Data Communications Company

DCC Business & Development Plan

2020/21 - 2024/25

DCC Public

The DCC operates the secure, national data network to support the roll-out and operation of

53 million

energy smart meters in homes and small businesses across the country

Contents

DCC Public

1. Chairman's foreword

Our mission is to help digitise Britain's energy network, make a critical contribution in the effort to achieve net zero greenhouse gas emissions and improve the nation's connectivity

The Data Communications Company (DCC) believes in making Britain more connected, so we can all lead smarter, greener lives.

We provide the digital backbone of Britain's energy system. Our secure platform is strategic national IT infrastructure that is making our country more resilient; it will help to secure the nation's net zero greenhouse gas emissions target and play a major part in enabling a smart, green economic recovery.

Our data network adheres to stringent international cyber security rules endorsed by the National Cyber Security Centre (NCSC). At full scale, the DCC network will have greater reach than broadband (which had 26.7m lines as of 2019), connecting more than 30 million homes and businesses across Britain.

Our core role is to support the energy industry as it completes the smart meter roll-out over the next four years. We are approaching a critical point in this major upgrade. To date 4,720,931 second-generation (SMETS2) smart meters have already been installed and, before the COVID-19 lockdown, that number was growing by 20,000 a day.

Despite considerable technical challenges we are also migrating older, first-generation (SMETS1) smart meters over the air from energy suppliers' own systems to our central platform. This will mean all energy consumers have digitally connected energy meters and the ability to switch supplier without losing their smart functionality. This is a massive undertaking, and these are live meters; so the DCC is going to great lengths to make sure that the experience is as smooth as possible for energy consumers. By late July, 661,970 SMETS1 meters had been successfully migrated. During 2021 we will reach the combined milestone of 10 million active, interoperable smart meters in Britain.

The attainment of that scale is the beginning of a monumental change in the way Britain generates, stores and consumes energy, and in how it records this. The shift from fossil fuel power to clean renewables, combined with intelligent use of battery technologies, will be the biggest step made so far in combatting the spectre of climate change

As our platform matures over the coming years, we will facilitate additional services beyond core smart metering - not only for the energy industry, but also for innovators in other markets - in line with our licence conditions. By generating new sources of revenue, we will be able to make better use of our infrastructure for public good and begin to progress towards our goal of becoming cost neutral for our customers. Our vision is to make the DCC a platform for delivering wider public benefit: as a first step beyond smart metering, we already have plans to support interoperable, flexible and user-friendly electric vehicle charging across Britain. Because we have already done the hard work to build the platform, we will be able to do this affordably and in step with the car industry as it shifts more vehicles from fossil fuels to electric.

The unique security and ubiquity of the infrastructure we have built mean that the societal benefits the DCC could foster in the future are substantial. Remote healthcare, such as monitoring the wellbeing of elderly relatives, will be possible because of the data privacy built into our platform. In the long term, such capability could be transformational for the way we live our lives. As well as making us a cleaner nation, future innovation on the network has the potential to make our public services more resilient.

The dedication and talent of my colleagues at the DCC was highlighted in recent months by their response to the Covid-19 pandemic. We have delivered a high-level of service to our customers throughout this period of unprecedented disruption, not just operationally, but across all of our corporate teams too. At the same time the killing of George Floyd in the United States has brought home to us all that more needs to be done to ensure our society is fair and equal. Our HR and employee engagement teams at the DCC continue to work on making our workplace a culturally diverse, inclusive and healthy place to be, not least by listening to, and acting on, the views of our colleagues. I want to thank everyone in the business for their contributions.

I commend to you this plan for sustained delivery and exciting innovation over the next five years. I look forward to the DCC network delivering even greater public benefit and first-class service, in the energy sector and beyond.

Richard McCarthy CBE,
Chairman

The DCC is essential national infrastructure at the heart of decarbonising Britain

2. CEO's summary

The DCC plays a key role in the national decarbonisation agenda and in supporting delivery of Ofgem's Decarbonisation Action Plan, published in February.

Our primary role is to build, operate and enhance the national smart metering network that underpins the transformation of the UK's energy system - enabling consumers to participate much more actively in their energy management and decarbonisation and helping industry become more agile and competitive. We are creating a platform that will for the first time enable both suppliers and consumers to react in real-time, based on secure, reliable data, to changes in energy supply and demand as the UK dramatically changes the way it generates, transmits, stores and uses energy in the coming years.

This is requiring large-scale change to systems and processes across the industry, not simply due to the technical and logistical challenge of installing new devices in 30 million homes that deliver a critical national service (and doing so considerably faster and more comprehensively than broadband), but also making sure that it is done reliably and securely to enable innovations as diverse as the faster consumer switching programme to the rapid national deployment of electric vehicle chargers.

We have performed well under the Operational Performance Regime set up by Ofgem, but there is still scope to reduce downtime, minimise disruption to our customers' operations and improve confidence in our service. A key focus of our work in the short to medium term will be to enhance the resilience of our network through increased monitoring and management of the ecosystem. In the medium term, our Network Evolution Programme will also make a significant contribution, particularly in accelerating and reducing the cost and speeding up change driven by SEC modifications, which is a priority for our customers.

To ensure that smart meters and the benefit they bring are available to everyone – even those in properties where the gas and electricity meter are situated far apart – we have developed Dual Band Communications Hubs. We have made good progress over the last quarter in testing these devices and resolving any defects so that they can be launched this financial year. Across Britain, this technology will increase the premises our network reaches by some 25%.

One of the DCC's biggest undertakings is the migration of more than 14 million SMETS1 smart meters onto our network. This will address a major concern of consumers about the earlier generation of meters – the loss of smart functionality when switching energy supplier. Migration onto our network, will restore that smart capability and interoperability. By late July we had migrated 661,970 SMETS1 meters, and we aim to complete the process for all eligible dormant devices by December 2020. Since these are meters already in people's homes, we are closely monitoring the transition of each one. This applies especially to the migration of prepayment meters, to ensure that vulnerable householders are never without energy and are always able to top up.

Switching energy supplier is set to become a much faster and more reliable experience for consumers as a result of the work that the DCC is undertaking on behalf of Ofgem. The ambitious goal is to reduce switching times from as much as three weeks to the next working day, and to cut the number of failed attempts significantly, since this is a major disincentive for consumers considering changing energy supplier. We are working closely with our industry partners on delivering the Central Switching Service which will underpin the new process. The programme is currently in the "design, build and test" phase, and we expect it to go live in early 2022.

Like faster, more reliable switching, half-hourly settlement has the potential to revolutionise the consumer experience. Built on the foundation of nationwide smart metering, the reconciliation of customers' actual consumption (or indeed, generation) of energy at half-hourly periods will expose suppliers to the true costs of sourcing energy.

This insight will enable them to become more efficient. In addition, consumers can be incentivised to consume energy at times when it is more plentiful and therefore cheaper. Providing access to half-hourly data will give the industry fresh insights into energy use, allowing market participants - such as the networks - to optimise their investment in assets, and enabling new entrants to create new offerings for consumers.

Delivering this capability is consistent with our licence obligation to facilitate effective competition in the energy supply industry. Following a request from Ofgem, we have made our initial proposals, including some preliminary costings. We believe that half-hourly settlement would take at least two years to implement. We look forward to further engagement with the regulator on delivering these benefits for consumers.

Our licence also enables us to facilitate innovation and re-use of our network for new services. This can be done through the delivery of bespoke services for our existing customers in the energy industry. As part of our innovation strategy, we opened a new test facility in Manchester with 19 test labs in June 2019. One of these labs provides an experimentation environment for our core energy customers to test new devices and capabilities. There is also potential to create additional revenue streams in future, by offering value-added services to new customers outside the current scope of smart metering, and by supporting delivery of other Government policies and programmes such as electric vehicles and smart water metering. The new revenues from these activities would help us to reduce the charges paid by our core energy customers, delivering a further return on their investment.

Since elective and value-added services allow our customers to propose and pursue creative new ideas and products of their own, they are our principal channels for innovation on the DCC platform. We have therefore been seeking our customers' views on how we can make these processes work better. We will ensure that any new, tailored offerings do not have an adverse impact on our core communications services and that there is independent assurance of any changes.

In building the DCC platform, the energy industry has created a network of unprecedented reach, scale and security. By the end of the smart meter roll-out, we will have over 100 million devices connected and will be carrying billions of messages per month. We want to explore and consult with customers old and new about opening access to our data and connectivity through a set of wholesale products that would allow them to build new applications. We will ensure that our business model to achieve this maintains focus on our core mandate. One of our major objectives is to digitise the customer experience, so that eventually we can meet most of their needs online. To help this transformation, we are retendering the contract for our service desk to guarantee the higher, outcome-based levels of service which our customers rightly expect. We anticipate that the new arrangements will go live in Q1, 2021. We are also taking steps to improve and simplify the onboarding process for new energy customers and other users who want to access (mainly consumption) data.

We are committed to improving our engagement with customers and we have put in place a number of new systems and processes to support this. We are sharing more information with our customers about new programmes and activities, in a clear and consistent fashion, so they can help us co-create them. We have also introduced a new online customer portal that will enable customers to access DCC documents and information easily, search for events and take part in surveys. The customer portal is underpinned by a customer relationship management (CRM) system that will enable us to ensure that customer feedback is captured and to report back to our Board and Ofgem on the views of different stakeholders.

As we embark on the five years described in this Business & Development Plan, the DCC and its network will be at the heart of exciting developments and changes which have the potential to deliver a host of new benefits to society.

Angus Flett,
Chief Executive Officer

DCC Public

We believe in making Britain more connected so we can all lead smarter, greener lives

3. Who we are and what we do

The Data Communications Company is a private sector company, licensed by the Government to build and operate the central, standardised wireless network for smart metering in Great Britain. We support the roll-out of second-generation (SMETS2) smart meters, as well as the migration of more than 14 million existing first-generation (SMETS1) meters onto our system. We are also delivering a solution to boost the signal in homes where it is difficult to connect smart meters to the home area network (e.g. blocks of flats), through Dual-Band Communications Hubs, and we are working with the energy regulator, Ofgem, to deliver a faster, simpler central switching service for energy consumers.

DCC works in a complex environment, paid for by the energy industry, regulated by Ofgem, mandated by the Government and with a responsibility to end consumers. We deliver our obligations through a series of contracts with third party External Service Providers, shown below in Figure 1 for the core SMETS2 and SMETS1 service (not including the Smart Metering System Operator).

