ANNEX 28: SMART METERING STRATEGY

Electricity North West Limited
Registered Office:
304 Bridgewater Place,
Birchwood Park,
Warrington,
Cheshire.
WA3 6XG.
Registered no: 2366949 (England)

Contents

1. Executive summary

Smart Meters will be installed in the homes and businesses of our customers over the next few years. These devices will help our customers realise savings and benefits never before available. As our customers' usage of and reliance on electricity increases smart meters will become a vital part of the network management infrastructure.

This annex outlines how we will use smart meter data to improve our services and deliver savings to our customers. As the meter installation programme gathers pace our initial challenge will be to assist Suppliers in ensuring customers receive a safe and trouble free transition to the new meters. In parallel with this installation programme we will upgrade our IT systems to be able to use the meter data for the benefit of our customers. This IT upgrade programme has already started and to ensure we deliver benefits as soon as possible we have commenced several elements of this work in DPCR5. We are also working with suppliers to ensure customers are properly informed about both the installation programme and the benefits on offer.

We have worked through the various industry-led groups to ensure that the functionality of smart meters is suitable to assist Network Operators in meeting the challenge presented by the GB's de-carbonisation of heat, transport and electricity generation. This work will continue for some time and is vital to ensure GB customers receive the maximum possible benefits from their investment in this programme.

The installation programme will take five years to complete and once approximately 70% of meters are installed then customer benefits will start to be delivered. We have outlined below the main benefits to our customers and stakeholders arising from the adoption of smart meter data flows.

In total we forecast that customers will receive over £20 million of direct benefits across our RIIO-ED1 and RIIO-ED2 business plans. These benefits will be realised across the latter third of RIIO-ED1 and increase significantly in RIIO-ED2. To enable these benefits we will invest a total of £18.1 million, £3.1 million of which will be funded from our existing DPCR5 allowances.

2. Our smart metering strategy

The benefits of GB's adoption of smart meter technologies will mirror that seen in a number of countries and will accrue to the customers initially from Supply businesses and then later from Distribution Network Operators (DNOs). In the early years of the roll out programme, immediate benefits such as reduced meter reading costs and access to time of use based tariffs will be realised by customers. The customer benefits accruing from DNOs will be less immediate but eventually include:

- Improved network visibility and hence reduced or deferred network reinforcement costs
- Improved management of power outages
- Improved connection processes
- Reduced costs for micro generation customers
- Access to the benefits offered by demand side response
- Losses reduction
- Improved customer service across a range of routine activities.

Whilst the introduction of Smart Meters will bring immediate benefits to customers, their full potential in relation to network-related benefits will only be realised as customers increase

their electrical power consumption or install generation. The profile of many benefits therefore follows the adoption pattern for Low Carbon Technologies (LCTs) such as Heat Pumps, Electric Vehicles and micro generation. In addition, in the early years of the smart meter roll out programme the penetration levels for smart meters will not initially facilitate a number of the benefits associated with network management.

Smart meter benefits encompass financial, service and less tangible areas and below we have outlined our thoughts on the main benefit areas. We believe that smart meters have a significant role to play in RIIO-ED1 serving as a platform for a variety of service and cost improvements. Critically, RIIO-ED1 will be the bedding-in period for smart meter technologies and their full integration into network operators' systems in preparation for wider scale LCT adoption and hence greater demand growth in RIIO-ED2.

2.1 How will smart meters improve network visibility?

Smart meters will for the first time allow us to monitor how much power our customers are using or producing in real time. This will allow us to not only influence their usage but to operate our network to be more responsive to their needs. The more responsive we can make our network, the more efficiently it operates and that helps us keep customers bills lower.

For many years we have had monitoring systems covering our extra high voltage (132kV and 33kV) networks enabling these systems to become steadily more efficient. At present we have virtually no visibility of our customers' needs on our low voltage (LV) network, and only limited visibility on our high voltage (HV – 11 & 6.6kV) network. The improved visibility provided through smart meter data will revolutionise network management allowing us to monitor demand across our entire network for the first time ever. This will help us ensure capacity is available for our customers to use when they need it and help us to ensure we only spend money increasing the capability of the network when absolutely necessary.

These benefits have been included in our investment plans and in our attached scenario submissions.

Customers are increasingly adopting micro distributed generation (DG) technologies such as photo-voltaic (PV) and micro-CHP; these generation technologies have huge benefits for both customers and the UK. However they also introduce a number of challenges for us. We have seen the rapid adoption of micro DG by tens of thousands of customers resulting in localised reverse power flows whenever generation output exceeds the demand. This can cause voltages to rise and we need to monitor voltages to ensure statutory limits are not exceeded. At the moment we do this by retro fitting various monitoring devices; smart meters will allow us access to this information at much lower cost. We will pass on these savings to our customers.

Smart meters will provide us with greatly improved visibility of voltage profiles along LV networks enabling better control of voltage and hence more efficient connection costs for all LCT equipment such as heat pumps. Our early work under our First Tier LCN Fund innovation projects clearly indicates that network visibility improvements enable lower connection costs using connect and manage technologies.

We have examined the use of smart meter data across the entire range of LCT penetrations included in the DECC decarbonisation scenarios. The benefits of smart meters allowing visibility of congested networks will be realised once meters reach approximately 70% penetration ie around 2019. We believe that the infrastructure detailed in our IT investment plans coupled with smart meter data will allow our business to respond efficiently to the needs of customers.

