UK Energy Utilities: Preparing for the Smart Metering Implementation Programme (SMIP)

With the foundation for smart metering in place, UK energy utilities must now apply hard-earned lessons to identify and build new capabilities, complete installation, and support mandated interactions with the Data Communications Company (DCC).
Executive Summary

The UK government’s Smart Metering Implementation Programme (SMIP), overseen by the Department of Energy & Climate Change (DECC), aims to replace 53 million legacy electricity and gas meters in over 30 million residential premises by 2020. This is by far among the biggest UK energy infrastructure projects in recent history. The government’s vision is to equip every UK home with smart energy meters - empowering users to manage their energy consumption and reduce their carbon emissions. Businesses and public-sector consumers will also have smart, or advanced, energy metering suited to their individual requirements. According to the DECC, “The rollout of smart meters will play an important role in the UK’s transition to a low-carbon economy, and help ensure an affordable, secure, and sustainable energy supply.”

When chartered in 2011, SMIP was designed around two stages: Foundation and Installation. In 2012, the program established the Data & Communications Company (DCC), a central body for facilitating all communications between the utility and meters on the wall. During the foundation stage, DCC developed the systems and capabilities required to fulfill its responsibilities, while DECC-empowered utility organizations began rolling out smart meters that comply with SMETS 1 (smart metering equipment technical specifications). The installation stage (2016-2020) involves installing SMETS 2-compliant smart meters across the UK, with the DCC managing interactions between the utility and smart meters. (To learn more about the two phases of SMIP, read “The stages of the rollout.”)

Having now gone live, DCC Releases 1.2 & 1.3 are among the most important milestones in SMIP. Although the program missed its initial target by more than a year, the delay is understandable, considering the scale of the program. It also gave utilities an additional 12 months to prepare for and develop the foundational infrastructure needed to work at full throttle.

Today, as these companies prepare for DCC, they face some tough questions: Are they ready for the DCC world, or are they still putting out fires in the foundation stage? Will the knowledge gained during the foundation stage transition to the installation stage? And will they be ready in three to six months, when volumes ramp up, to deliver a smart, satisfying experience to customers and gain a competitive advantage in the market?

To answer these questions, companies must identify the capabilities needed to ensure a successful DCC installation, as well as the complexities they will encounter along the way. The next step is to understand how many applications can be lifted and shifted, with required tweaks, and how many must be built from the ground up, in order of priority.

Otherwise, utilities will face the same issues when they reach the installation stage, but at a much greater degree. Those that apply lessons from the foundation stage to the installation stage will be able to tap into the benefits of smart metering sooner, rather than grapple with isolated daily issues.

This white paper discusses what UK utilities can do to help ensure they are well equipped and fully prepared to make DCC a success.
BUILDING CAPABILITIES: GAINING & SUSTAINING MOMENTUM

Our earlier white paper, "Scaling-up Smart Meter Operations: Challenges and the way forward for UK Energy Utilities"\(^5\), reviewed the capabilities utilities need from the perspective of smart meter operations. These proficiencies - business, technical, and operational alike - are key to overcoming the challenges and realizing the full benefits of this transformation.

Drawing on our framework for the foundation stage, we developed a blueprint and capability matrix for the installation, as shown in Figure 1. In addition to enhancing their existing capabilities, utilities must develop new ones. These will typically focus on design, rather than actual operations. Much like the foundation stage, installation will require utilities to glean insight from their current operations, and make investments in point solutions, process augmentations, and other technologies to heighten efficiencies as they move along the installation path. The following Quick Take provides a high-level overview of these requirements, as well as our recommendations for applying foundation-stage investments and lessons to the installation phase.
Quick Take