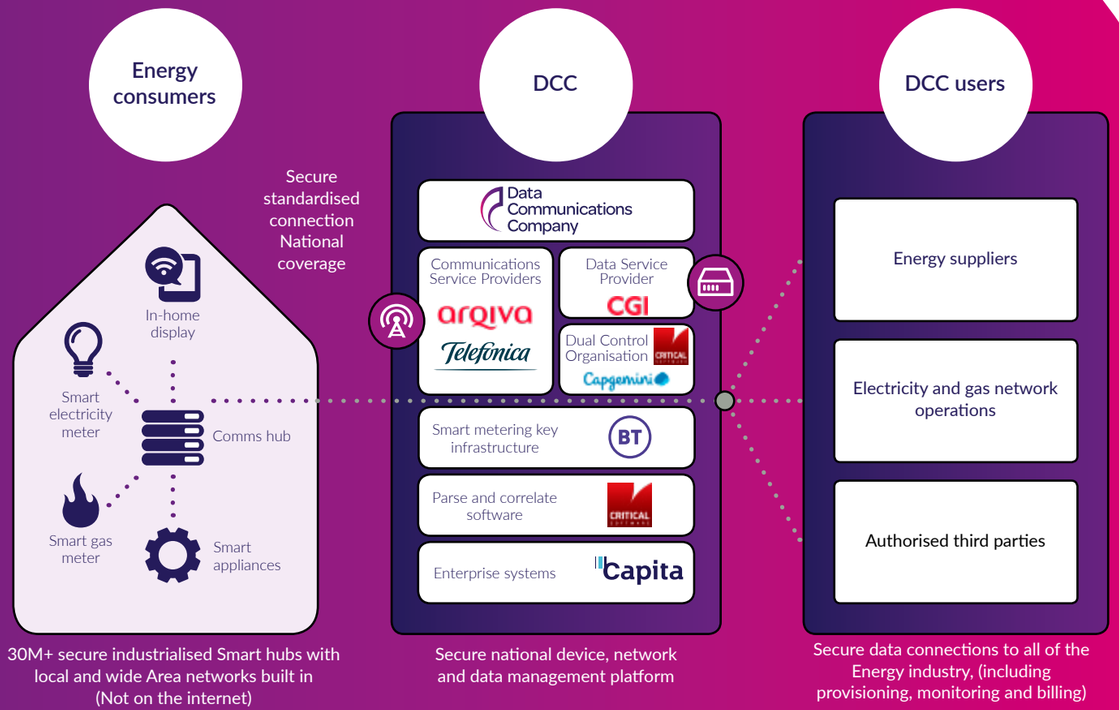
Energy companies and network operators who are DCC customers can commission us to add new or customised features in exchange for a period of exclusivity. In addition, in line with our licence obligations, we are seeking opportunities for the re-use of our network with the aim of raising additional revenues which will allow us to reduce charges for our core energy customers.

A national, secure, private network

DCC's service comprises the mobile phone network in the south and central regions of Great Britain and a dedicated radio network in the north. Taken together, this network provides greater reach than mobile phones, digital terrestrial TV and superfast broadband, bringing the benefits of smart metering to more than 30 million homes and small businesses.

During 2019-20, the roll-out of second generation (SMETS2) meters increased momentum. As of 03/06/2020 more than 4.7 million devices have been installed and connected to our network. Before the outbreak of COVID-19, smart meters were being installed at a rate of up to 31 every minute.

Figure 1 – The DCC ecosystem - a secure smart platform Built to industrial scale and economics managing Devices and data to every location in the uk



We have also started migrating SMETS1 meters on to our network, enabling many more households to continue to benefit from smart functionality when changing suppliers.

DCC's network operates to stringent national and international security standards endorsed by the National Cyber Security Centre (NCSC). The information that travels across our network is encrypted so that it is readable only by the consumer's own energy supplier and other authorised parties, – a far higher level of security than broadband.

Evolving the network

We will begin to evolve our network in 2020-21 in order to keep pace with rapid technological change. Our Network Evolution Programme will introduce enduring technology to address the future obsolescence of 2G and 3G mobile networks and to extend the lifespan of SMETS1 and SMETS2 meters. As contracts for key components come up for renewal, such as the provision of the Data Services Provider (DSP) service and the Smart Metering Key Infrastructure (SMKI), these will present opportunities to inject greater competition within the supply chain. The evolution of the DCC network will be good for the entire energy industry, as it has the potential to reduce costs and deliver improvements for our customers.

Enabling a net zero greenhouse gas future

Through the digital transformation of the energy network, we are supporting the UK's commitment to become a net zero greenhouse gas economy. Our work means that the energy industry has a real-time view of consumption, allowing it to optimise energy generation and storage, and ultimately to smooth the peaks and troughs of consumption and maximise the use of renewables.

More specifically:

- Smart metering is the digital spine that supports the move to a decentralised energy system
- It allows energy consumers to monitor their energy usage and make smarter choices about what they use and when
- Energy suppliers are enabled to provide a more innovative selection of energy tariffs
- Distribution Network Operators (DNOs) are able to balance the load of the network, balancing supply with demand and ensuring greater use of renewables.

A platform for wider value creation

As well as providing services to our existing customers, our network also has the potential to become a platform for innovation in the wider energy sector and beyond. These new products would be delivered as value-added services by us and, as a source of additional revenue, would create an opportunity for DCC eventually to become cost neutral for our existing customers.

Our customers have invested in a network that is highly secure, and ideally suited to delivering further developments in the energy sector such as a standardised, centralised electric vehicle (EV) charging network. By reusing this infrastructure, the Government can mandate a high value-for-money solution.

In the wake of COVID-19, the resilience of our economy and vital public services will be high on the Government's agenda. As information is encrypted across the DCC network, and with its reach of over 30m homes in Great Britain, it could provide the world's first central, secure and ubiquitous remote healthcare platform. Not only would this give an opportunity to relieve pressure on the NHS; it would also allow some more vulnerable citizens, such as those with Alzheimers, to remain at home longer rather than going into care.

Smarter, greener lives – Smart Green Team

In 2019 we formed our Smart Green Team. They are a group of DCC volunteers driving our own corporate behaviours in the interest of leading 'smarter, greener lives'. It's now at the heart of our company purpose.

Since forming, the group commissioned work to baseline the DCC carbon footprint for 2018/19 and the calculation was 473 tonnes of CO_2. This knowledge now allows the DCC to take action to reduce our footprint and offset our impact with appropriate initiatives going forward, achieving carbon neutral status in early 2020. We intend to progress this further through engagement with our people, our Board and our supply chain.

4. Market context

This section sets out our view of the DCC's operating environment, and the key industry trends informing the priorities of our business over the next five years.

The move to clean economic growth, through low-carbon technologies and the efficient use of resources, is described in the Government's Industrial Strategy as 'one of the greatest industrial opportunities of our time'.[1]

The continuing decentralisation of generation and storage is transforming the way the energy sector operates. Driven by the growth of renewables and emerging technologies, new patterns of usage, and the ability to integrate supply and demand signals, the way in which today's energy systems operate will undergo profound change.

At the same time, the energy system is becoming more digital, with vast quantities of data being generated by smart meters, grids, appliances, and consumers themselves. As part of the broader Internet of Things (IOT), the digitised energy system will enable new insights, business models, services and entire markets for businesses and for consumers, as well as presenting risks around data privacy and security.

These changes will in turn have a profound impact on the development of the DCC's services.

1 BEIS, The Grand Challenges, https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/industrial-strategy-the-grand-challenges

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4.1 Our approach

Summary

As well as underpinning our current customers' businesses, the DCC is actively monitoring developments in technology, policy, and markets relevant to our business. We take into account external factors, uncertainties and opportunities that might influence our current and long-term development plans. We prepare for tomorrow's opportunities, whilst delivering today's core priorities.

We have identified high-level trends which we expect to be most relevant to us, using a combined approach including desk-based research, customer engagement and the insights of numerous key stakeholders, such as government departments, innovation agencies and consultancies. We are grateful for their input.

Key trends

We have identified three high-level trends which we expect to be most relevant to our development over the next five years:

Decarbonisation and clean growth

The UK is committed to reducing net greenhouse gas emissions to zero by 2050. The next five years will see significant expansion of low-carbon technologies in energy generation, transport, heat and other sectors. The DCC can provide the secure communications infrastructure to make this transition a reality.

Decentralisation

Energy generation and storage has started to proliferate on the distribution system – the next five years will see the tipping point, as this model becomes the norm for businesses and for consumers. Solar, battery storage, electric vehicles (EVs), and localised heating and energy generation solutions, increasing proliferation of technology, changing working patterns, work/life balance etc. The vast increase in the number of energy system components will require the secure communication and co-ordination capabilities that the DCC's network enables.

Digitisation and data

The energy system is truly becoming "smart" – able to communicate events and status in real-time, to monitor and even predict issues, to make adjustments to provide continuity of operation, and to do all this in an automated way. Linking up millions of devices, and in the future, households and customers, will increase exponentially the volume and value of data in the system.

Cross-cutting themes: technology

These trends are interrelated and driven by – and are co-dependent on – emerging technological advances in hardware, software, data, AI, and integration services, from national-scale infrastructure programmes to in-home appliances. We have witnessed unprecedented growth in the use of connected devices with sensing and cloud-based technologies, along with data analytics and AI decision-making.

The falling cost of sensor technology, moves to cloud-based servers, improvements in data analytics capabilities, and collaboration by industry leaders on communication protocol standards (such as Zigbee) create the perfect environment for the growth of connected devices: there will be 75 billion such devices by 2025 worldwide, requiring communication and integration services to unlock their full value.[2]

These new technologies bring new risks, not least in the domains of cyber security and data privacy. With more critical assets becoming networked, more personal information in transit, and greater incentives on malicious actors (private and state) to cause disruption, considerations of privacy and security will only become more pertinent in the coming years.

Cross-cutting themes: coronavirus

At the time of writing, the UK is in lockdown, to help mitigate the effects of the coronavirus, COVID-19. Worldwide, COVID-19 has caused hundreds of thousands of deaths, and economic and social hardship for millions of people. In the immediate term, the impact of the pandemic on our day-to-day lives is stark.

In the medium and long term, the lasting effects of COVID-19 are harder to foresee. There are clear possibilities for impacts close to the DCC's business:

- An increase in remote working could lead to a renewed interest from consumers in getting value from their energy choices, perhaps resulting in more decentralised generation and storage, and greater uptake of connected domestic appliances
- The difficulties of international travel and of using public transport over the coming years could spark renewed interest in private vehicles, most likely to be electric (and potentially autonomous), kick-starting the market for EVs, charging points and network integration
- A new demand for smart appliances to help combat the virus, including health sensors (heat scanners), contactless devices (such as smart doorbells and home security), and track-and-trace applications will require a secure communications network to function
- Continuing to run the DCC's current operations, and to develop new services in a way that protects our staff will require new ways of working, collaboration tools and innovative delivery methods
- Understanding the impact of COVID-19 on our customers and supply chain partners, and to adjust our business to better meet our common goals.

The DCC remains "open for business" throughout the lockdown: we continue to run the communications network for smart meters; work is ongoing to enrol SMETS1 devices; future services are still under development.

It is too soon to be definitive about the long-term impacts of COVID-19. We will continue to mitigate any impact on running our business day-to-day, and monitor the ways our industry and customers will operate in the future.

