

Scaling Up Smart Meter Operations: Challenges and the Way Forward for UK Energy Utilities

Globally, utilities are aggressively adopting smart technologies, which include smart meters, automated demand response, grid integrated distributed generation and micro grids. Under a government mandate, UK energy utilities are undertaking one of the world's largest smart meter rollouts; here's how we expect this to play out.

Executive Summary

The UK government's smart metering implementation programme (SMIP) aims to replace 53 million legacy electricity and gas meters in over 30 million residential premises by 2020.¹ This is by far one of the biggest energy infrastructure projects in the UK in recent history. Simultaneously, a set of directives have been introduced by UK regulatory bodies to ensure a level playing field for utilities and minimal disruption or negative impact on customer experience.

- **Smart Energy Code (SEC):** This defines the rights and obligations of all stakeholders in smart metering. All parties should comply with the business, customer, systems and security requirements, per SEC.
- **Smart Metering Installation Code of Practice (SMICoP):** This initiative endeavours to make sure the customer receives a high standard of service throughout the installation process, and knows how to use and benefit from the

smart metering equipment to improve the energy efficiency of their home.

- **Data Communications Company (DCC) guidelines and consultations:** This set of regulations aims to ensure there is a coordinated effort to deliver back-end systems and processes required for full-blown smart metering rollout.

UK utilities are also undertaking massive investments in rolling out smart meters and adopting customer-centric smart metering models. This allows customers to assert more control of their energy usage. Utilities are making efforts to comply with regulatory requirements for initial rollout phases in key areas such as security, onsite support, change of supplier, Smart Metering Equipment Technical Specification 2 (SMETS2) compliance, smart prepayment, calorific value updates and customer data obligation. In parallel, utilities are regularly introducing new value-added functionalities such as smart prepayment, payment mode change and debt management, to stay ahead of the competition.

Critical Operational Functions in Scaling Smart Metering

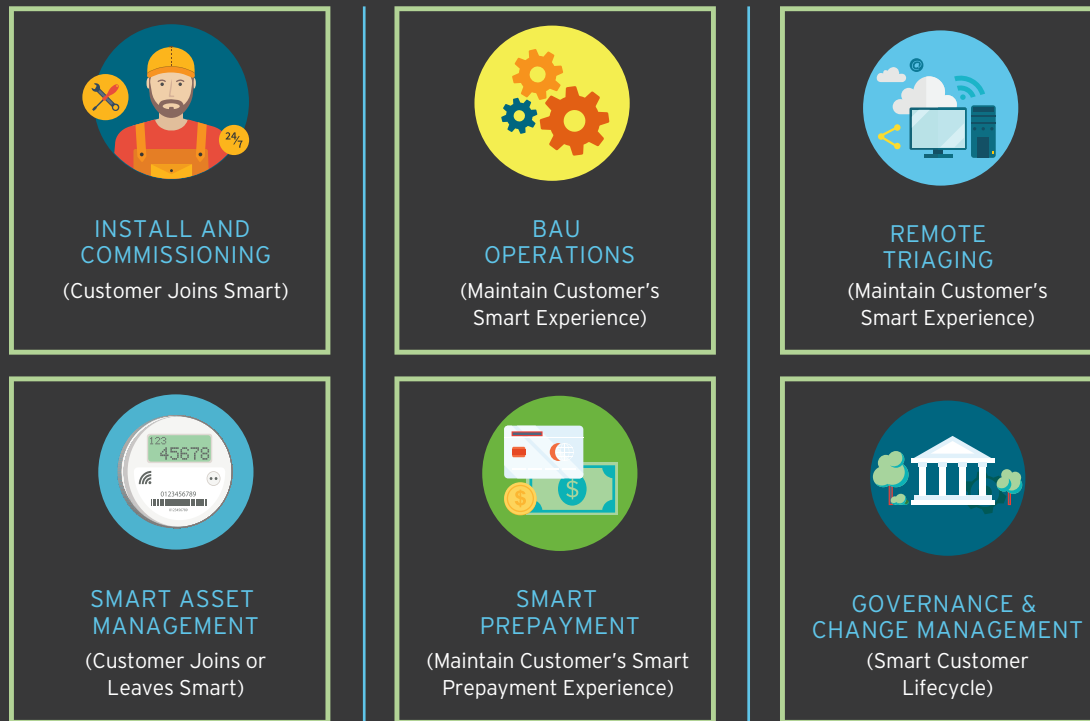


Figure 1

This white paper highlights the benefits and challenges to utilities attempting to expand their smart metering infrastructure and services, and offers practical recommendations for ways they can improve their business, technical and operational capabilities as they pursue this build-out.