Building on the Foundation

Recommendations

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<th>CAPABILITY</th>
<th>RECOMMENDATIONS</th>
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<tr>
<td>Business Capabilities</td>
<td>As DCC system capacities and capabilities improve, more premises will be eligible for smart metering. Eligibility criteria - including factors such as network coverage, device availability, expansion strategy, and property type, for example - vary among utilities, and can include maintaining data on customer eligibility to better manage installations and customer communications. Utilities with customers in the foundation stage will have to re-tune their eligibility criteria to reflect DCC attributes and their expanding service base. Companies that haven’t experienced the foundation stage should set up this classification in their core systems, such as ERP, to better administer the smart metering rollout.</td>
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<td>Smart Customer Eligibility</td>
<td>What will change in the DCC world is the management of additional smart metering devices provided by new vendors and the assets provided by DCC. These changes will affect the entire infrastructure - from procurement, to installation, to related systems. Identifying and implementing these requirements will help utilities meet their installation target. Those with experience in the foundation stage will be better positioned to manage this transition by enhancing the systems they already have in place for asset and supply chain management.</td>
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<td>Smart Supply Chain</td>
<td>Foundation experience is immensely helpful, since it tests the operational capabilities of enterprise systems, the supply chain, and field operations collectively. Foundation installations consume a lot of time, money, and effort to achieve a high-level installation and commission rate. Although there might be many case studies to draw on from the foundation phase during install and commissioning (I&amp;C), they may fall short in signal strength, location, or device performance, for example. Utilities should make sure they are ready to manage the transition to DCC, since the latter’s IT infrastructure and processes might not be as responsive as the ones established during the foundation work. Since DCC now owns the operations of the head-end system, utilities with foundation experience must adjust their expectations to reflect the number of installs they can realistically complete in one day, and revise their forecasts and operational agenda accordingly. At the same time, companies should continue to develop and refine systems and processes, and train their field force and customer service agents to manage this transition. Utilities should also be aware that I&amp;C processes for DCC should not vary much from the foundation phase; otherwise, training and change management would be overwhelming.</td>
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The decision to assign a separate team for smart metering depends solely on an organization’s strategy. To capitalize on the knowledge and experiences gained from the foundation stage, companies should focus on minimizing changes at the operational/field level and instead concentrate those efforts at the system level. For workers in the field to manage DCC I&C jobs, hand-held or other mobile devices must be equipped to handle the demands of DCC. Technical and process training will also be necessary. Utilities that plan to install SMETS1, SMETS2, or DCC devices in parallel should ensure that systems and processes are prepared to support the field workers during the transformation. No major changes are expected at the contact center level. Systems used to check customer eligibility, book appointments, and manage customer relationships, for example, will require updates and training to help customer service agents become comfortable with new processes and tools. At the DCC service level, governance and project teams work independently, since the systems and processes they interact with will be different from those in the Foundation stage.

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<td><strong>Smart Pre-payment</strong></td>
<td>Prepay customers are the most vulnerable if smart pre-payment devices do not work as expected. Smart pre-payment requires close monitoring in areas such as calorific value updates; financial reads; non-disconnect calendar; smart card creation and delivery; data preparation in back-end systems; customer vends; change of supplier; and changes in payment modes. With DCC in place, these customers will be rigorously monitored through business services to ensure an optimal pre-pay experience.</td>
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<td><strong>Mode Change/Debt &amp; Credit Mgmt.</strong></td>
<td>With pre-pay smart meters, mode changes for customers, as well as activities related to debt and credit management, will be handled remotely. Systems that previously managed this function will have to be enhanced to handle smart data and efficiently manage debt and credit to avoid disputes and loss of revenue.</td>
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<td><strong>Time of Use</strong></td>
<td>Among the key outcomes of smart meter rollouts is the implementation of an accurate Time of Use (ToU) tariff structure. This new capability can be a key differentiator for utilities, since it helps ensure that smart-meter data is well utilized to personalize tariff structures for smart customers. The solution for ToU combines smart analytics that provide key insights on customers’ energy consumption, as well as back-end system enhancements to support rapidly changing tariff structures.</td>
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<td><strong>CoS/CoT</strong></td>
<td>Change of Supplier (CoS) and Change of Tenancy (CoT) will have a very positive impact on DCC implementations, since the transition from a group of market aggregators to a single body (DCC) ensures faster switching (one of the key imperatives of the SMIP). For utilities, the key is to use centralized data to accelerate industry flows and offer customers a better experience. Re-engineering process flows, utilizing smart data, and making use of automated exception management is a good approach for addressing this requirement.</td>
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Utilities' adoption of smart products and solutions will be largely driven by their short and long-term strategies - keeping in mind the possibilities with DCC infrastructure. Over the short term, companies can offer tariff plans with attractive rates to increase smart meter adoption, backed by the capabilities of smart meters, such as half-hourly reads; time of use (TOU); and over the air (OTA) updates. In the long term, utilities will offer complete energy-management products through smart home/connected home concepts.