2 Statista, https://www.statista.com/statistics/471264/iot-number-of-connected-devices-worldwide/

4.2 Decarbonisation and clean growth

Summary

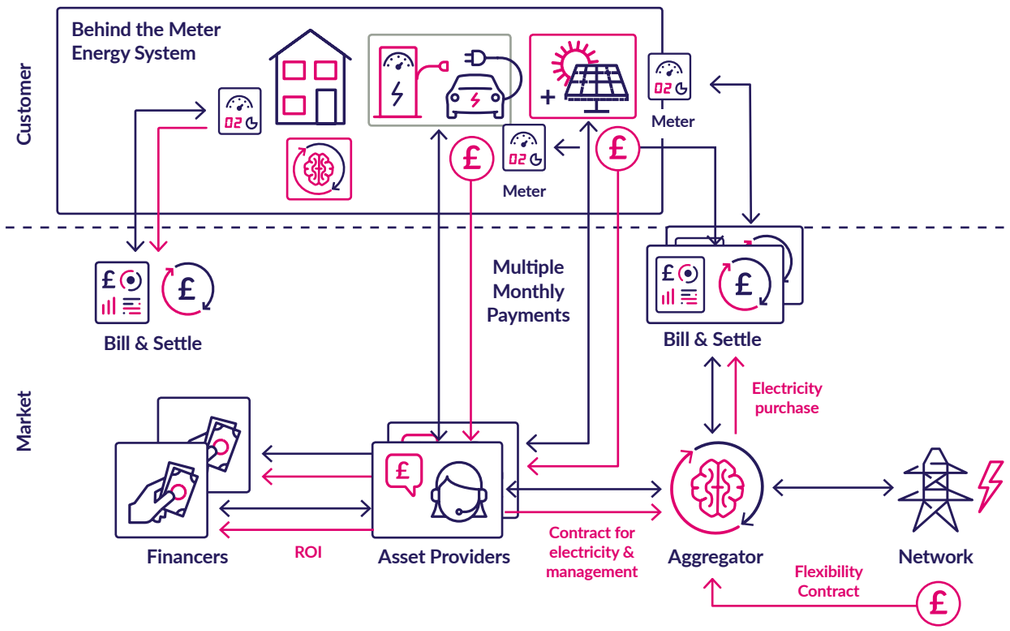
Decarbonisation – the drive to net zero greenhouse gases by 2050 in an attempt to limit the change in the global climate – is the key future trend across the whole energy value chain. In 2008, the UK Government committed to reduce greenhouse gas emissions by 80% relative to 1990 levels by 2050, and in 2019 set a new target of "net zero" by 2050.[3] The UK has made significant progress in decarbonising the economy: as of 2018, emissions have fallen by 43% against 1990 levels.[4] All sectors have recorded a reduction in emissions since 1990, with the greatest reduction coming from decarbonisation of energy supply, due to the large-scale replacement of coal-based generation with the cleaner energy fuels such as solar, wind and gas.

Renewable generation is intermittent and less reliable than fossil fuels, requiring the ability to store power (when generation exceeds demand) and to reduce demand (when demand exceeds generation). To achieve net zero in energy, these two problems must be solved, at scale, with greater investment in network infrastructure, storage and other flexibility services.

Net zero will also require greater efforts in other sectors – most notably transport and heat. Both the Clean Growth Strategy, and the Committee on Climate Change (CCC) have identified interventions to deliver the net-zero target, including the electrification of transport, decarbonisation of heat, green generation (to support increased electrification), industrial decarbonisation and development of supporting infrastructure (hydrogen production, carbon capture and storage, EV charging networks). [5, 6]

The government has already committed more than £2bn to support decarbonisation in sectors across the economy since legislating for net zero. This includes £390m invested in in hydrogen and low carbon technology to reduce emissions from industry, up to £1bn to develop and embed the next generation of EV technologies, and £400m in new charging infrastructure for electric vehicles. Climate policy will be critical to the economic recovery post-COVID-19.[7] Figure 2 below conceptualises the shape of the future energy system.

Figure 2 – DCC enables multiple ways of generating customer value in the future energy system [8]



Electric Vehicles

The transport sector will be the next focus area for emission reduction. As of 2018, emissions from this sector have decreased by only 3% on 1990 levels. Several initiatives have been taken by the government including the publication of Road to Zero strategy [9], Aviation 2050 Paper[10] and Clean Maritime Plan[11] setting out plans to decarbonise the transport sector. A Transport Decarbonisation Plan is also under development which is expected to provide a more coordinated and cross-modal approach towards establishing a cleaner transport network.

Electric vehicles are at the core of the sector's emission reduction plans; nearly 270,000 ultra-low emission vehicles have been registered in UK as of 2019.[12] The number of EVs in the UK will only increase, likely exponentially, as under Government plans new conventional petrol and diesel cars cannot be sold after 2035.

Electric vehicles bring new threats and opportunities to the energy grid. On the one hand, mass EV adoption will drive increased demand, likely clustered at the same time of day, creating exactly the demand spike that is damaging to the grid. On the other hand, the widespread advent of domestic batteries (in the EV itself) opens new opportunities for flexible demand, with households (or neighbourhoods) drawing on stored EV power to balance the grid.

Enabling scheduled charging to smooth the demand peak, integrating renewables to avoid the "long tail" of carbon emissions, co-ordinating local demand-response and delivering real-time price signals requires a national, secure, communications infrastructure, just like the DCC's. Using the DCC's central data and communications platform counters the risk of expensive-to-maintain fragmented infrastructure, and instead helps establish technology standards, interoperability and end-to-end security, which in turn will help ensure the stability of the electricity grid and the protect the interests of consumers.

3 BEIS, https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law
4 BEIS, national statistics, https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2018
5 Committee on Climate Change, Reducing UK emissions – 2019 Progress Report to Parliament, https://www.theccc.org.uk/publication/reducing-uk-emissions-2019-progress-report-to-parliament/
6 BEIS, The Clean Growth Strategy, https://www.gov.uk/government/publications/clean-growth-strategy
7 https://www.theccc.org.uk/wp-content/uploads/2020/05/CCC-to-Prime-Minister-Boris-Johnson-Covid-19-recovery-002.pdf
8 Baringa 2020
9 Department for Transport, The Road to Zero, https://www.gov.uk/government/publications/reducing-emissions-from-road-transport-road-to-zero-strategy
10 Department for Transport, Aviation 2050, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/769695/aviation-2050-web.pdf
11 Department for Transport, Clean Maritime Plan, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/815664/clean-maritime-plan.pdf
12 Department for Transport & DVLA, https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01

Heat

Government has reviewed the options for decarbonising heat, concluding that the diversity in demand for heating requires a similar diversity in solutions, including electric heat pumps, the use of hydrogen in place of natural gas, and heat networks running on low-carbon fuels.[13] The government plans to publish a heat decarbonisation policy roadmap in 2020. The CCC suggests that large-scale deployment of low-carbon heating must begin before 2030. Low-carbon heat is also a priority for Ofgem in its Decarbonisation Action Plan of February 2020.[14]

The proliferation of diverse, networked and sensor-driven capital-intensive heat assets present an opportunity for the DCC to handle the secure communication and data transfer between these devices and network operators, just as the DCC does today with smart meters.

Drivers

Decarbonisation is being driven by Government policy: the net zero target by 2050, curtailing fossil fuel car sales by 2040, and large-scale investment in clean growth (especially post-COVID-19). Government will also offer increased support for local and regional projects, such as heat networks and EV charging points.

Customers are also driving these changes: consumers will demand – and expect – value for money, as well as reliable and low-carbon power. Technology enables these demands to be met, through the normalisation of electric vehicles, and continued improvements in solar, batteries, and heat networks driving better results for lower cost. At the same time, customers will have an expectation that their data is private, and lower tolerance for businesses who fail in this regard.

These drivers will result in changes to the market dynamics:

- Even more renewable generation will be integrated with the grid
- Energy suppliers risk becoming dis-intermediated
- Demand-response becomes widespread, and automated, requiring price-signal information
- Data becomes more valuable to network operators and other actors

What it means for the DCC

- Integrating more renewables onto the grid will require greater demand response to match demand to a variable renewable supply (solar, wind). The DCC can provide the co-ordination and communication to underpin this critical future activity.
- As the number of networked heat assets increases, the DCC can offer data transmission services from sensor devices to network providers
- As EV uptake increases, the DCC can support DNOs by providing data on the charging needs and location of EVs. This will enable responses from the distribution grid to manage the changing load profile
- As EVs become commonplace, the DCC can carry messages to co-ordinate charging at a grid level, and trigger demand response to use EV batteries as local power sources to smooth demand
- As the energy ecosystem grows, the DCC can provide grid actors with data to carry out real-time monitoring and analytics to maintain the stability of the network
- The EV ecosystem can leverage the DCC's existing infrastructure – essentially re-using what has already been paid for – and benefit from a secure and interoperable architecture
- Price signals will be key for an automated energy grid – analogous to Google's instant automated auctions for ads. The DCC's smart metering infrastructure can support this, through development of existing smart tariff technology
- Electrification of transport and heat would lead to a shift from a single meter paradigm. This would create a market for billing and settlement services to help customers manage multiple suppliers of energy.

The UK heat pump market will double by 2025.[17]

By 2040, global annual EV sales will top 5.8m and EVs will increase demand by 1,964TWh.[16]

Renewable generation will increase by 50% between 2018 and 2024. Solar PV accounts for 60% of this expansion.[15]

13 BEIS, Clean Growth -Transforming Heating, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766109/decarbonising-heating.pdf
14 Ofgem, Decarbonisation Action Plan, https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-decarbonisation-action-plan
15 International Energy Agency, Renewables 2019, https://www.iea.org/reports/renewables-2019/power
16 Bloomberg, Electric Vehicle Outlook 2020, https://about.bnef.com/electric-vehicle-outlook
17 Delta-EE, https://www.delta-ee.com/delta-ee-blog/uk-heat-pump-market-likely-to-double-by-2025.html

4.3 Decentralisation

Summary

The decarbonisation of the economy goes hand-in-hand with decentralisation of the energy system. Decentralisation enables an energy system that is secure, reliable, safe, affordable and compatible with increasingly pressing environmental goals; Government's net zero target, and Ofgem's Decarbonisation Action Plan both require such a system. Decentralisation will fundamentally change the way energy is generated, distributed, stored, and consumed – whilst simultaneously transforming the economics of the industry.

Generation will no longer be the sole preserve of centralised, synchronous capital-intensive plants; the transmission system operator will need to work closer with its counterparts at distribution level, who will have a more active role in the management of the system; and suppliers (already in a precarious position, with eight market exits in 2019) risk being disintermediated from their customers. Consumers will benefit from private, or local, generation and storage assets, as well as peer-to-peer energy grids.

Meanwhile, "traditional" generation and transmission assets must be maintained to provide a last resort, but without the centralised consumption to fund them. Static retail prices must give way to time-sensitive pricing, to reflect peaks in demand or in renewable generation. Opportunities for new services will abound: co-ordinating a neighbourhood of dishwashers and EV chargers to run at the optimum period overnight, for example, or automatically switching a customer to the cheapest supplier on an hourly basis. Real-time peer-to-peer energy trading, perhaps using blockchain, becomes possible.

Through a combination of greater asset visibility, better data analytics, (including half-hourly smart meter data) machine learning and other capabilities, DNOs can take on more system operation functions at distribution level. With support from Government funding, flexibility markets will allow close to real-time balancing of local peaks and troughs that a decentralised energy system will bring. In parallel, retaining security of supply is a critical requirement and new technologies including battery storage have a vital role to play – as witnessed in the August 2019 blackouts.