To ensure that we have included all likely smart meter benefits within our plans we led work undertaken by all DNOs through the ENA and commissioned KEMA, Redpoint and EATL to identify the potential benefits. These documents can be found as Annex 28 – A1 to A3. Their

work mirrors our internal analyses and indicates that visibility benefits will manifest in two forms:

- a reduction in planning and design costs facilitated by improved visibility of network load and voltage levels and a reduced need to design reinforcement schemes based on the same visibility. These have been estimated at £0.38 million phased over the latter 3.5 years of RIIO-ED1. Prior to this date smart meters will not have penetrated sufficiently to allow the data to be used accurately

- In RIIO-ED2 under all DECC LCT scenarios the volume of connections rises and we would expect these benefits to exceed £2 million in the period

- A reduction in direct reinforcement costs arising from more accurate data, again this will occur in the latter half of RIIO-ED1. In our most likely scenario we have estimated the benefits of smart meters in the latter half of RIIO-ED1 at £1.1 million over and above the benefits of smart grid solutions. At higher penetration levels such as those shown in the DECC medium scenarios, benefits would increase slightly, however in the event of high penetration levels with dense clustering then smart meters offer proportionally diminishing benefits; as network loads go well beyond the existing network capacity.

The use of Smart Meter data in active network management techniques designed to reduce reinforcement costs are included in the Transform model and hence fully included in our business plan and all submitted scenarios. In our best view case based on the low scenario these benefits are relatively modest in RIIO-ED1 at £0.9 million but will increase significantly in RIIO-ED2 exceeding £3 million in the period.

2.2 How will smart meters improve our management of power outages?

Smart meters offer a number of important service benefits for customers experiencing power outages. Whist approximately 80% of customer interruptions are already detected automatically by our Operational IT systems, detecting the remaining 20% which arise due to LV network faults is dependent on customer calls. Smart meters offer significant functionality for the automatic notification of loss of supply for individual customers and we will incorporate these functions within our trouble management systems.

This will enable more rapid restoration of supplies particularly during storm events. Whilst SMETS1[1] compliant meters do not offer this functionality the proportion of SMETS2 compliant meters will be sufficient to allow outage detection on the vast majority of low voltage network events in the latter half of RIIO-ED1. The primary benefit for customers of early outage detection manifests in the form of a slightly earlier mobilisation of our operational response and hence earlier supply restoration. Our analysis of call patterns versus time of interruption indicates that this will result in an average 2.5 minute earlier detection and mobilisation. This will not result in an additional IIS reward as both the incident notification time and restoration time will be advanced by the same amount and hence all benefits will accrue to customers in slightly shorter outage duration times. This benefit will recur in all future RIIO periods; for RIIO-ED1 we estimate this benefit to be £0.3 million and for RIIO-ED2 £0.8 million based on the number of such event per annum, the number of customers per feeder and the RIIO-ED1 IIS incentive rate.

There will be a secondary benefit in terms of fault unit cost performance which arises through the more accurate diagnosis or the network section affected by open circuit LV cable faults. We have estimated this at £0.1 million over the last four years of RIIO-ED1; as high levels of smart meter penetration are required to enable this functionality. This will have an associated IIS benefit of a total of £0.64 million in the period arising from slightly faster localisation of such faults.

[1] DECC's Smart Metering Equipment Technical Specifications

Smart meters offer additional benefits for customers during storm events; as they enable more accurate diagnosis of LV network faults and hence better prioritisation of available repair resources and earlier supply restoration for some customers. These do not result in any reduction in repair costs as the same numbers of faults need to be repaired. Whilst more customers will benefit from earlier supply restoration, there is little appreciable IIS benefit as storm events are generally exempt from IIS. For non exempt events there is an IIS benefit to the DNO however this is outweighed by a larger disbenefit for DNOs as all faults are identified immediately as opposed to waiting for customers to contact a call centre agent to report no supply. We estimate the IIS equivalent benefit to customers in exempt storms will be approximately £1 million per annum post 2019.

We anticipate that smart meters will be of assistance in diagnosing LV network faults underlying HV faults post HV network repairs. Again this will allow some customers to be restored earlier leading to improved service at the macro level however similar to above there are no net reductions in repair costs or IIS benefits accruing to us. Use of last gasp functionality will be likely to evolve over RIIO-ED1 as penetration levels increase and communications and IT systems bed in. It is not possible to fully evaluate the financial benefits of this functionality until tested; however the benefits for customers are very apparent and we are committed to maximising all possible service benefits.

Whilst the so called ‘first breath’ and associated ‘pinging’ functionality has an important role to play in positive confirmation of supply restoration, our customers and particularly our vulnerable customers consistently tell us that they prefer a warm voice contact post supply restoration so as to enable them to understand the cause of the interruption and the likelihood of a repeat interruption. As such we do not propose to reduce the number of proactive voice contacts made and have not included any associated call centre savings in our plan.

Smart meters will enable us to automate the verification and identification of a number of standards such as the 12 hour restoration standard. This will not necessarily reduce the number of payments made as at the margins of the standard as many will be shown to fall inside as outside the set time. Processing of claims will be speeded up with customers benefiting from faster payments however given the relatively small number of projected events we do not forecast a material financial benefit to our current cost base.

2.3 How will smart meters improve our connection processes?

Improved network visibility as described above will also enable us to process connection applications more quickly and provide customers with greater certainty of efficient costs. Customers will benefit from a reduction in associated quotation and installation times. We have estimated the reduction in associated back office planning and design costs at £0.29 million for the RIIO-ED1 period and £0.8 million for RIIO-ED2. All direct cost benefits arising from smart meter data enabling more effective designs will accrue to customers in reduced connection costs. We estimate these to be in the order of £0.25 million in RIIO-ED1 and £1.1 million in RIIO-ED2. Note that LCT-driven costs for domestic customers are included in general reinforcement.

2.4 How will smart meters facilitate demand side response?

A significant potential benefit from Smart Meters arises from their potential to change customer demand patterns; either via a Time of Use Tariff signal or by use of the load switch. Our present understanding of both SMETS1 and SMETS2 is that we will not have direct access to either of these facilities.