Smart Meter Operations Scaling Challenges

Utilities in the UK face numerous challenges to meet the government's target of complete smart meter rollout by 2020. For example, they need to set up smart meter operation centers to manage day-to-day business and technology operations of smart meters. Figure 1 depicts the critical operational functions that pose most of the challenges utilities face as they attempt to scale up their smart metering operations.

Install and Commissioning (Customer Joins Smart)

A customer's smart experience starts from the meter installation process. The utility should be able to suitably schedule the field engineer appointment and complete the meter installation within a promised time slot. Close coordination of

multiple teams - business, field service, customer care and smart meter operations - is required to ensure a hassle-free installation process.

Smart Asset Management (Customer Joins or Leaves Smart)

Managing millions of new smart meters in the field poses new challenges to utilities in terms of effective tracking and managing asset data consistency across systems. Utilities could face huge financial impacts if they do not possess suitable tracking systems for asset management, covering areas such as supply chain, warehouses, engineer vans, customer premises and reverse logistics.

BAU Operations (Maintain Customer's Smart Experience)

There are many daily changes that need to be applied to smart metering assets, like opt-in, opt-out, tariff, move-in, move-out, calorific value, firmware, certificate update, mode change, non-disconnect calendar, etc. First-time-right execution of these daily changes is critical to ensure satisfaction for both end customers and internal business teams.

A Snapshot of Smart Meter Operations Scaling Challenges and Business Impact



Figure 2

Smart Prepayment (Maintain Customer's Smart Prepayment Experience)

Prepay customers are mostly vulnerable customers, with the potential of energy disconnection if smart prepayment devices do not work as expected. Hence, they require special attention. There are numerous areas in smart prepayment customer journeys that require close monitoring and attention, such as calorific value updates, capturing financial reads, non-disconnect calendar, smart card creation and delivery, data preparation in back-end systems, customer vends, change of supplier, payment mode change, etc.

Remote Triaging (Maintain Customer's Smart Experience)

Remote triaging promises to be a strategic capability for utilities. This capability can optimize the field service team size and drastically reduce operational costs. Any issues with the operation of smart metering assets (communications hub, electric meter, gas meter, smart energy display, etc.) installed in the customer's home can be investigated and resolved remotely without sending a field engineer to remedy.

Governance & Change Management (Entire Customer Lifecycle in Smart)

The number of smart meters in the field will have to increase at an exceptional pace in order to meet the government targets for smart meters by 2020.² The smart metering landscape and regulatory activity are slowly and gradually evolving in the UK to support this change. It is critical that utilities have a strong governance framework for managing business/technical changes expected in smart metering space.

Innovative and customer-facing business capabilities would enable utilities to deliver a superior smart/digital experience to customers and also improve their organisation's competitiveness in the market.

Guiding Principles to Tackle These Challenges

Utilities need to ensure they develop industry best-practice-driven business, technical, operational and organisational capabilities to ensure superior customer service levels and reduce operational expense. This will maximise benefits from smart technologies and ensure competitive advantage. Figure 3 (page 5) offers a typical view of a capability matrix that utilities need to build to

ensure their smart meter operations are scalable and stable for the delivery of smart services.

Business Capabilities

Utilities have an opportunity to transform their business offerings with the advent of smart metering. Innovative and customer-facing business capabilities would enable utilities to deliver a superior smart/digital experience to

Capacity constraints in smart IT systems and operations processes can impact the mandated smart rollout plans and result in financial impacts to utilities and a poor smart experience to customers.

customers and also improve their organisation's competitiveness in the market. The following capabilities are critical:

