System

L

LCT– Low Carbon Technology

LV – Low Voltage

M

MPRS – Meter Point Registration Service

O

OMS – Outage Management System

S

SME – Small Medium Enterprise

SMETS – Smart Meter Equipment Technical Specification