Consumer satisfaction with the energy industry has long lagged behind other utilities, and customer expectations will continue to rise, as decentralisation moves beyond the early adopters on the coming years, and due to experiences with technology-led interventions in other markets. Consumer adoption of solar PV, battery storage, EV and renewable heating systems will grow as the return-on-investment becomes more attractive.

Drivers

In many respects, decentralisation is an inconvenient trend for energy market incumbents. Technological developments (principally, year-on-year improvements in solar and batteries driving better results for lower cost) enable greater direct consumer participation in the market. Peer-to-peer transactions are unlocked with block-chain, and AI allows a much greater scale of grid automation.

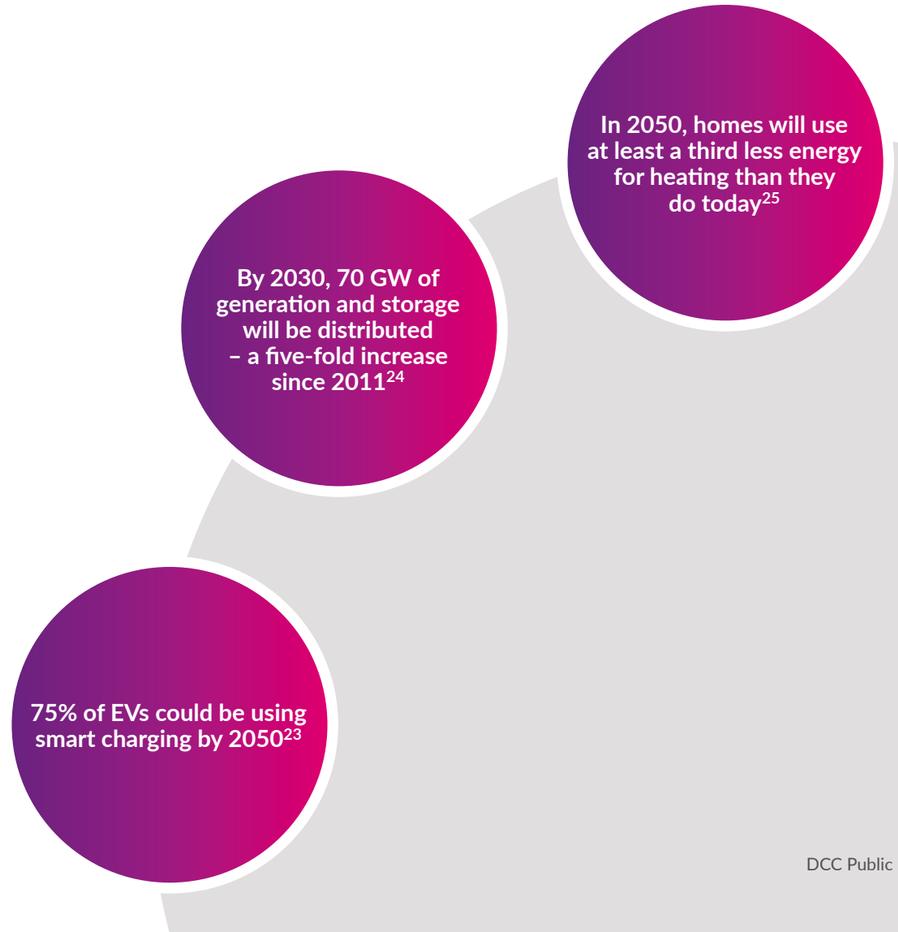
Excellent technology-enabled experiences beyond energy raise expectations. In the energy space, consumers are responding with greater private and local uptake of generation and storage solutions (supported by targeted government subsidies), and are turning to non-traditional energy companies (e.g. SolarCity, Tesla) for innovative technology and/or services. Consumer interest in value for money, return on investment, and decarbonisation has never been stronger.

For the market overall, this means:

- Changing roles for all current actors in the value chain
- Lower value captured by incumbents – and more value at the local and individual levels
- Scope for new products and services, and for disruption by data / tech firms
- Omni-directional (rather than mono-directional) grid, requiring new capabilities, services, and operating models.

What it means for the DCC

- Continuing to provide an excellent experience for current customer segments, whilst developing new customer types, with new use-cases, processes and Service Requests
- Enhancing on-boarding for new market entrants and improving collective industry processes, such as change of supplier and supplier of last resort
- Enabling the energy industry to transform value propositions around the Centralised Switching Service (CSS) and next-day switching; going further to consider support for same-day and intra-day switching
- Enabling DNOs to manage network constraints more effectively, and save consumers money, by facilitating secure visibility and control of distributed energy resources, especially at low voltage
- Working closely with other parts of the regulated energy ecosystem (Ofgem, balancing and settlement, traditional data providers, the Energy Systems Catapult and so on) to support and lead innovation in the decentralised energy system
- Providing high quality testing, experimentation capability and elective communication services to assist our current customers – and new market innovators, academics and public institutions – in developing diverse and exciting consumer propositions quickly and cost effectively
- Investigating new technologies, such as Edge computing, cloud applications, and blockchain to support market trends such as peer-to-peer energy trading.



18 BEIS £2.1m investment in the development and demonstration of innovative energy flexibility exchange solutions
19 Energy Storage News, https://www.energy-storage.news/blogs/batteries-and-the-blackout-how-energy-storage-saved-the-uks-grid
20 Institute of Energy and Sustainable Development, https://www.dora.dmu.ac.uk/bitstream/handle/2086/12048/1-163-13_Snape%5B1%5D.pdf?sequence=1&isAllowed=y
21 Enquiries into the DCC 'Other User' role have more than trebled since 2018, with interest spanning energy, health, insurance and research
22 Over 25 organisations have visited our prototype experimentation environment at Brabazon House, Manchester
23 National Grid, Future Energy Scenarios 2019, http://fes.nationalgrid.com/media/1409/fes-2019.pdf
24 National Grid, Future Energy Scenarios 2019, http://fes.nationalgrid.com/media/1409/fes-2019.pdf
25 National Grid, Future Energy Scenarios 2019, http://fes.nationalgrid.com/media/1409/fes-2019.pdf

4.4 Digitisation and Data

Historically, the UK energy system had purely physical assets – generation plants, overhead cables, underground wires, and mechanical meters. The energy system is now becoming digitised, and interconnected. The addition of sensors, connectivity, and automation to these physical assets – the Internet of Things – will result in the proliferation of data across the energy industry.

Data will be available on energy consumption, status of distributed generation assets, condition of grid components, requirements of individual appliances, and, importantly price signals – all in realtime. Much of the utility's infrastructure is becoming smart with built-in processing and connectivity. Hundreds of terabytes of data are produced by multiple sources in diverse formats across the industry.[26] These vast flows of data will become interoperable and therefore extraordinarily valuable, to the operation of the grid, for the forecasting of energy demand, for matching demand to supply, and to better serve consumers.

In parallel, the technology and business models to derive value from this data are developing at pace. New capabilities of artificial intelligence, machine learning, machine-to-machine interfaces, and predictive analytics mean boundless datasets can be interrogated to determine outliers, trends and relationships.

The Energy Data Taskforce recognises the challenges and opportunities in this space, and recommends: digitising the energy system, maximising the value of data, making data visible, co-ordination of asset registration, and providing visibility of infrastructure and assets.[27] The DCC is uniquely placed to deliver on these recommendations on behalf of the industry.

In the first instance, the primary beneficiaries of this data will be the Distribution Network Operators. As the energy system changes, and DNOs adopt more complex operational and customer-facing roles, and more tightly manage their networks in real-time, they begin to take on the characteristics of Distribution System Operators (DSOs). DNOs are also investing in new control systems, market platforms, customer management systems and enhanced income management solutions to support this transition.

Energy suppliers will also value this data – to hedge supply and demand better, and to build a stronger relationship with their customers. Suppliers are facing existential risk, so need to find new ways to add value to the consumer; understanding and responding to their specific combination of usage, appliances, EVs, solar etc. should allow new methods of arbitrage, adding value to both the customer and the balance sheet, in a way that is not possible today.

Non-traditional actors, from outside the current energy system, may also find a use for this data. Perhaps there is value to a connected home vendor from aggregating appliance data; insurers may benefit from a deeper understanding of the household; health tech and assistance for the vulnerable could be boosted by additional data.

Of course, the abundance of data brings new challenges in the realms of data security and privacy. Ensuring consumer buy-in and protecting privacy are critical if these benefits are to be realised. Whilst some customers will happily exchange personal data for personalised services, this is not universally the case.[28] Transparency, customisability and consumer confidence will be critical.

The DCC is already well-positioned as a key source of industry data – as a national, secure network invested in public outcomes. This role could extend to maintaining asset registers and facilitating data transfer between participants. The DCC could provide centralised data hub services such as real-time information, network congestion or outages, or provide notification services. The DCC's systems already serve as proof-of-concept of secure data exchange between market participants.

Drivers

Consumers are ahead of technology and government in driving the data agenda. There are significant consumer concerns about data privacy, ownership, security and usage and 48% of consumers have switched companies in response to concerns about security.[29] At the same time, some consumers show an increasing willingness to exchange personal data for personalised services.[30]

Government energy policy is catching up: the Clean Growth Strategy identifies data as a crucial building block, and the Energy Data Taskforce has made recommendations for a digitised energy system. BEIS has published a National Data Strategy call for evidence.[31] Ofgem has published its Decarbonisation Action Plan and approved DNO privacy plans for half-hourly smart meter data. Government innovation agencies are driving better use of data in the public sector.[32]

Technology unlocks answers to these challenges for the market overall:

- Edge computing, AI and machine learning technologies expand the potential of data applications, and increase the value of the data itself
- New applications of machine learning enable disaggregation of half-hourly energy consumption data
- Non-energy supplier interest in smart meter meta-data continues to increase – enquiries for the DCC 'Other User' role have risen over 200% in the past 12 months
- Data trusts create opportunities for ethical consumer data ownership and empowerment
- Establishing the £8m Data Analytics Facility for National Infrastructure will provide national-scale secure data storage, next-generation computing power and cutting-edge analytics, machine learning and visualisation

What it means for the DCC

- Delivering benefit in the energy sector by maximising availability of smart meter data and meta-data running through the system
- Leading the industry in data cataloguing and standards, allowing maximum understanding and ease of availability and integration with other datasets
- Enable technology providers to offer consumers secure connectivity for their smart devices such as Consumer Access Devices (CADs)
- Increasing the value we bring to DNOs and other market participants through access to richer datasets and integration of new technology to support the energy system transition, and to underpin new markets (e.g. flexibility services)
- Providing data to support world-class research, inform policy, and enable deep machine learning and problem solving. The potential to use this data to enable collaboration with Government, industry and academia is vast
- DCC is not just a platform for managing national smart device deployments, secure and with more reach than the Internet. The DCC platform is equally applicable to provide data and communications service to non-energy industries such as remote healthcare or water.
- Maintaining an unwavering focus on data privacy and cybersecurity; placing consumer interests at the heart of all data activity; ensuring a robust data access approach and adopting principles to support innovation and new service development.