Failing to develop a robust, automated on-boarding process can lead to a poor customer experience. Utilities that have gone through the foundation stage will have to equip their existing systems and processes with new installation timelines, devices, and communications tools. Utilities that do not have the capabilities to support and manage first-time DCC customers should develop them. This will strengthen customers' confidence in smart services - making it easier and more profitable to bring new products to market and enable contact center agents to better respond to customers' questions and concerns regarding smart metering.

Utilities need to develop mechanisms for forecasting the following elements of smart metering, and convey forecast figures to DCC in a timely manner to allow the central body to prepare for the volumes:

- **Communications Hubs – Forecast & Order**
  These systems are delivered by the communications services provider in DCC, Telefonica, and Arqiva. The allocation of these hubs will be based on a 24-month rolling forecast, with a minimum 10-month forecast for delivery submitted by utilities. Delivery is based on orders placed five months in advance. Therefore, it is critical for utilities to plan their installation and provide information early on. Delaying procurement could lead to a cancelled appointment, which could lead to cost overrides and unhappy customers. Although there is some flexibility, orders that exceed thresholds may be amended in accordance with the hubs' order policies. Building an accurate forecasting mechanism requires coordination among teams in asset management, customer operations, the field force, smart metering operations, (for exchange volumes) and smart metering governance. It's also important for utilities to identify the owner of the forecasting process - a highly manual activity that requires all inputs to DCC to go through Microsoft SharePoint. Communications hubs vary according to region - adding to the complexity of forecasting and ordering.

- **Smart Meters**
  Utilities must also submit a forecast for their smart meters. Smart-meter forecasts are the basis for communications hub forecast - the only deviation being exchange scenarios. Once the process is set up, it should address both requirements. However, exchange requirements will be very different. The accuracy of forecasts depends on how well the operations team can identify the point of failure of an inactive asset - completing the feedback loop.
Forecasting (continued)

- **SMKI Certificate Signing Requests**
  These address the complexities that arise from multiple options - batch requests or single requests, and CSRs for the six different asset types. Utilities must ensure that the process for SMKI CSRs is in place to avoid scenarios such as when an engineer making a service call to install the meter is forced to install it as “dumb” because the certificates are not in place when commissioning. In the foundation stage, utilities had control over their systems and third-party environments, which they could use to their best advantage in cases like the one cited above. In the installation stage, utilities are bound to follow the rules set forth by DCC.

- **Service requests (SR)**
  These forecasts may be among the more complex activities utilities need to prepare for, given that the allowable variance must be within 10%. Utilities need to develop the capability to predict SR requirements based on customer preference, back-end system design, and regulatory mandates. Scheduled SRs should be straightforward, with the only deviation being when customers change their billing or read preferences. On-demand SR forecasts can be highly inaccurate when utilities enter the installation stage, due to companies’ lack of experience in the DCC world. Once utilities start operating within the new model, they can overcome this problem with on-demand SRs. Experience gained in the foundation stage could have helped utilities in this area; however, due to a lack of proper tracking of on-demand activities (which were mostly ad hoc and performed at will) that it will not be useful when designing a process for on-demand SR forecasts.