In assessing the benefits associated with such behavioural change in customer profile classes 1–4 inclusive we have limited our modelling to examine the likely benefits to DNOs arising from similar signals sent by suppliers. In examining such potential alignment of price signal benefits we have considered the following points:

- Our work with Suppliers, National Grid and consultants such as Pöyry shows that price signals from Suppliers and the Transmission System Operator are likely to be dominated by hedging positions and real time balancing. Such markets signals span the entire load cycle; for example STOR[2], and do not necessarily align with peak network demand periods.

- Our customer engagement work on DSR generally and projects such as C_2C and CLASS shows that customers have a relatively low appetite for peak demand reduction DSR services unless offered a very strong price signal in the region of £20 000 per MWhr[3]. These findings are confirmed by other DNO projects. This payment level is adverse to the equivalent reinforcement NPV cost.

- Industrial & Commercial (I&C) customers have a greater appetite for so called "N-1 DSR" at much lower costs ranging between £14 000 and £24 000 / MWhr[4]. However this service cannot be used as effectively on secondary network feeders penetrated by LCTs as I&C customers are in the main fed by dedicated LV networks feeders or are connected at higher voltages.

- Our recent work with Baringa-Redpoint indicates that suppliers will put Time of Use (ToU) tariffs in place; however their effect is complex and not necessarily beneficial to DNOs. International trials show that peak price tariffs have little sustained effect on customer behaviour unless the price signal is extremely strong. Where a proportion of customers adopt sufficiently strong static ToU tariffs, then over the peak demand period 5 to 8pm their demand is reduced, but is increased at other times, most markedly between 4 to 5pm and 8 to 9pm. As a result the system peak may by moved outside of the 5 to 8pm window, although the reduction in system peak demand may be less that that observed in the domestic sector alone given higher demand from other sectors during the times that domestic load is shifted to, particularly 4 to 5 pm. This movement of domestic demand into the pre-system peak period may actually increase the net system peak. This effect is outlined fully in the attached Baringa-Redpoint report however the overall conclusion is that the effects of Supplier led ToU tariffs on peak demand is unlikely to be material before the early 2020s under all likely scenarios.

- Beyond RIIO-ED1 then automated appliance response coupled with ToU tariffs will allow more significant peak demand shaping reducing peak demand by up to 3GW nationally in 2025 and up to 7GW by 2031.

    - In our best view scenario LCT penetration levels are low and hence reinforcement costs are low and highly localised. The probability therefore of Suppliers sending a ToU signal that successfully or partially alleviates a reinforcement need is considered very low. Under the most optimistic viable ToU tariff scenario our work with Baringa-Redpoint indicates the effect on peak demand nationally to be 1000MW by 2025. This equates to less than 80MW against Electricity North West present peak demand of 4 500 MW. Given that this will be across our entire network and with the scarcity of LCT or other smart demand under the low scenario we are unable to identify an associated reinforcement expenditure reduction in RIIO-ED1.

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[2] STOR – Short term Operating Reserve etc...

[3] Early work on our C_2C project and on Low Carbon London indicates that domestic customers require a price signal of at least 10p / kWhr. This is borne out by our work with Baringa-Redpoint which shows that the value of ToU signals in RIIO-ED1 is likely to be low particularly under our best view low scenario.

[4] C_2C trials have indicated this is the viable price range for commercial scale DSR contracts.

- For micro DG the structure of FiT[5]s limits the effectiveness of generation side response to constrain output and hence reinforcement costs. These technologies respond more readily to smart grid solutions and the associated efficiencies are included in our reinforcement plans.

- We have examined in detail the potential affects of so called 'Wind Following' on market price fluctuations and peak demand levels. Our work with EATL and Baringa-Redpoint indicates that these are negligible in RIIO-ED1 but in RIIO-ED2 may exacerbate network constraints.

Given the above, our view is that ToU price signals issued by other market participants such as Suppliers will have limited, if any, benefit under low LCT penetration scenarios during RIIO-ED1. Further into the future as LCT volumes increase or under higher LCT penetration scenarios the effect of increased marginal plant costs are likely to produce stronger price signals and hence greater customer demand response. We have not therefore included additional smart meter benefits over and above those indicated by the Transform model in our most likely scenario.

Our innovation strategy requires us to continue to explore new ways of engaging with customers to mitigate the effect LCTs on the network. We are at the forefront of change and development in this area; for example the development of new local energy market services such as C_2C, the use of third party services such as aggregators, social landlords or communities of customers to effectively purchase distributed resource services to deliver network benefits. These new services have the potential to marginally reduce costs under our most likely scenario but have much greater potential to reduce costs under higher LCTs scenarios.

We have worked with Ofgem on the development of suitable uncertainty mechanisms to ensure the benefits of such work are appropriately shared between customers and other stakeholders. We believe that the structure of efficiency incentives and re-openers outlined in the RIIO-ED1 strategy decision provides a strong incentive to continue to develop and realise such DSR benefits.

Critically, our submission is based on a number of benefit assumptions contained within the Transform model, specifically the forecast cost of services such as DSR, storage and other new technologies. In the event that costs or other assumptions vary then the associated benefits may change and hence trigger the load re-opener.

2.5 How will smart meters aid losses reduction?

It is inevitable that as energy flows increase network losses will increase, however the effects of smart meters on peak energy demand may assist DNOs in helping to curtail this rise. In particular improved network visibility will allow us to progressively improve the management of feeder voltage profiles and hence losses management.

Our work with EATL indicates that smart meters will cause customers to become significantly more aware of their energy usage. This will have a forecast benefit on losses driven by price visibility, energy usage visibility and energy awareness. At GB level EATL forecast this to be in the region of £35 to £45 million over the period 2015 to 2031. This equates to £3.1 million for our region occurring predominantly in RIIO-ED2 and will accrue directly to Electricity North West's customers.

[5] Feed-in-Tariff.