DCC platform could provide data services to other industries

38% of consumers are concerned about the security, and 36% about privacy, of smart appliances[33]

There will be 75 billion connected devices by 2025[34]

A smart and flexible system can contribute to cumulative savings of up to £40bn by 2050[35]

26 Energy Systems Catapult, Energy Data Review, https://es.catapult.org.uk/wp-content/uploads/2019/02/Energy_Data_Review_Full_Report.pdf
27 Energy Systems Catapult, Energy Data Taskforce Report, https://es.catapult.org.uk/wp-content/uploads/2019/06/Catapult-Energy-Data-Taskforce-Report-A4-v4AW-Digital.pdf
28 EY, Decoding the Digital Home, https://www.ey.com/en_uk/tmt/decoding-the-digital-home-2020
29 Cisco, Consumer Privacy Survey, https://www.cisco.com/c/dam/en/us/products/collateral/security/cybersecurity-series-2019-cps.pdf
30 EY, Decoding the Digital Home, https://www.ey.com/en_uk/tmt/decoding-the-digital-home-2020
31 DCMS, National Data Strategy open call for evidence, https://www.gov.uk/government/publications/national-data-strategy-open-call-for-evidence/national-data-strategy-open-call-for-evidence
32 For example, see Connected Places Catapult, Data Science Fellowships, https://cp.catapult.org.uk/2019/07/08/data-science-fellowships-at-connected-places-catapult/ and Nesta, Public Sector Data Analytics Guide, https://media.nesta.org.uk/documents/Public_Sector_Data_Analytics_-_A_Nesta_Guide_byCwKTI.pdf

5. Our priorities and plans

The DCC's priority remains the roll-out of smart meters across Great Britain and making sure that the benefits they bring – of accurate billing and greater control of energy use by consumers – are shared as widely as possible across the country; helping shift the nation from fossil fuels to renewables through a granular understanding of energy demand. As we scale up our live operations to support this, we will continue to make sure that we provide a stable, reliable and secure service for the energy industry. We are also implementing a number of improvements to how we introduce change into the system, to make it quicker and cheaper.

We have already begun the migration of first-generation (SMETS1) devices onto our network and this process will accelerate this year as we work systematically through the adoption of meters in three major phases. Migration will restore the smart capability of dormant devices, a critical factor in bringing the full benefits of competition to energy consumers.

We will continue to work to make switching energy supplier a faster and more reliable experience for consumers. As the key delivery partner for Ofgem in this area, we are well advanced in our preparations with the industry for the launch of the new Central Switching Service and we have also made our initial proposals on what will be required to enable half-hourly settlement.

In line with our licence obligations, we are fostering innovation and the re-use of our network to make it easier for the energy industry and innovators to use our platform for the development of new services. We are creating an experimentation environment where they can test innovative devices and capabilities. This will lay the foundation for us to expand our products and services and enable new customers to innovate on the DCC platform. In turn this will generate revenue and enable us to work towards providing a cost-neutral service for our existing customers.

We have sought our customers' feedback on our priorities and plans at a series of workshops and webinars in January, February and March 2020, and when discussing drafts of this plan. Their input has helped to shape this document. Figure 3 on the next page summarises our main live programmes and indicates estimated timelines for forthcoming programme opportunities.

Our priorities in energy

Supporting the successful smart meter roll-out across Great Britain, by maintaining and improving the DCC's secure data network

Helping to make Britain's energy infrastructure more responsive to the needs of consumers and the country

Delivering flexible, simple, cost-effective innovation, and finding ways of re-using our platform to reduce costs for our customers

Continuing to provide cost transparency and improving our engagement with customers and stakeholders

Figure 3. Live programmes

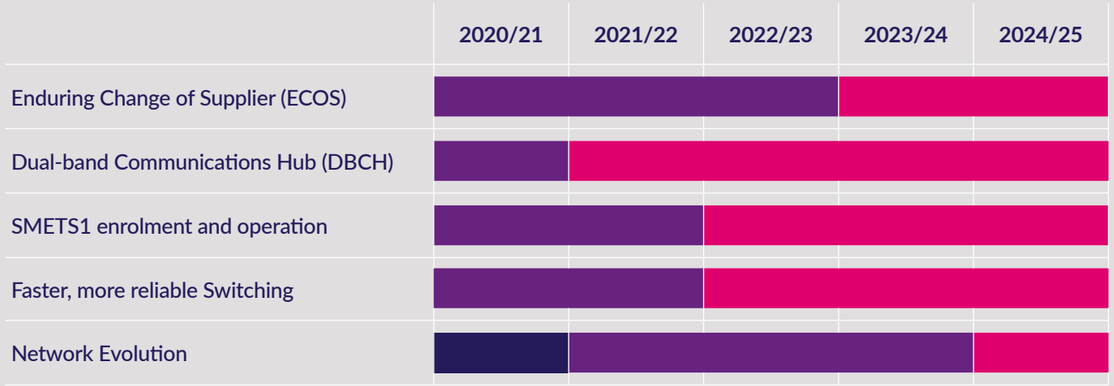
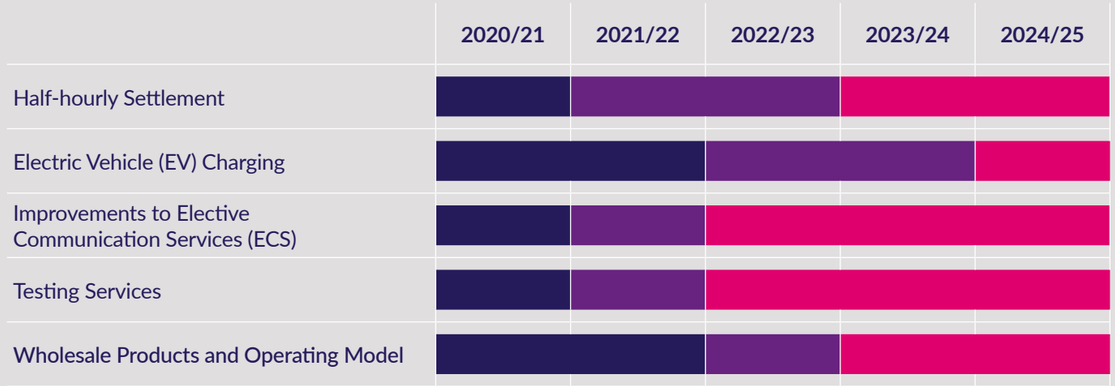
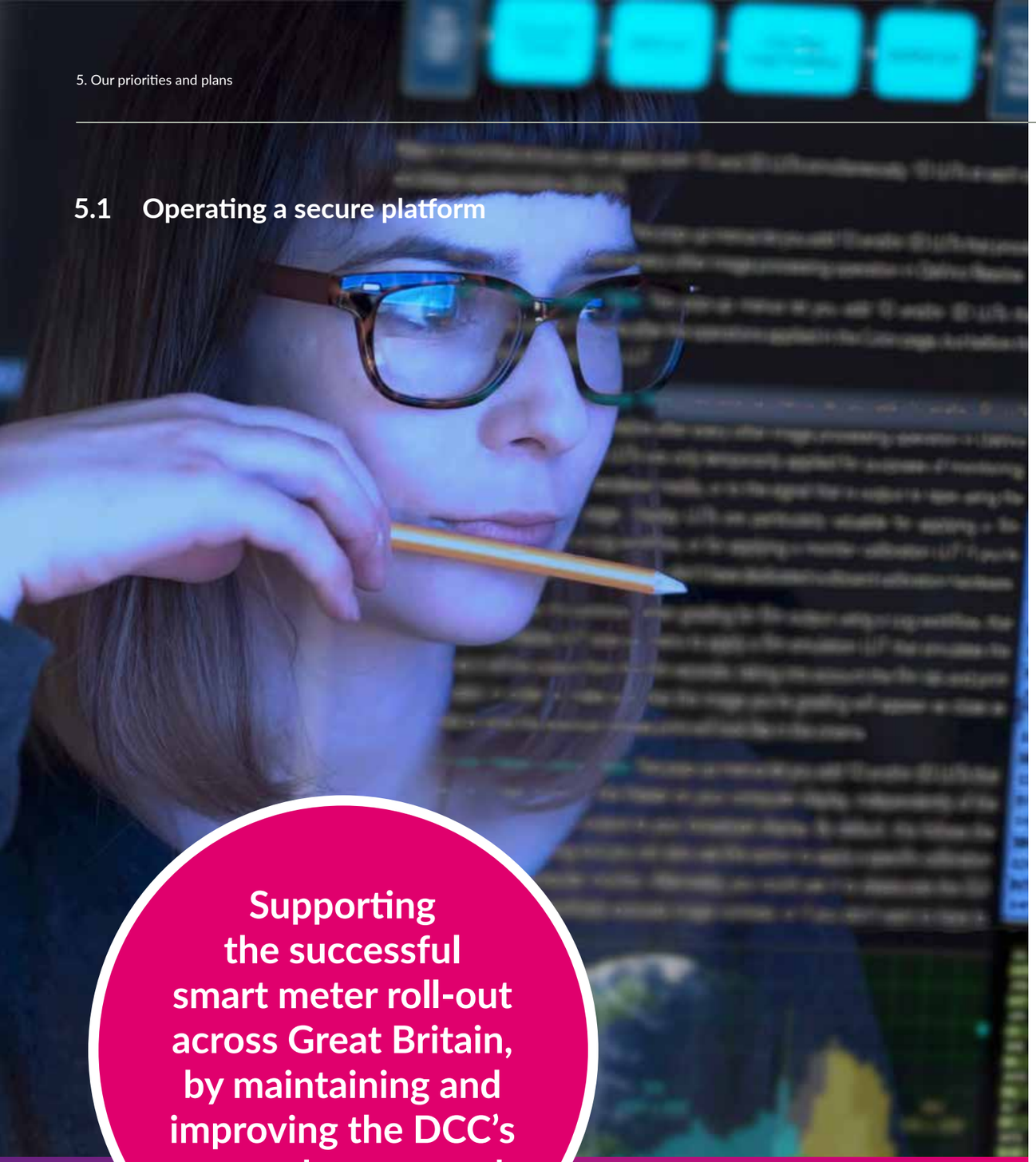


Figure 3. Future opportunities*



*Timescales are estimates and subject to customer feedback and Government approval

5.1 Operating a secure platform



Supporting the successful smart meter roll-out across Great Britain, by maintaining and improving the DCC's secure data network

To carry out the obligation of operating a secure platform, we have several programmes in place which ensure that we continue to improve our operational stability and performance, while maintaining security and delivering the additional functionality requested by our customers and stakeholders.

5.1.1 Operating and improving the live service

DCC Operations faces significant challenges over the coming years, including the increasing volume of SMETS2 installations, the migration of dormant and active SMETS1 meters and the launch and early life of the new switching service. We are expanding the capacity of the system to respond to the increased demand that will arise from these changes. We are also looking at ways to improve the reliability and stability of the network and provide a quality of service which meets their expectations.