**Smart Home (IoT/Automation)**

As mentioned earlier, smart home or connected home concepts will provide customers with end-to-end energy management solutions. SMETS-2 offers capabilities for smart meters used with other smart devices in the home. With proof of concepts already in the marketplace, utilities should invest in developing products and services around these offerings.

**Technical Capabilities**

A major part of the smart infrastructure will be managed by DCC; as a result, the management burden will lessen for utilities. However, to ensure smooth operations, problems must be identified early and proactively. This means that utilities will need to work closely with the DCC team to resolve issues before SLAs are created. We expect that in the early days of DCC operations, there will be issues regarding ownership of problems that arise in the smart infrastructure. Utilities should invest in capabilities around remote monitoring and triaging to help identify the root cause of problems, substantiate their claims, and effectively manage the infrastructure.
The security of smart communications is crucial to building customer confidence and adhering to regulatory guidelines. Smart certificates play a major role in ensuring end-to-end security. The process of certificate management must be right the first time; otherwise, communication cannot be established with smart devices using a DCC-managed smart infrastructure. Managing certificates will be similar in the foundation stage. Utilities will need to work closely with their respective device providers to ensure that SMKI (smart metering key infrastructure) and IKI (identity-based key infrastructure) certificates are set up to ensure secure and trusted communication between smart devices and utilities’ existing systems. DCCKI (DCC key infrastructure) certificates will help utilities utilize the DCC Gateway Connection, Self-Service Interface, Registration Data Interface, and DCC User Interface.

Although utilities will not be required to manage communications, it is important to understand how they work so that installations are carried out with minimal disruptions. For example, during the initial phases of installation, companies must perform a pre-check before an appointment to confirm that the area is eligible for installation as approved by the CSP of DCC. Communications-related investigations will be handled through the SSI portal, so it will be crucial to understand and keep track of incident trends and categories in the portal to avoid delays in closing investigations.

A utility’s success in the installation stage will depend on its ability to manage operations internally, with minimal dependency on DCC. DCC will be a busy infrastructure with daily installations set to hit records every other day. Alarms and alerts analyses help assure that installed meters are functioning well and can proactively address failures.

Smart security and capacity management must be managed in the same way as in the foundation stage. Back-end systems and DCC interfaces, which the utility will be responsible for, will have limited capacity during this initial phase. Monitoring the progress of roll-outs and managing capacity requirements should be a recurring activity. While utilities with foundation experience will benefit from lessons learned the hard way, those experiences can be applied to effectively manage risk.

As DCC prepares for SMETS 1 adoption, utilities must be aware of DCC design specifications, and make sure their systems and processes align with those requirements. One approach is to use the knowledge gained when installing service operations and make the necessary changes within the timelines for SMETS 1 adoption. In addition, utilities must see to it that their pre-SMETS meters share the same platform and comply with SMETS 1. Programs should be planned around utilizing OTA updates, especially firmware, to transition all pre-SMETS meters to SMETS 1.
The final design and availability of DCC were major roadblocks for utilities. At the same time, this should not have stopped companies from assessing, implementing, and validating the required changes in their internal systems and processes at the component level. Given the maturity level of the technologies involved, a modular strategy works best (see Figure 2).

An end-to-end approach can work once all IT components are at the agreed-upon performance level. With a modular approach, the entire process can be segregated into four focus areas:

- **Module 1** - Internal systems to DCC integration hub.
  - Tests internal systems for DCC readiness.

- **Module 2** - Individual service requests from the integration hub to DCC systems without the devices.
  - Tests interfaces and interactions with DCC as defined in specification.

- **Module 3** - Individual service requests from the integration hub to DCC systems with devices.
  - Tests integration with DCC and devices.

- **Module 4** - Integration of all systems.
  - Tests end-to-end functionality.
  - Required for DCC operations.
### System Integration/Enhancement

Back-end systems must adapt to the DCC infrastructure. Major changes involve how business services are sent to or received from DCC; the interface used by utilities’ back-end systems and DCC; how firmware and other OTA updates are managed; and how triages investigate accidents and other unexpected events. It is important to have the right interface or integration hub between the DCC and back-end systems. The other challenge is to properly test systems to ensure that all potential scenarios are taken into account before going live.