2.6 How will smart meters improve dataflow management?

The introduction of smart meters will allow some simplification of our billing and dataflow management processes. However these will only be realised towards the end of the installation programme; in RIIO-ED2 we expect these to total £0.8 million.

2.7 Other customer service benefits

Our customers and other stakeholders consistently rank CIs, CMLs and price as their top priorities. Our engagement also shows that they also place value on other factors such as the speed of response and information provision across a range of requests. Smart meter functionality enables a number of features including real time polling:

Meter messaging

We do not consider the messaging functionality available to DNOs to be sufficiently developed in SMETS2 to allow services such as Planned Supply Interruption notifications to be effectively migrated to smart meters. We do however foresee potential to provide supplementary updates of value to customers on forthcoming Planned Supply Interruptions such as timings and other information such as severe weather warnings. We have included the associated data costs within our submission however these are only minor transaction charges. The benefits arising from this improved information flow will benefit customers however we do not believe they will be material as observed in mechanisms such as the customer satisfaction incentive.

Voltage enquires

We receive a small number of routine enquiries from customer regarding their supply voltage. At present we fit monitoring equipment to the customer's installation to check if their voltage is within statutory limits. Smart meters will provide an almost instant means by which we can check the customers supply voltage and hence reduce our measurement costs. We estimate these savings to be £0.1 million in RIIO-ED1 and £0.4 million in RIIO-ED2 and these have been included in our business plan.

Guaranteed standards

Smart meters will enable us to proactively check and verify if customers are entitled to a guaranteed standards payment. This will improve the efficiency of our back office processes and importantly ensure customers receive any payments due promptly. We estimate these savings to be £0.1 million in RIIO-ED1 and £0.34 million in RIIO-ED2 and these have been included in our business plan.

As the functionality of smart meters and the surrounding IT infrastructure evolves we will continue to develop new services and benefits to customers based on this valuable data source. The greatest value from smart meters will arise once demand levels increase significantly on our network which we forecast will occur in RIIO-ED2 and RIIO-ED3.

3. Customers' smart meter benefits

3.1 – Customer benefits for our best view scenario

In Table 1 below we have summarised both the financial benefits for customers included within our plan and those they will receive external to our plan.

Table 1: Smart meter benefits summary

Benefit area	RIIO-ED1 period value £m	RIIO-ED2 period value £m	Savings included in RIIO-ED1 WJBP
Network visibility	£0.9	£3.0	Yes
Power outage management	£0.74	£1.5	Yes
Connections	£0.29	£0.8	Yes
Planning and design costs	£0.38	£0.9	Yes
Dataflow management	-	£0.8	Yes
Voltage investigations	£0.1	£0.4	Yes
Guaranteed standards	£0.1	£0.34	Yes
Benefits within plan	**£2.51**	**£7.74**	
Additional benefits realised by customers external to Electricity North West's business plan			
Reduced power outage duration	£0.3	£0.8	No
Reduction in network losses*	£0.2	£3.1	No
Storm benefits	£2	£8	No
Reduced connection costs	£0.25	£1.1	No
Additional benefits	**£2.75**	**£13.0**	
Total benefits	**£5.26**	**£20.74**	

3.2 Savings arising under alternate LCT adoption scenarios

The above savings are based on the DECC low LCT adoption scenarios. Savings under higher adoption scenarios are likely to be much larger.

In particular, the forecast reduction in losses is the minimum value likely to be observed, however under higher LCT growth scenarios coupled with the introduction of active time of use tariffs by Suppliers, then this benefit could rise to as much as £9M pa by RIIO-ED2, equating to over £72M of additional benefits for customers over the RIIO-ED2 period.

In addition to losses savings, time of use tariffs under the high scenario would be likely to add a further £4.8M of reinforcement savings pa by 2025 totalling an additional £29M by the end of the RIIO-ED2 period.

4. IT system changes

4.1 Scope

New IT systems and integration with existing IT systems will be required to support the roll out of smart metering within Electricity North West. The IT system changes that will be delivered within the remainder of the DPCR5 period and throughout the ED1 period to support the roll out smart meters to customer premises include; interfaces to DCC, integration into our network management (NMS), customer response management (CRM) and registration services.

The key objectives during the RIIO-ED1 period are:

- Support the Supplier smart meter rollout via the introduction of new scheduling and appointment tools (to be implemented in DPCR5)
- Connect to DCC systems to enable smart meter interaction (Alerts and Services)
- Improve network visibility to reduce or defer network reinforcement costs
- Improve customer service across a range of routine activities
- Provide the foundation for the future Smart Grid

4.2 Business Change drivers

The adoption of smart metering will require us to undertake a number of mandatory activities. In addition there are several non mandatory data transactions offered by the DCC which the business will adopt driven by the business benefits as outlined in this annex:

Smart meter rollout - DNO interventions

- The network operator is obliged to inspect and potentially undertake remedial works where a meter operator advises they are unable to complete a smart meter installation at a premise due to safety or other issues affecting the service termination. It is likely that many such referrals will come through industry data flows however it is also likely that our contact centre will experience an increase in customer or meter operator calls relating to smart meter installations. In order to ensure that we are able to offer excellent service to customers, whatever the communication route, we will implement enhanced work scheduling systems within DPCR5.

Industry interfaces – business systems changes mandated by licence condition:

- Registrations interface changes
    - Changes to existing interfaces to accommodate unique property reference number (UPRN) and SMETS data items
    - New interfaces from the DCC to inform us of the enrolment of each smart meter and to the DCC to update supplier registrations and agent appointments.