Meeting higher demand

Our current capacity management process focuses primarily on how the core infrastructure is performing and scaling up. Over the next two years, we will continue to mature this function, becoming more responsive and more proactive. In addition, the increased dataset will enable us to make better predictions about available capacity to meet future demand. Our Technical Operations Centre (TOC) will give us greater detail about the characteristics and growth of traffic on our system, ensuring that we can constantly refine our service to align with customer usage.

We have built and continue to develop the TOC's capability to support customers in the roll-out of SMETS2 meters and the migration of SMETS1 meters. We are now monitoring the service in near real time and are using our machine learning and analytical tools to highlight service issues. The TOC moved to 24/7 availability in 2019 and has been instrumental in picking up incidents and issues overnight, as well as following the implementation of changes, to prevent any residual impacts running into the next working day. It also provides 'clearance' of any changes to ensure that all dashboards and monitoring capabilities are returned to their pre-set levels. In addition to monitoring the service, the TOC data science capability is being used by customers, suppliers, the Department for Business, Energy and Industrial Strategy (BEIS) and Ofgem to provide in-depth analytics and insights into the entire end-to-end customer journey, from successful change of supplier to device installation and prepayment meter performance.

Ensuring reliability and stability

During 2019 and into 2020, we experienced some service outages which affected the confidence of our customers. In response, we have implemented an "Enterprise Stability Plan" to identify the root causes of these outages and remedy them as far as we can.

Causes of disruption can be varied, ranging from internal DCC issues to customer behaviour and external influences. As we have grown the live estate, external factors have had a bigger impact on the platform, including the number of alerts generated, which is much greater than expected when the system was designed. There are many reasons for this, including communication hub and meter interoperability issues, firmware defects in OEM (Original Equipment Manufacturer) products and the side effects of customer behaviour.

We have asked our customers to help us prioritise the issues to be addressed in the Enterprise Stability Plan and this has surfaced further issues which are having an impact on their operations. For example, customers have asked for a holistic review of capacity management. Amongst other things, they also highlighted issues with traffic pointing to a test environment and asked us to focus on expediting a solution.

We are paying particular attention to improving operational stability in the North, working with our infrastructure partner Arqiva, device vendors and our customers to resolve key performance issues such as excessive traffic on the network caused by spurious alerts. We are currently tracking Arqiva's performance in the region against six Key Performance Indicators (KPIs). We have started to see progress against all six measures, the most important being an improved success rate for meter installations, and this has been acknowledged by our customers. In June 2020 the Arq Common Issue Forum noted that the agreed success factors for in-life stability in the Arq region have been met (agreed with BEIS). The ongoing management of in-life stability in CSPN has moved

into business-as-usual operations to monitor and drive continuous improvement. It was agreed that once install volumes increase, DCC would reach out to its customers to re-engage on bilateral orchestration workshops to share any lessons learnt that may impact them directly.

In future, we are also looking to see how these measures can be reviewed against other service providers to monitor performance. We will share our progress against the Enterprise Stability Plan with industry through the Operational Sub Group (OPSG).

We are now taking a faster, risk-based approach to fixing defects in the system and have been able to reduce delivery time for fixes from several months to just a few weeks. In order to reduce the number of defects that arise in the system in the first place, we are proposing to establish a new capability called 'Production Proving'. This capability would provide regression testing of all software updates and any new functionalities in the live environment before they are introduced to the system, identifying issues before failure occurs. This has the potential to reduce downtime by a conservative 10%, saving industry £5.3m over 5 years. We have been discussing this new programme of work with our customers and industry and will continue to engage them as we develop the detailed design.

Maintaining Security

Security is an important priority for the DCC. In 2019 we defined a new target operating model, which aligns to best practice from the National Institute Science and Technology (NIST) Cyber Security Framework (CSF), the licence and Smart Energy Code (SEC), the Centre for Internet Security (CIS) controls and the ISO 2700x standards.

Our strategic approach not only covers technology but also extends extensively to people and process. We have set ourselves the target for our Security approach to exceed our current level set on the Capability Maturity Model Integration (CMMI) maturity curve by 2022.

In line with the SEC, the purpose of our security strategy is to protect the smart meter network in the UK and in turn to ensure confidentiality, integrity and availability of services and information under our control or influence. We're achieving this with robust and repeatable processes, which will allow us to run the Security function efficiently and - more importantly - effectively with clear visibility of threats to our people, stakeholders and systems.

Over the coming years, our priorities are to further mature and standardise our processes and to automate them where appropriate, leveraging technology to enable us to keep ahead of the threat curve. We'll continue to drive internal awareness of security and adherence to governance and policy, supporting the principle of our employees being a key part of our defence capability.

We're already participating in a number of intelligence sharing platforms to stay informed of the ever-evolving threat landscape informing our position on counter-measures. We will continue to strengthen our security posture by adopting new security technologies, for example in the field of threat hunting, orchestration, deep analytics and cloud-based technologies.

Our Security Operations Centre (SOC) operates 24/7 to protect the DCC's network, which forms part of the country's national infrastructure. Following the maxim 'prevention is better than cure' we focus on the early identification of potential threats to avert harm to the DCC's and our customers' assets. This includes monitoring for issues within supplier-provided services and horizon scanning for any potential digital threats to the DCC or our supply chain. Over the next two years and beyond we will continue to enhance and mature this capability to gain deeper insight and foresight ensuring that we are more resilient against security incidents and able to minimise any resulting downtime or impact on data.

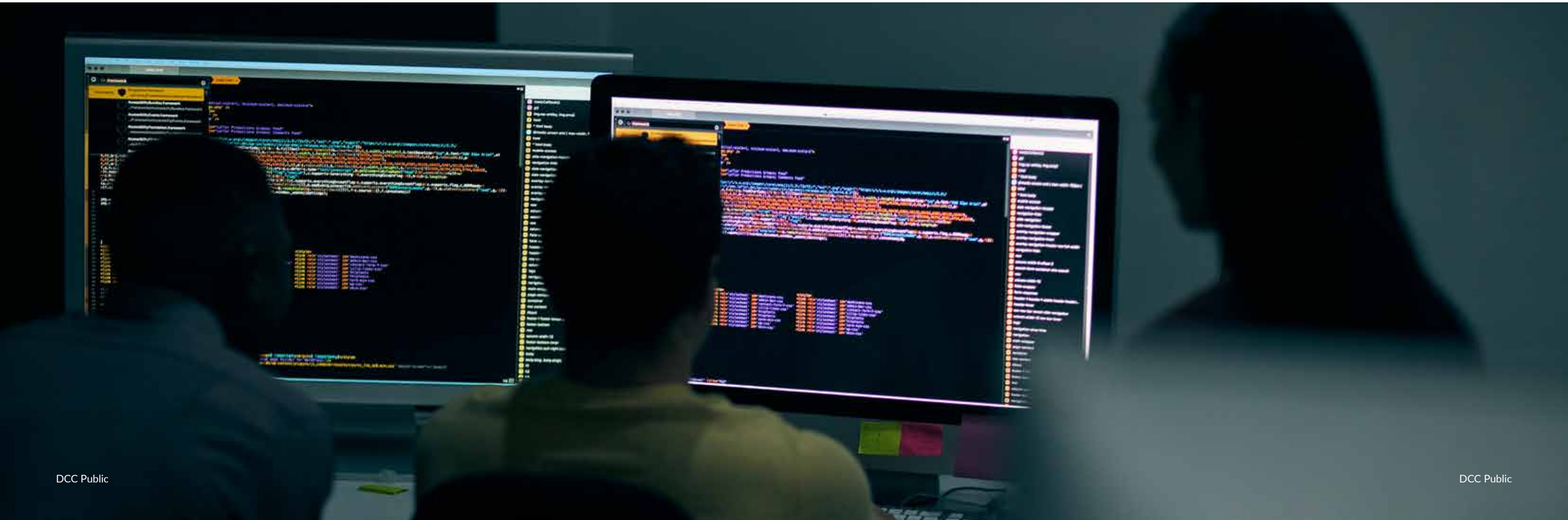
Business continuity and disaster recovery

With the growing scale of our operation, we will continue to evolve our approach to business continuity and disaster recovery (BC/DR) to make sure that our customers can always rely on the DCC service. We have run a series of "war games" (testing major incident management capabilities) as we have onboarded new suppliers under the SMETS1 migration, as well as carrying out full annual disaster recovery tests across our data centres.

We also use live simulations to ensure our readiness for business crisis events, for example with a recent 'Black Swan' exercise that simulated a full-blown cyber-attack on the DCC infrastructure. It showed that our processes are robust and that we have a highly empowered team who can make critical operational decisions under pressure.

We have tested a wide range of scenarios, from technology challenges to adverse weather events and aggressive attack vectors. We will continue to test different aspects of our approach to BC/DR, using different contexts to ensure that we are always as ready as possible for the unexpected.

Our team is also working with suppliers to develop an enduring availability plan to perform system tests within



DCC Public

data centres. We expect to initiate the plan later this year and continue it throughout the life of the service. This will help to reduce downtime during operational changes, causing less disruption to our customers and increasing confidence in the resilience of our infrastructure.

Standards

We will improve effectiveness and efficiency across DCC Operations by simplifying and streamlining complex processes for all our customers. We are looking to measure all our operational processes against industry standards, and we are aiming to achieve Capability Maturity Model Integration (CMMI) Level 5 by April 2023. By harnessing technology to design processes that are easy to use and repeatable, we can maintain service quality at a consistently high level for our customers and reduce the number of defects. As we mature our processes, we will look to drive continuous improvements, a key requirement of a CMMI Level 5 certification.

In addition to CMMI certification, our longer-term target of aligning with international standards (ISO9000 and ISO20000) will ensure that service improvement remains at the heart of our operating ethos. We are looking to implement these standards and achieve these accreditations by 2024.

We are also looking to implement The Open Group Architecture Framework (TOGAF) Level 5 across our design architecture by April 2023. TOGAF helps businesses to design, plan, develop, and implement their infrastructure with fewer errors while staying on budget. It ensures there is an alignment between an organisation's goals and its technology. Adopting TOGAF helps to reduce IT operating costs; drives an efficient IT operation aligned appropriately to business outcomes; increases the portability of applications so change is easier; and improves interoperability so that it is far easier and cost effective for our customers to interact with the business.

5.1.2 Enduring Change of Supply

Overview

Smart metering devices use secure, signed certificates to validate that remote parties are authorised to communicate and operate them. One of these certificates relates to the energy supplier and so needs to be refreshed when a consumer switches supplier to ensure that the consumer is identified and billed correctly.

The original intention was that the energy suppliers themselves would develop a process to refresh the certificates when a consumer switched provider. But, given the amount of change already planned as part of BEIS' Smart Programme, this capability – known as Transitional Change of Supplier (TCoS) - is currently being delivered by the DCC's Data Services Provider. TCoS will eventually be replaced by an Enduring Change of Supplier (ECoS) capability.