### Business Services

Business services is integral to Installation. The success of the program depends on how well a utility understands its services and how well they align with systems and scenarios they may encounter down the road. Although services are defined by DCC, every utility operates differently, which will be evident in the design and interaction of these services with downstream systems.

### Remote Operations

In the foundation stage, remotely triaging inactive assets was straightforward. Head-end systems, which captured all information, including data and logs, were owned by the utility, and provided the status of transactions at any point. Other components of the smart metering infrastructure (network communications, certificates management, etc.) are also owned and operated by the utility. In the installation stage, there is no head-end system; the integration layer that communicates with DCC only holds logs, not data. Consequently, the ability to perform remote triage will depend on portals provided by DCC and the information in the back-end systems, such as billing, customer management, and meter data management. Utilities will face numerous challenges when utilizing DCC portals, such as SSI or SMKI, since these systems are manually driven. An automated solution must be ruled out due to DCC restrictions. The most feasible approach is to utilize the data captured in the back-end systems and build analytic models to draw meaning from those assets.

### DCC Operations

It is crucial for utilities to understand how DCC operates and learn how to use the different DCC portals. This should be a priority when planning the transition. Assigning the right team to manage DCC relations and operations will help companies achieve a successful roll-out and sustain operations.

### Smart Asset Management

While all aspects of the smart metering infrastructure are critical, managing the “Owner of Comms Hub” in the installation stage is the most complex. The DCC has mandated that the owner be the electricity supplier. So in scenarios where a utility only provides gas, it would go through DCC to reach out to the electricity provider to the communications hub. Utilities need to build a process for tracking cases where they are not the owner of the comms hub, or where they own a hub with another supplier on the same customer premises. Having this capability will help utilities resolve customer complaints faster and be proactive in addressing inactive assets. Regarding other assets, the focus should be on ensuring that testing is approved for all possible scenarios and before the assets – particularly the ones that will go on the walls in customer homes – are given the green light for installation.

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The number of third parties a utility will need to manage in the DCC world can be higher or lower than in the foundation stage. While a communications partner could be eliminated, other resources will be needed, since meter manufacturers will increase. While all third parties must be managed, special attention should be given to DCC and how a utility maintains and manages relations and interactions with it. It's also critical for utilities to train third-party vendors on how DCC operates, since many of these partners will directly interact with DCC systems (e.g., meter manufacturers for registering the devices and acquiring security certificates).

Service management will become more complex. Until now, utilities only managed their in-house capabilities and vendors. But in the installation stage, DCC will play a crucial role. The key is to design a service management organization that can align with the guidelines set by the DCC. In addition, knowing the DCC’s ways of handling this function and bringing it into design will be critical. There are three distinct service management requirements that will emerge during the Installation phase:

1. Managing systems and processes to prepare for the DCC user gateway — including back-end systems for billing, CRM, digital, and management information (MI). This aspect of service management will be straightforward for most utilities, since it was part of the foundation phase. Aligning new vendors with the service management structure is the biggest change.

2. Managing DCC incident and service aspects. The DCC service management module is manual at this point, and has seven distinct headers with multiple sub-options. Understanding how each incident/request must be logged under DCC service management, and streamlining the task of handling so many, is key, since installations will peak from 2018.