Further changes may also be mandated at a future date, potentially including:

- Additional registration and billing interface changes deemed required by DECC to support the smart meter roll out
- Billing methodology changes. Small/medium commercial sites may in future be billed from half hour consumption data obtained from smart meters. Billing of domestic properties is currently based upon aggregated profiled consumption, it is not currently envisaged that this would change
- Centralised registrations. It has been suggested that meter point registration systems may be centralised within DCC at a future date to be advised
- Requirements to certify the organization (or parts thereof) to standards such as ISO27001
- Costs for delivering future mandated changes such as described above are not included within the plan and any costs incurred as a result of additional mandated

requirements or change would be expected to be treated as pass through if they occurred – ie additional to this plan

Network operator participation and use of smart meter data is not currently mandated by DECC or Ofgem. We believe however that smart meter technology offers benefits for customers and therefore intends to be early adopters. For this reason, an investment of £1.5m has been brought forward from RIIO-ED1 to DPCR5 for DCC integration enabling Electricity North West to fully align with DECC and industry expectations that DNOs will actively invest and participate in smart meter readiness activities during the DPCR5 period.

Interaction with the DCC will be required in order to access smart meter data:

- Communications
    - Interface specifications are defined by the DCC; network operators will need to comply with interfaces specifications and communication protocols in order to access smart meter data.
- Privacy and security
    - Access to smart meter data will be subject to strict privacy and security requirements - to be defined within the smart energy code (SEC). Network operators will be required to achieve certification against the SEC obligations before being able to access smart meter data
    - Formal security risk assessments will be carried out on an annual basis, and an independent third party will undertake an audit of information security management.

Access to smart meter data services will enable customer and business benefits as outlined in our smart meter strategy. Examples of smart meter data flows that support the identified benefits include:

Improved network planning

- Read profile consumption data
- Read network data (voltage and power quality logs)
- Read maximum demand registers

Improved network management

- Manage device (configure event alert thresholds)
- Read network data (voltage and power quality logs)
- Read maximum demand registers

Improved outage management

- Last gasp/first breath alerts
- Read supply status

Improved customer service

- Read supply status
- Read network data (voltage and power quality logs)

Some services will bring immediate benefits eg the ability to remotely interrogate a smart meter device and determine supply status without the need to despatch a fault technician. Other benefits will only be realised in the longer term when sufficient volume of smart meter data becomes available eg detailed consumption data assisting in long term network planning.

Network Management System solution vendors are expected to significantly upgrade their product offerings in order to fully exploit the capabilities and benefits of smart meter data and for this reason the expected procurement of a new Network Management System has been partially deferred in order to ensure that we obtain the best fit of functionality and integration of smart meter data, as a result £1.5m of NMS smart metering development costs have been

pushed back into the RIIO-ED1 period from DPCR5. Note that in cash terms this move when considered with our advancement of DCC interface, as noted above, nets to zero.

4.3 IT system landscape

To have access to smart meter data we will require a new communications interface to the DCC. We are working closely with other DNOs to help understand and define the requirements of such a system and to ensure comprehensive review, and where appropriate challenge and feedback to DCC interface design drafts. It is intended that we may partner with one or more interested network operators to specify and procure the necessary IT systems for the interface, sharing costs equitably and hence delivering benefits at the lowest possible cost to customers. It should be noted that some potential solution vendors have given prior indication that they may seek to licence DCC communications software and services to the corporate entity rather than to individual distribution licence holders, in such case our total IT costs will be proportionately higher and may not compare favourably with a direct comparison of other DNOs who are able to leverage a single solution purchase to service their multiple distribution entities.

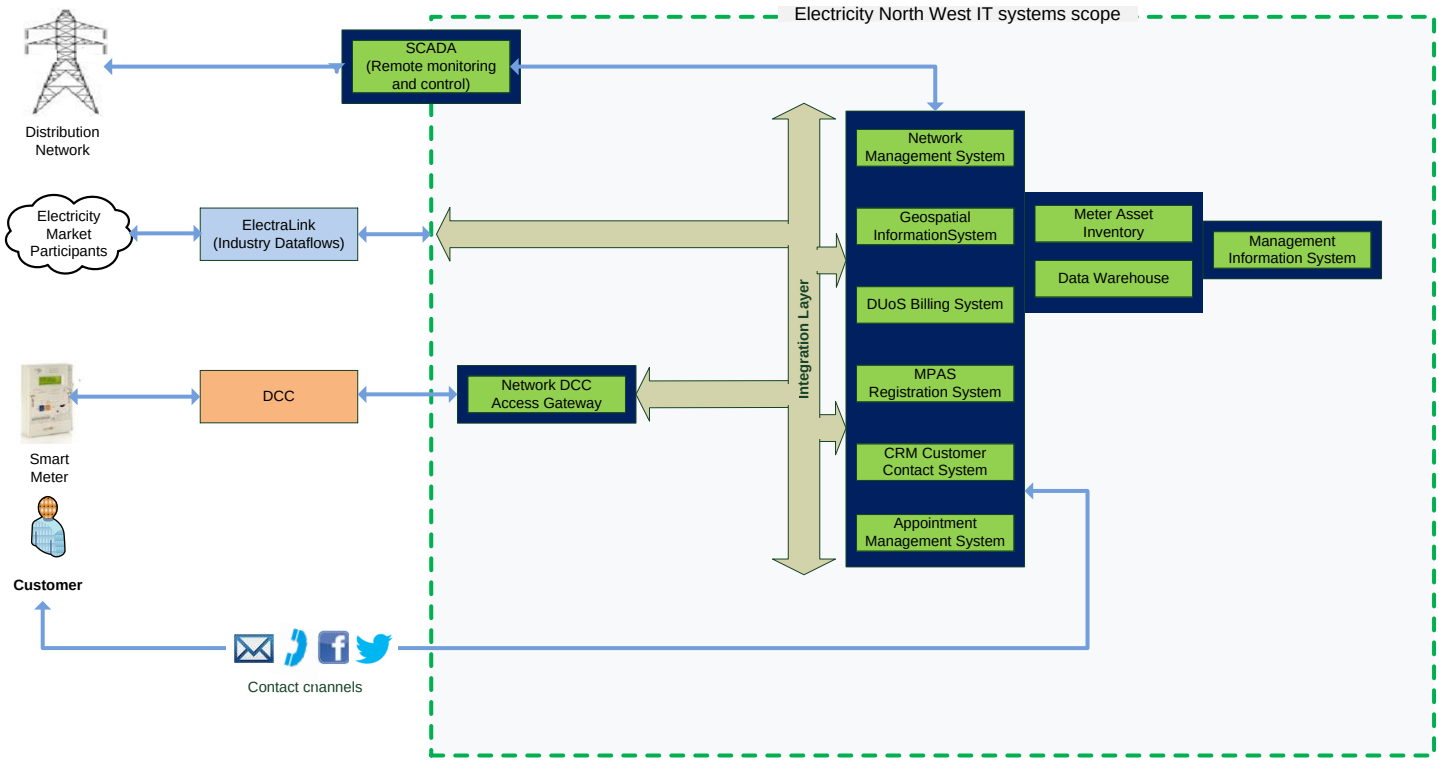
Connection to the DCC will require us to meet a defined set of security criteria affecting systems, process and staff resource. Our investment plan accounts for achieving and maintaining ISO27001 compliance which we believe fulfils the information security and privacy requirements currently required by SEC for our DCC User Systems. In the event that SEC changes mandate ISO27001 certification any costs arising will be additional to our plan and we have assumed these costs will be allowed as efficient smart meter related implementation costs under the uncertainty mechanism. Further work will be required to then integrate the use of smart meter data into our systems and processes to realise the forecast benefits.