- **Install and commissioning:** Business capability to facilitate smart field engineer visits for smart meter installation and commissioning. Utilities should build/develop this capability to minimise install and leave scenarios and maximise engineer productivity.
- **Smart prepayment:** Build/develop the business capability to deliver smart prepayment requirements, starting from the top-up/vend process through multiple payment channels and, eventually, the top-up landing on the smart meters.
- **Debt management:** Build/develop the business capability to manage the debt lifecycle by enhancing smart metering functionalities for eligible customers with debt. This will involve auto-reconciliation of prepayment top-ups and installments towards debt recovery for the utility.
- **Change of supplier:** Needed is the business capability to ensure automated and quick turnaround on change-of-supplier requests from smart metering customers. One of the critical requirements here is to ensure that the smart metering customers do not lose their smart experience due to a change-of-supplier request.
- **Home automation:** Build/develop home automation/Internet of Things (IoT) capabilities to create a comprehensive customer experience integrating control and adminis-

tration of the customer's smart meters, smart domestic appliances, smart electrical installations, etc.

Technical Capabilities

Utilities must keep their smart metering, back-end systems and infrastructure updated to the higher level of maturity in order to ensure that business capabilities and smart experience are not impacted by bottlenecks. Scalability issues with IT systems/infrastructure will impact business operations during large-scale smart meter rollouts. The following are typical technical capabilities utilities need to consider:

- **Smart infrastructure management:** Infrastructure supporting smart metering includes a head-end system in the foundation phase, data communications integration hub (DCIH) in the enduring phase, hardware security modules (HSMs), meter data management solutions, back-end customer data management and billing solutions. Utilities need to develop subject matter expertise and have 24x7 technical support models in place to ensure that these smart infrastructure components are well-managed and fully supported.
- **Capacity management:** Smart metering systems and supporting-process capacity need to be planned in advance so that they can support future smart meter rollout plans. Capacity constraints in smart IT systems and operations processes can impact the mandated smart rollout plans and result in financial im-

pacts to utilities and a poor smart experience to customers.

- **Certificate management:** A number of certificates need to be renewed and kept active within smart infrastructure, such as device certificates, commissioning certificates, external interface certificates, etc. This will ensure that utilities have secure and authenticated communications with their smart infrastructure components. There needs to be a closely monitored tracking mechanism for certificate expiry and renewal timelines to help utilities plan ahead for managing their certificates.
- **Network communication:** Smart metering communication has been chosen over a telecommunications network (i.e., SMS and GPRS technology), and hence this includes requirements for managing SIM cards and monitoring network operations. This would entail managing the connection/SIM card portfolio for the utility and analysing issues/problems specific to network communications. This function is critical to over-the-air transfers and overnight reads sent by smart assets.
- **Alarms and alerts:** Smart metering assets - namely the communication hub, electric smart meter, gas smart meter and in-home display - have mechanisms to send real-time (high priority) and daily summary (low priority) alarms and alerts to utilities. This allows utilities to proactively predict and resolve any issues/problems with smart metering assets remotely using over-the-air transfer capabilities

Capability Matrix for Smart Meter Operations



Figure 3

within the smart infrastructure. It also benefits utilities to quickly understand and react to any theft or tampering attempts with their smart metering assets.

Operational Capabilities

Utilities are required to run business as usual (BAU) operational changes to smart meters. These operational changes should be carried out in accordance with industry benchmarks to ensure superior customer service and compliance with business SLAs. Better process automation and remote device management will bring higher operational efficiency. Efficient business and technical operations is critical for maintaining high customer satisfaction. The following high-impact processes can help to enable this:

- **Remote triaging:** Any issues with smart meters need to be immediately investigated and fixed. The utility should schedule a field engineer visit to the premises to check and resolve issues. The capability to remotely check inactive smart meters, investigate the issues and fix them remotely will bring a lot of cost savings to the utility. The most critical requirement here is to ensure that the capability drives more predictive and proactive analysis and troubleshooting exercises for smart metering assets.
- **Billing/reads management:** The ability to ensure the quality of meter reads is critical to reduce billing errors and estimated bills, which impacts customer satisfaction. Minimising estimated bills is the cornerstone of the smart metering implementation programme, and hence there are numerous processes and workarounds that need to be followed before utilities pursue the last resort of estimating consumption for a smart metering customer. Utilities also must satisfy a requirement that they have to store at least two years of energy readings under the regulation of Customer Data Obligation (CDO).
- **OTA deployment:** Timely and successful on-the-air (OTA) update is required as part of business and operational processes. Most functional, technical and security related issues with smart metering assets typically require a firmware upgrade. Hence, a higher failure rate of OTA update will require more retries, which is time-consuming and results in increased operational overhead. The ability to predict the success rate for OTA update at any specific time based on multiple parameters will be a handy functionality support in OTA planning.