3. Managing SMETS 2 devices involves covering incidents and requests related to the devices installed in customer homes. The difference is that many incidents can roll back to DCC to handle and close. Given that DCC stays in the middle of points one and three, it is essential to learn how to manage device-related requirements as a separate function. Our recommendation is to instill service ownership concepts in service management, where all the requirements related to smart metering will be handled by a single team. This will help reduce handoffs and turnaround times, with a single point of contact for utilities’ various business and technical teams, third parties, and the DCC.
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<th>Organizational Capabilities</th>
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<td><strong>Smart Customer Communications</strong></td>
<td>Realizing the benefits of smart meter implementation depends to a great degree on how customers embrace change. Customer experiences from the foundation stage will highlight their priorities and how they use smart devices. In the installation stage, customers' awareness of smart meters will increase exponentially, along with their number and their expectations. The key will be to take lessons learned from the foundation stage and create a meaningful communications solution to keep customers excited about smart meters. Effectively utilizing this capability can help utilities cross-sell smart products and offerings. Bringing smart meter data to the customer through digital channels and informative bills is a good approach.</td>
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<td><strong>Management Reporting (MI/BI/Analytics)</strong></td>
<td>Data captured from smart meters for various reporting and analytics will be a critical driver of success in the smart metering world. The information and solutions associated with this data will impact the customer experience, the cost to serve, revenue growth, and regulatory compliance. Building the right solution for managing data and utilizing it to personalize offerings and operations will become a major differentiator for utilities in the UK's competitive market. In the foundation stage, meters increased visibility into this data - allowing companies to deepen their understanding of customer behavior, as well as their operational performance. Applying this knowledge to enhance applications and handle increasing volumes of data will help utilities quickly acquire this capability.</td>
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<td><strong>Governance</strong></td>
<td>The number of smart meters in the field will increase rapidly to meet government targets. The smart metering landscape and regulatory activity will require a strong governance mechanism. For utilities with experience in the foundation stage, this will be a linear expansion of teams and roles, with some assigned to manage DCC and related activities. Utilities without this experience must build a process to ensure the success of the program.</td>
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<td><strong>Change Management</strong></td>
<td>Transitioning to DCC will impact all stakeholders. From an organizational perspective, managing change means making sure that internal and third-party teams are well aware of the DCC world. Knowledge transition involves business and technical change as the utility moves to the installation stage. From the customer’s perspective, the strongest impact will be on those who have installed SMETS 1 or pre-SMETS smart meters. They will question how their meters will function in the DCC world; if there are advantages to moving to SMETS 2; and the impact of switching between both systems. Utilities should plan on educating customers through campaigns to ensure that their trust and experiences are unhindered.</td>
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Considering the capabilities and requirements of DCC, utilities need to establish a separate smart metering operations centre (SMOC) – a one-stop shop for smart metering in the DCC world.

**EMBRACING DCC**

Considering the capabilities and requirements of DCC, utilities need to establish a separate smart metering operations centre (SMOC) – a one-stop shop for smart metering in the DCC world – from inception to day-to-day operations and beyond.

Figure 3 details the SMOC framework we believe will help utilities ease the DCC transition.

Smart metering capabilities can be grouped based on the interactions among the people, processes, and technologies needed to deliver the expected business outcome. (See Figure 4, next page).

**A Framework for Smart Metering**

![Smart Metering Operations Centre Diagram](image)

Figure 3
Smart meters open opportunities to manage people, products and services remotely. Taking advantage of this capability can reduce the cost of remaining competitive and enhance operational agility.

**LOOKING FORWARD**

With the installation stage around the corner, utilities need to focus on the following principles to ensure that they are ready for the DCC world:

- **Build the right organization for smart metering.** With business outcomes in mind, utilities need to develop the right team and roles to ensure a successful execution.

- **Build capabilities with volume as the key consideration.** The most evident challenge that utilities face in the foundation stage is the capacity constraints of people, processes, and technology. Hence, it is critical to build solutions around these requirements, given the huge volumes of installs and operations that will be needed to fulfill them.

- **Build a future-focused strategy.** With smart metering, the biggest advantage for a customer will be the ability to switch suppliers with ease. Hence, continually improving the customer experience is key.

- **Build a smart organization.** Smart meters open opportunities to manage people, products and services remotely. Taking advantage of this capability can reduce the cost of remaining competitive and enhance operational agility.

By developing the capabilities highlighted in this white paper, utilities will be well positioned to compete in the age of smart metering.
FOOTNOTES


5 https://www.smartdcc.co.uk/consultations/dcc-consultations-archive/dcc-plan-and-implementation-milestones/

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