Changes to industry data flow interfaces will be mandated to support the exchange of smart meter data between other industry parties and data and licence charges will be mandated for the use of smart meter data.

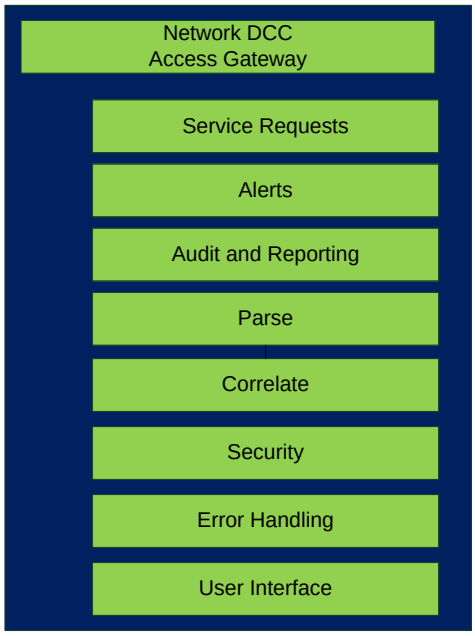
With the introduction of smart meter data there will be a requirement for secure storage and access control of sensitive data (consumption profile data) and data integration with the network management system to aid fault diagnosis and future network planning.

From mid to late 2015 the supplier rollout of smart meters is forecast to ramp up significantly. At the peak we will expect 8,500 meters installed per week across the region, with an anticipated rate of between 2 - 5% of installations requiring network operator intervention to support the installation process. This represents a 400% increase on normal installation volumes and will require a corresponding ramp up of engineering resource. New and amended IT systems will be required to help manage and support the increase in workload in resource scheduling and customer appointments management.

Conceptual Systems schematic



Network DCC Access Gateway

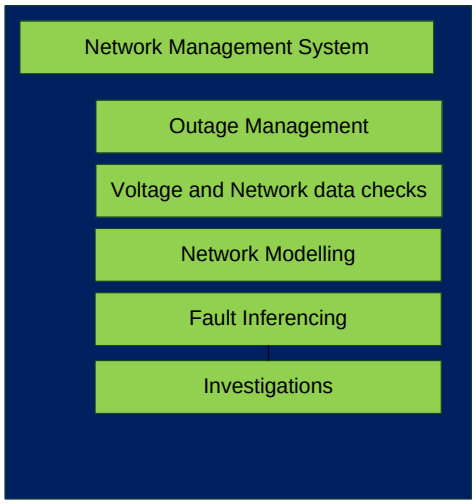


Smart meters deliver the capability to be remotely interrogated and collect engineering and consumption data. Access to smart meter data can only be achieved via the DCC, direct meter access is not permitted. A new IT solution is required which will handle the communication, security, audit and control of all data exchanged. The gateway will provide both machine to machine interfaces and a user interface to allow the full range of network operator smart meter commands to be utilised.

Minimal business logic will be embedded within the gateway although some common responses and orchestrated activities may be specified as a part of the common requirements definition taking place in partnerships with the other DNOs eg automatic change of meter security keys and configuration of network parameters whenever a new smart meter is installed.

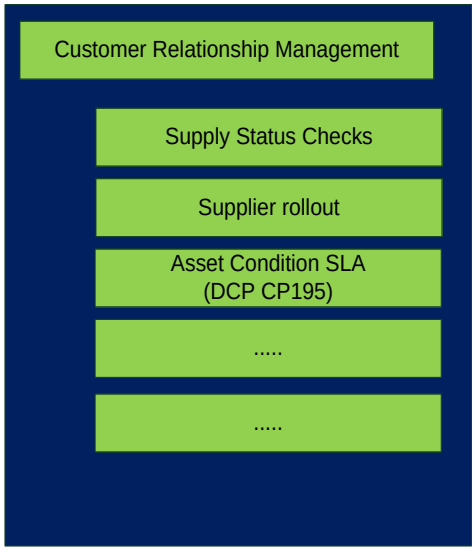
The gateway is expected to maintain the inventory of smart meter device ID to MPAN mappings but will not store any transactional smart meter data, acting only as the interface to Electricity North West's back end systems.