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- **Remote commissioning support:** Utilities are required to reduce lost time in failed/aborted smart meter replacement jobs. Hence, it makes sense that they can remotely assist the smart field engineer in resolving any issues/problems with customer jobs. Building a capability within the utility to perform a quick analysis on engineer issues/problems and suggest known workarounds/solutions would go a long way in minimising failed/aborted customer jobs.
- **Smart asset management:** Smart metering assets have a significant pound value compared with traditional metering assets. It's important for the utilities to track smart metering assets end-to-end within the supply chain, warehouses, in-transit, engineer vans, customer premises, returned assets, third-party triaging, etc. End-to-end automated asset tracking processes will help utilities to ensure they are maximising the value of smart metering assets.

Organisational Capabilities

The UK smart meter landscape is evolving rapidly, especially with respect to customer service, smart meter roll-out, the digital revolution and regulatory changes. New requirements are coming up frequently, and utilities are mandated to comply with them with stiff timelines. A strong utility organisation should be able to manage the quantum of mandated changes, provide end-to-end customer communication to educate users about the changes and provide a snapshot of their performance management to their stakeholders.

- **Governance and change management:** Due to aggressive changes in the smart space market (smart prepayment, payment mode change, home automation, etc.), there is an immediate need for utilities to establish a multidisciplinary governance board to exercise control and ensure the required business/technical readiness is available to deliver the change plan. The change plan can be business-driven for rolling out new features or functionalities or can be driven by regulatory impact on the way a utility offers services to customers.

- **Customer communication:** With in-home displays being offered free of cost to all smart metering customers, there is an option for utilities to use this display for sending communications directly to the customer's premises. Utilities need to build and develop processes around customer communications and make sure all parties within the organisation and customer community are made aware of any issues, enhancements and changes relating to smart metering.
- **Incident management:** Utilities are extending their IT infrastructure to customer homes with smart meters, and so any major incidents relating to smart metering assets, central systems, back-end billing and customer management systems would have direct customer-facing implications. Utilities need to rethink, strengthen and make their incident management processes flexible enough to accommodate the smart metering dynamics of incident resolution. Some of the incident resolutions might take weeks or months to resolve across the entire customer's estate due to the very nature of smart metering installations and customer locations.
- **Smart security management:** Security concerns are the issues that resonate most with UK consumers. Given the regulation of onshore support for smart systems and potential critical national infrastructure (CNI) implications, utilities must be proactive in managing any security vulnerabilities in their smart infrastructure.
- **Reporting and Analytics:** Business, technical, operational and organisational capabilities need to be measured, tracked and improved as smart metering evolves and becomes mainstream. The reporting and MI capabilities allow the utilities to be in control of their key performance indicators and ensure that their smart metering capabilities are able to deliver the best possible value to customers at minimal cost.

Looking Forward

In the near term, utilities need to ensure they focus on the following principles to ensure they

Utilities need to evaluate the maturity of smart meter operations and chalk out a roadmap to reach the required level of maturity, as demanded by the market and regulations.

are not caught unprepared for the transition to smart metering:

- With the advent of smart technologies, numerous operational levers are available within a utility's smart infrastructure, which can be effectively managed and controlled to realize maximum gain.
- With the distinct increase in the number of smart meters, exceptions such as issues with install and commissioning, prepayment customers, remote triaging, customer complaints, non-reading meters and data inconsistency will increase. These will need an operational focus to resolve.
- Utilities need to evaluate the maturity of smart meter operations and chalk out a roadmap to reach the required level of maturity, as demanded by the market and regulations.
- Utilities should engage industry experts to define best-in-class standard operating procedures, processes and controls for smart meter operations.
- With pressure to perform in this new and dynamic business environment, utilities need to ensure they are building the required smart metering capabilities to deliver industry-leading smart experience to end-user customers.
- Utilities must define the right operating model for remote and customer-facing smart operations - including business and technology processes.

By developing the capabilities highlighted in this paper, utilities will be able to deliver on their smart commitments to their stakeholders. And, most importantly, to their customers!

Footnotes

- ¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/266685/second_annual_report_smart_meters.pdf
- ² https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/533060/2016_Q1_Smart_Meters_Report.pdf

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