Benefits

The Change of Supplier credentials (CoS) process allows the supplier certificates associated with a losing energy supplier to be replaced with those of a gaining energy supplier whenever a consumer changes supplier. DCC Systems were originally developed to operate using a Transitional CoS (TCoS) process during the roll-out of smart meters to minimise the impact on suppliers during this critical period, although it was recognised at the time that this was only a temporary solution. The intended ECoS solution is more effective in supporting faster and more reliable switching in the energy market, along with reducing the impacts and costs on energy suppliers. It is also a more resilient and secure solution.

Timescales

DCC and BEIS have been collaborating since late 2018 on the plan to implement this change. A consultation on options, including the original plan for energy suppliers to provide ECOS capability, was completed in 2019. The consultation identified that the preferred solution for stakeholders was for the DCC to design and implement the enduring solution.

In January 2020, we issued a plan – agreed with BEIS – setting out how we would deliver this solution for consultation. This will see us procure and select new service providers and then host and manage the provision of the service. We will also manage the migration of certificates in devices away from TCoS to the new ECoS or Change of Supplier (CoS) party provider.

Following the consultation, we expect BEIS to direct us to deliver the plan as documented, with suitable incentivised milestones. The plan assumes a requirement for three distinct procurements:

- **The provision and ongoing support of an IT solution to manage the activities relating to Change of Supply** – notably the validation of an 'Update Security Credentials' (CoS) SR6.23 from the Gaining Supplier, the co-ordination of related messaging with the Access Control Broker and ultimately efficient replacement of Losing Supplier security credentials with ones provided by the Gaining Supplier, on the devices within the end consumers smart metering system
- **The provision of a hosting platform to support the ECoS solution** – a hosting platform and relevant infrastructure required to independently host the ECoS solution
- **The Provision of a managed service agreement for ECoS** – a managed service which will maintain, monitor and evaluate the service on behalf of the DCC, in order to ensure the continuity of the Service Management framework for the ECoS Service

We expect procurement to be completed by May 2021. The technical design work to create the new solution and unbundle from the DCC's Data Service Provider has been completed.

The design, build and test (DBT) phases of the programme will run through 2021 and 2022, with a planned live implementation in June 2022. This will be followed by the migration of TCoS certificates to the new CoS party through a process which may take up to 12 months to complete and is dependent on technical capacity.

The ECoS programme is linked to the DCC Faster Switching Programme, in that the new CoS party provider will need to be updated when consumers switch supplier. The DCC and BEIS have worked with Ofgem to review implementation options and timings. The changes required in the Switching Programme to support the provision of information to the CoS party have been designed and lodged. It is expected to have minimal impact on timelines for the Switching Programme.

5.1.3 Dual-Band Communications Hubs

Dual-Band Communications Hubs will bring an additional 25% of properties in Great Britain within the scope of the smart metering programme, extending the coverage and benefits to approximately 95% of all GB premises. They have the capability to overcome some of the physical

challenges which are holding back the smart meter roll-out, such as weaker signal strength in buildings with thick walls or in a block of flats where the meter is at the other end of the building and potentially out of range.

Dual-Band Communications Hubs will improve the installation process, cutting out the need for abortive assessment visits and reducing the number of failed installations caused by the limitations of Single-Band Communications Hubs.

In recent months, we have made good progress in the key test phases and validation of the new hubs to identify and resolve any design defects prior to launch, which is currently on schedule for the end of 2020, subject to completion of any further testing and subsequent approvals.

Following launch, we will look to refine and improve this capability further in line with the agreed Smart Energy Code (SEC) release schedule. We will also ensure that this aligns with our wider activity under the Network Evolution Programme (see Section 5.2).

5.1.4 SMETS1 migration

Overview

We are required to facilitate the enrolment and adoption of more than 14 million SMETS1 meters onto the DCC network so that all smart meters become interoperable and that consumers will continue to receive smart benefits when they switch energy supplier. Where consumers have lost smart functionality already, our solution will allow suppliers to restore that capability. We are already seeing this happen with a hundreds of thousands of devices migrated onto our network, avoiding the considerable cost to our customers and ultimately end consumers of replacing dormant SMETS1 devices with new SMETS2 meters.

This is the first mass migration of live smart meters and we are very much aware of the need to make sure that consumers do not experience any negative side-effects. We are organising the migration in three phases known as the Initial Operating Capability (IOC), the Middle Operating Capability (MOC) and the Final Operating Capability (FOC). The migration of meters for the IOC cohort is now under way and we plan to ramp up migrations during 2020.

As the volume of SMETS1 meters available for migration increases, we will continue to mature and improve our Migration Control Centre (MCC) and Early Life Support (ELS) capabilities. The MCC is responsible for forecasting the rate of migrations with input from industry and the co-ordination of all meters in readiness for migration. Along with our ELS capability it provides real-time monitoring and intervention to ensure successful migration and minimum down time.

Right now we are on just over 450,000, expecting to pass half a million quite soon and we may even be at 750k by the time of publication. We make our own life harder by publishing in July a figure that's so out of date. Key to success of the programme is our ability to perform migrations right first time (RFT) as failures and retries consume valuable resources and capacity. After some initial teething problems, we are now achieving a steady RFT measure of close to 100%, which will build confidence in our ability to complete the migration successfully.

The MOC and FOC cohorts have both successfully entered Systems Integration Testing (SIT). The first delivery for the MOC to support meters currently managed by Morrisons Data Services went live in March 2020 and small numbers of devices have now been successfully migrated. The remaining MOC capability is currently planned to go live at the end of July. Timescales for the FOC are in re-plan (expected to be Q4 2020 or Q1 2021). Following that, we will continue to test the interoperability of all remaining SMETS1 meters with the DCC's system.

We are prioritising the migration of SMETS1 meters which lost smart capability when consumers switched energy supplier. These are termed 'dormant meters'. Once these have been migrated, they can be made smart again by the consumer's new energy supplier, to the benefit of the consumer. The DCC is planning to complete migration of all eligible dormant devices by the end of 2020. The DCC will complete delivery of capability to enable the migration of the remaining cohorts during 2020, allowing all migrations to be completed during 2021.

In September 2019, the DCC held an industry-wide session to review plans and to take feedback from the industry. We intend to hold another similar event during Q2 2020. We are now also sharing regular migration reports with the Implementation Managers Forum (IMF) and the Smart Meter Delivery Group (SMDG) (see Figure 4 below).

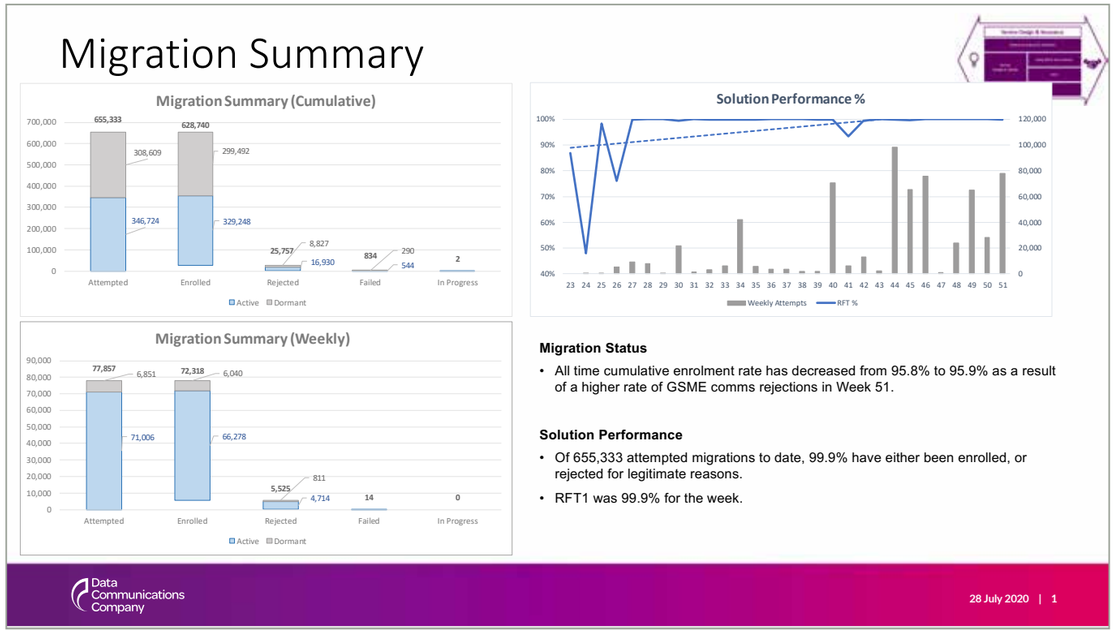
Benefits

Improved interoperability will support a more competitive retail environment and enable consumers to benefit from the new products and services which depend on smart metering. In addition, other energy market players, such as Distribution Network Operators (DNOs) and the Electricity System Operator, will have a full picture of energy usage, irrespective of whether the consumer has a SMETS2 or SMETS1 meter, thus enabling them to manage supply and demand better, and to balance the system.

As part of the SMETS1 migration programme, in agreement with BEIS and industry, the DCC have developed a Dual Control Organisation (DCO), a system which provides additional security controls designed to mitigate the risk of having all SMETS1 devices connected to a single infrastructure.

Overall, the SMETS1 programme is currently expected to deliver savings of around 25% of in-life costs to the industry through the consolidation and renegotiation of contracts previously held by multiple energy suppliers and service providers.

Figure 4 – Migration Summary Report as of 2 June 2020



5.2 Enabling the intelligent transformation of the energy system

Helping to make Britain's energy infrastructure more responsive to the needs of consumers and the country

5.2.1 Switching

Overview

The overall purpose of Ofgem's Switching Programme is to deliver a Central Switching Service (CSS) which will give consumers access to faster, more reliable switching of energy suppliers and support various Government policies to achieve digitisation and decentralisation of the energy market.

The main objectives of the CSS are:

- **Faster switching.** Bringing switching times down from up to three weeks to next working day
- **More reliable switching.** Failed switches undermine consumer confidence in the process. 80% of failed switches relate to address data. A new address service will provide a single version of the truth for this data
- **Unifying gas and electricity switches.** The programme will replace the current separate gas and electricity approaches and will allow linked gas and electricity supplier switches

Benefits

The impact on existing energy suppliers is potentially significant. They may gain or lose consumers much more quickly than in the past and the retail market will evolve as digitisation enables the introduction of additional services in the future such as automated switching. The consumer proposition could also change significantly as the faster process facilitates the creation of a diverse new range of business models.

There is a complex mix of further factors that will shape switching in the years to come. The DCC is looking to understand the potential factors and has developed a roadmap to manage future change proactively. As the key delivery partner of Ofgem the DCC has the responsibility to design, implement, manage, and maintain the new CSS. To date, we have developed a logical design for the CSS and a detailed set of requirements, as well as procuring key service providers who will help us build and operate the CSS, act as the systems integrators, provide service management tools and provide assurance of activity by the core systems involved in switching.

The programme is now within the design, build and test (DBT) phase. The DCC and its four contracted service providers have developed the approach and plan for this phase; the final design; a tool that allows software developers to see the details of the interface to CSS; simulator tools to enable the industry to test the functionality of their solutions in advance of the central solution being fully available; and the data migration approach.