Network Management System (NMS)



Separate to the introduction of smart meters, we are replacing our existing NMS with an up-to-date system that will provide smart grid functionality. The new NMS will use smart meter data to fulfil its potential, including loading data and alerts from smart meters. Given the emerging nature of smart grids, it is expected that the interface requirements between the DCC Access Gateway and the NMS will continue to develop.

Customer Relationship Management (CRM)



Separately to the introduction of smart meters, we are introducing a new Customer Relationship Management (CRM) system with the aim of centralising and improving all the interactions with customers.

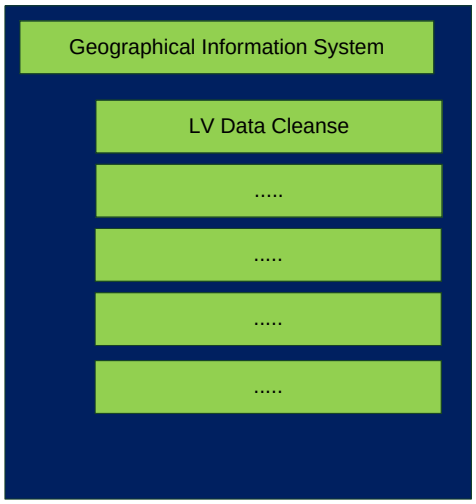
The CRM will be integrated with the DCC Access Gateway and NMS systems so that call agents can provide the customers with more accurate information regarding the scope, nature and expected resolution timescales for any incidents, including those related to metering issues.

The CRM system will be enhanced to support all aspects of the smart meter rollout, including introduction of Asset Condition SLAs (DCP CP195).

Appointments Management System

During the smart meter rollout, the meter operator may identify problems at the service position and where the network operator will be required to undertake work before the smart meter can be installed, eg replacement of the cut-out fuse assembly. Electricity North West needs to enhance its appointments management system to manage the expected volumes of interventions triggered by the smart meter rollout. We intend to use the appointments system to schedule both direct and contract labour. The appointments system will interface to the CRM to provide a seamless service for customers.

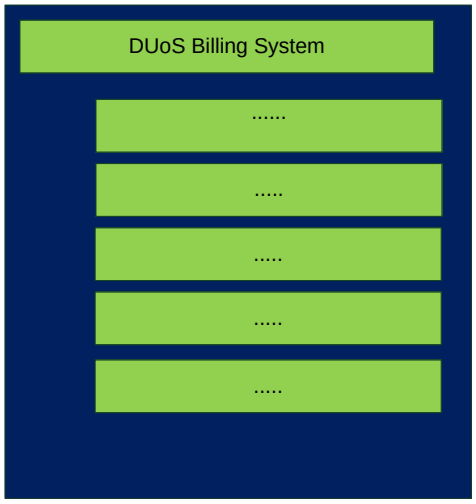
Geographical Information System (GiS)



The introduction of smart meters should not directly affect the GIS system; however to make any realistic use of available smart meter data it will be critical to modify GIS system data to make accurate the LV network connectivity model. For example without a completely accurate connectivity model, last gasp alerts for fault inferencing will not work efficiently. A comprehensive programme of LV data cleansing work is required to map meter assets to LV service terminations

We have included £4m investment to undertake this LV data cleanse activity.

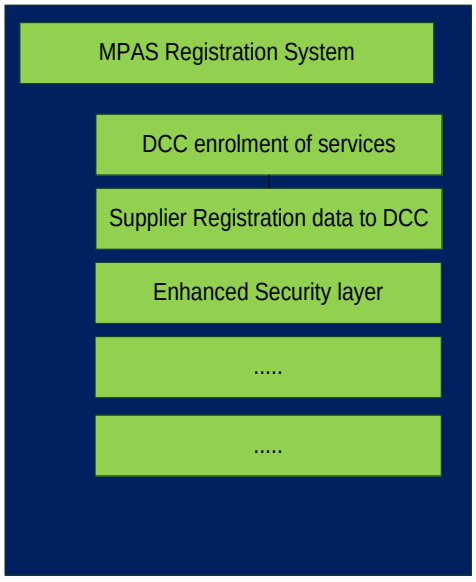
DUoS Billing System



There is unlikely to be any significant changes to the DUoS billing system during the early part of RIIO-ED1 but as smart meters become more prevalent the industry may develop new tariffs and charging initiatives which, for example, need to send appropriate Demand Side Response cost signals to consumers.

Although these could require billing system changes, we have not included any significant costs within plan.

MPAS Registration System

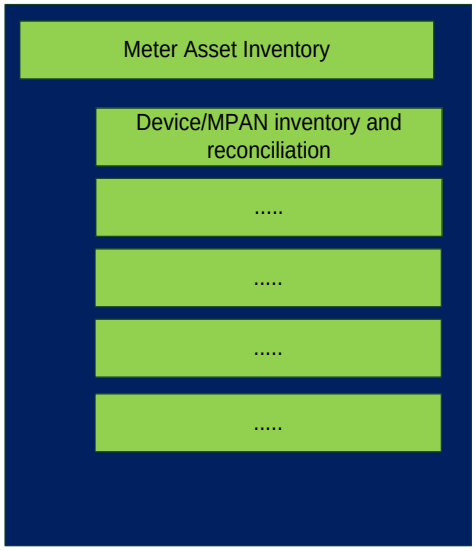


DECC have mandated changes to existing registration interfaces to cater for the exchange of new smart meter data attributes and also defined new interfaces to enable exchange of registration data with the DCC. We will have to change to our existing systems to meet the security requirements for the DCC and in line with DECC timescales.

From circa 2017 there is also the likelihood that Registration systems will be centralised within the DCC. This will require the development of existing, or new, interfaces for billing and other purposes.

We have not included any costs for centralisation of the DCC registrations system, assuming that we would be able to achieve it within the existing DCC interface capabilities rather than require any new infrastructure.

Meter Asset Inventory



The introduction of smart meters introduces new data attributes into several different business areas. To manage the relationship between smart meter devices, MPANs and notifications of DCC enrolled MPANs in registration systems a new meter asset inventory system is required.

We note that Ofgem has begun the process of consulting with industry on the potential creation of a centralised meter asset database. Centralisation will require the development of existing or new interfaces for billing and other purposes.

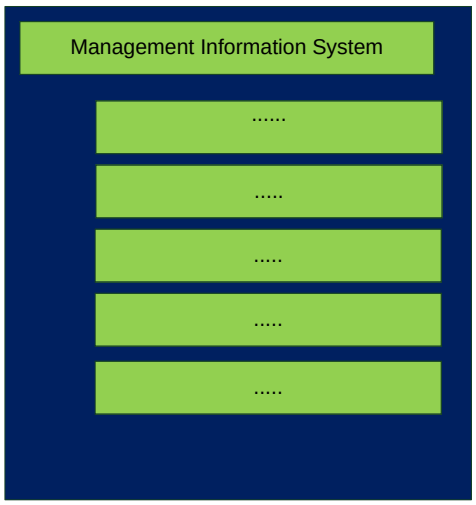
We have not included any costs for any significant integration to a centralised DCC asset inventory system. We assume that we will be able to achieve this within the existing DCC interface capabilities rather than require any new infrastructure.

Data Warehouse

Smart meter data will allow more detailed and accurate modelling of gross customer demand which will improve our network planning and help reduce or defer network investment. There are significant security implications in using customer data in this way, and we will have to implement appropriate data security systems including aggregation

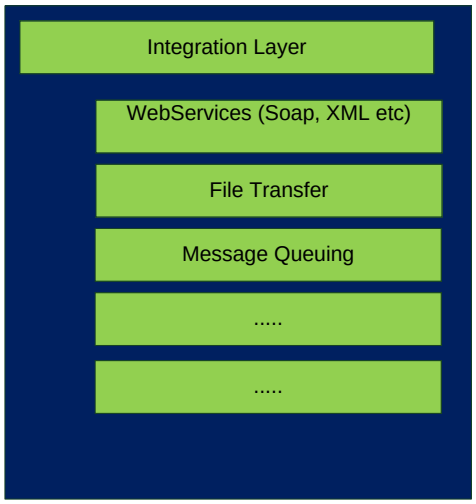
Large volumes of smart meter data may be collected from smart meters, a typical consumption profile data read from a 90 day period may contain up to 18 000 data points for one customer. We will introduce a new secure data warehouse which will maintain and control access, security and auditing of the use of data consistent with the requirements of Ofgem, DECC, and the Information Commissioner's Office.

Management Information System



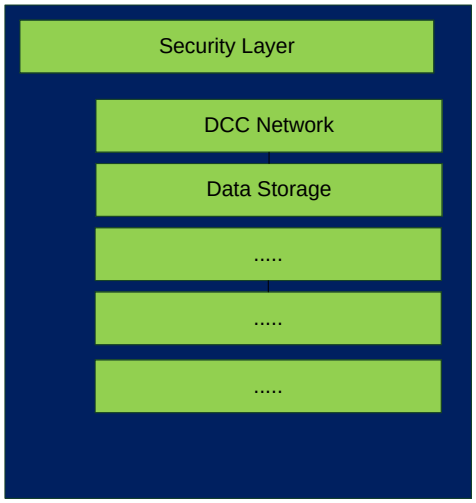
Smart meter data will allow more detailed and accurate modelling of aggregated customer demand which will improve our network planning and help reduce or defer network investment. New management information will be developed to help control, simplify and enhance network management, analysis and reporting.

Integration Layer



The integration layer will provide for the technical integration middleware and infrastructure required to join the various system components together. At present no one specific integration product or platform has been defined, it is expected that the layer will comprise of one or more of the technologies listed to the left. There may be different levels of integration applicable at different phases of the smart meter rollout as the volumes of smart meters installed grows and the resultant business benefits become more valuable.

Security Layer



Additional security compliance and audit requirements apply to connecting to the DCC network and also to storing smart meter data (disaggregated consumption profile data). Provision has been made for complying with relevant aspects of ISO27001 and the Data Protection Act.

Attaining actual ISO27001 certification or achieving compliance for wider system and process requirements are not currently included in the plan.

4.4 Costs

Smart Meter rollout

The following table indicates the ongoing Indirect/IT and data services costs with regards to smart meter rollout:

	DPCR5	ED1 Pass through period	2022	2023
IT set up costs for scheduling and appointments management (during DPCR5)	0.5			
Registrations and additional scheduling and call centre resource (during rollout FY16-FY21)		1.2		
Total	**0.5**	**1.2**		

Smart meter data and DCC integration

The following table indicates the ongoing data services costs with regards to smart meter data and DCC integration:

	DPCR5	ED1 Pass through period	2022	2023
DCC Licence Fee through ED1 (assumed costs)		2.4	0.4	0.4
Smart meter transaction data charges through ED1 (assumed costs)		0.6	0.1	0.1
Total		**3**		

The following table indicates the ongoing Indirect/IT vices costs with regards to smart meter data and DCC integration:

	DPCR5	ED1 Pass through period	2022	2023
Network DCC Access Gateway	1.5	1.2		
Integration and Analytics	0	3.0		
Asset Inventory	0	0.5		
Data Storage	0	0.5		
Data Centre/Hardware	1.0	0		
NMS (enhancements enabling utilisation of smart meter data)	0.5	2.3		
LV Data Cleanse	0	4		
Project Management, business support, Infrastructure support and maintenance	0	1.5	0.5	0.5
Hardware/software refresh	0	0	0.5	0.5
Security	0.1	0		
Total	**3.1**	**13.0**	**1.0**	**1.0**

4.5 Benefits

The aforementioned IT system changes are required in order to deliver the benefits as defined in this annex.