Timescales

Following discussions with Ofgem and energy suppliers, 'go live' is planned for early 2022. In the period leading up to this, key activities will include:

- Completion of Pre-Integration Testing (PIT) and Systems Integration Testing (SIT)
- Entry into User Entry Process Testing (UEPT) and the start of end-to-end testing
- Planning and approach for the DCC to be ready to operate the system from 'go live'
- Working with the DCC's customers to ensure that they are business ready, including review of their customer journeys
- Developing and consulting on a business case for the DCC's role in switching beyond 'go live' up to 2025

We are running a series of industry summits throughout the programme to share our approach with our customers and other interested parties. Three successful industry switching summits have been held to date and we have seen a significant increase in stakeholder satisfaction with each event. Responding to demand, we have also organised shorter, focused briefing sessions on topics of interest to our customers. Whilst no longer mandated by Ofgem, DCC has continued to survey customers and we are looking to publish more survey results and our follow-up actions.

In April 2019 we formally consulted with the industry on the internal business case for DBT and this will be updated to reflect the managed re-plan following Ofgem's response to industry concerns. We published the response to the consultation on the DBT internal business case, including Ofgem's views. The programme is covered by Price Control and is currently reporting favourably compared to business case estimates.

5.2.2 Half-hourly settlement

Overview

The introduction of market-wide half-hourly settlement (MHHS) will increase competition in the energy market in many ways, all of which will benefit the end consumer. The DCC is in a strong position to help deliver that outcome.

Access to half-hourly data will allow industry participants to build and bring new offerings to the market, differentiating themselves and providing the consumer with increased choice. This will build on the benefits that the national roll-out of smart metering is already delivering. Over time, greater differentiation and more choice for consumers is likely to drive further take up of MHHS, improving billing accuracy and system efficiency, creating a virtuous cycle of innovation.

The reconciliation of customers' actual usage or generation of energy in half-hourly periods will expose suppliers to the true costs of doing business. So, to maximise efficiency and remain competitive, they will need to develop new services that incentivise consumers to shift load and change their consumption patterns.

This will encourage market participants at all levels to trial, test and deploy a full range of new business models including time-of-use tariffs, services which encourage consumers to manage their energy demand and electric vehicle charging.

The ability of smart meters to measure exports will support the delivery of the Smart Export Guarantee, bringing better returns for consumers based on actual rather than deemed rates of generation. Longer term, there may be potential to help the industry to engage with customers in different ways, e.g. through the development of peer-to-peer trading models.

More broadly, for energy suppliers, greater visibility of actual consumer behaviour (consumer intimacy) could lead to brand extension opportunities and the bundling of services in adjacent or complementary markets.

Summary of response to Ofgem

Ofgem is midway through the development of the business case for MHHS. Ofgem issued a Request for Information (RFI) in August 2019 in which the DCC was asked to consider the proposed Target Operating Model and the impacts of moving towards half-hourly settlement.

We submitted a response in October 2019, which included a technical proposal; information about the impacts on competition and innovation; and outline financial and operational terms.

DCC Public

Without half-hourly settlement, the true benefits of nationwide smart metering will not be achieved. So, delivering this capability is consistent with our licence objective of facilitating effective competition in the energy supply industry and we will continue to support Ofgem in refining its requirements and identifying how value can be maximised through this initiative.

We have provided some preliminary costings to Ofgem and, while these have been subject to external assurance, they will need to be refined as further information is received.

Timescales

The DCC has suggested a programme timescale of two years starting in December 2020. Our timeline and cost estimations are reflective of the recommended solution the DCC has proposed. Should the solution approach or the scope change, we would have to review assumptions behind timescales and costs.

We have been working with Ofgem and Elexon[38] to review the optimum implementation of MHHS, in particular discussing the practical implications for our systems and the solutions which might be available. It is anticipated that any solution will require a SEC modification which may add to the overall timescale. Scaling up of the Data Services Provider (DSP) to handle the additional service request volume associated with MHHS would be handled as part of the existing capacity planning process.

There have been alternative Target Operating Models suggested by Elexon which would significantly change our original time and cost assumptions. However, the regulator has not yet made a decision about which option it wants to pursue, and we will continue to participate actively in these discussions.

5.2.3 Network Evolution

Overview and benefits

The Network Evolution Programme focuses on the future of DCC operations in the smart metering environment. It explores how new process, systems and technologies can improve the live service, reduce the operating costs of the DCC system, and, above all, secure the continuity of a critical part of the UK's national infrastructure.

The programme comprises four distinct programmes:

- **Network Evolution DSP:** Designing and procuring data services which are secure and sustainable, with a reduced operating cost, capable of rapid and cost-effective change in response to market and customer demand. This work will include investigations into how cloud computing and microservices could contribute to a new design for the Data Services Provider (DSP) to de-risk the overall re-tendering activity
- **Network Evolution Communication Hubs & Networks:** Designing and procuring future-proof Communications Hubs & Networks (CH&N). We require a technology with a longevity of at least 15-20 years so that the full benefit of CH assets' operational life is realised from the point of installation. It should also provide roaming and switchable capability to increase resilience and minimise industry costs and inconvenience to the end consumer
- **Network Evolution SMKI:** Procure a replacement or extension to the Smart Metering Key Infrastructure (SMKI) security service in a cost-effective way
- **Network Evolution Test Automation:** Designing and implementing automated testing of the SEC releases to achieve faster and lower-cost testing.

The Network Evolution programme is driven by advances in digital technology which continue to reshape the energy landscape. We must make sure that the DCC Network keeps pace with and prudently anticipates that change, while also maintaining continuity of service to the energy industry as contracts with service providers expire. These issues are becoming more urgent for a variety of reasons:

- The contract for the provision of the Data Services Provider (DSP) service with CGI is coming to an end and must expire by October 2024, given a maximum of three one-year extensions
- The 2G/3G network will reach obsolescence in around 2030. The existing 2G/3G networks, in use in the South and Central regions, have been superseded by the introduction of 4G networks, with 5G on the horizon. There is a high probability that the older networks will no longer be supported or maintained in the medium term and the DCC will need to modernise its communications provisions accordingly
- SMETS1 and SMETS2 assets have a 15-year life, so the earlier an enduring technology can be made available in the ecosystem, the lower the amount of scrappage and the longer the economic life of assets
- BT's contract for the Smart Metering Key Infrastructure (SMKI) security service, also known as Trusted Service Provider (TSP), is due to expire in 2021

38 ELEXON administers the Balancing Settlement Code on behalf of the UK electricity industry.

- There is a continuing need to drive competition within the supply chain to reduce costs, improve service and accelerate continuous improvement by, for example, adopting a future testing strategy which provides automated set up

The programme aims to ensure that customers are obtaining value for money at all times and that opportunities for competition are integral, such that all service providers are continually subjected to competitive pressures. We have started to socialise the outline business case with the SEC Panel and subcommittees and will continue to engage with customers as we prepare the final business case for BEIS' consideration.

Timescales

The overall programme is in the early phases of development, as follows:

- DSP is at the scoping phase, defining outcomes and critical success factors. The new DSP will be procured to be built, tested and deployed at the earliest opportunity, and by 2024 at the latest

- CH&N is at the scoping and requirements definition stage. The aim is to get an initial next-generation communications hub to market in 2021, and the capability to upgrade this with further services such as roaming and switching soon after

- SMKI is concluding an investigation phase including collaborative discussions with the National Cyber Security Centre (NCSC)

- Our test automation and robotics function is currently running an active procurement exercise against an agreed design with a target deployment in December 2020. This will enable 24/7 working and a significant reduction in the time and cost to complete regression testing

The programme will deliver over the next three or more years. Other than next-generation communications hubs and test automation, precise timescales are yet to be confirmed for these outcomes and more work is required on the approach to be adopted in each area.

5.2.4 Electric vehicle charging

Electrification of transport is vital in making our transition to a low carbon economy. However, a central data and communications platform is needed to manage electric vehicle (EV) charging, to avoid overloading local networks and to ensure interoperability of service when consumers change their charge point provider. The DCC network provides such a platform, which has already been paid for.

Alternatives, such as mandating interoperability agreements bilaterally between charge point providers, have proved ineffective. It is important to identify a central platform quickly to avoid a situation where the proliferation of local or individual solutions risks stranding a large number of dormant assets: this would require further significant spending at a later stage to rectify the situation.

We believe that our smart metering system is ideally positioned to provide the central data and communication platform for EV smart charging. It is highly secure, following a design endorsed by the NCSC, and can interface with various types of service users. At scale, it provides a reliable and proven way of communicating with assets across the UK and ensures interoperability when consumers switch energy supplier. Energy consumers have invested in this infrastructure via their bills, and by 2024 most homes and small businesses will be connected to the network and already connected to every energy supplier. Re-use of this in-situ hardware and platform would minimise development time and cost compared to other solutions.

Our infrastructure can be re-used to provide nationwide, secure load control for EV charge points, facilitating greater consumer choice, making it easier for consumers to change charge point provider and ensuring confidence in security and data privacy. Importantly, by shifting the EV charging ecosystem away from proprietary systems onto a common data and communication platform, we will encourage open innovation and differentiated services, which will benefit consumers.

This will stimulate consumer take-up of electric vehicles and help to accelerate the decarbonisation of transport.

In November 2020, proportional load control will be available to use through the DCC as a live service allowing users to control domestic loads, including EVs, proportionally along with a programmable schedule of 120 changes in load per day.

In our test facility in Manchester we are currently demonstrating load control through the smart metering system. We are using an auxiliary load device which is controlled remotely by the energy supplier and wired into the smart meter. We are developing a demonstration of a load control variant which uses a wireless connection through the home area network. Later this year we will showcase proportional control, which will allow customers to test our new capability.

5.3 Enabling innovation and re-use

Delivering flexible, simple, cost-effective innovation and finding ways of re-using our platform to reduce costs for our customers

We believe there is exciting potential to re-use our unique, secure network to foster innovation in energy networks and promote competition in energy supply. We can also generate new revenue streams from the re-use of our network and so reduce the charges paid by our existing energy customers. With this in mind, and in line with our licence obligations, we are assessing these opportunities.

Following customers' feedback, we are now dedicating some of our resources to explore what role we should play in supporting innovation and enabling re-use of the DCC platform. As we are preparing a business case, we will evaluate options for funding models, pricing principles and a suitable operating model.

5.3.1 Smart Energy Code Modifications and Elective Communication Services

These are the two main ways in which we already support innovation in the energy market. Smart Energy Code (SEC) Modifications are industry-wide requests for changes to our services. The Elective Communication Services (ECS) process allows existing individual customers to develop new messaging services on our platform on request, with a six-month exclusivity period.

In early 2019 we established a dedicated In-Life Change team to focus on the delivery of SEC Modifications and ECS. This led to the first successful delivery of a SEC systems release in November 2019. We understand that our customers would like to see a reduction in the time taken to assess the impact of SEC Modifications proposals and also a reduction in the associated delivery costs. So, based on the lessons learned by our In-Life Change team, we will be making a number of improvements to our processes this year to meet customer expectations and deliver on commitments made to the SEC Panel.

We are working closely with the industry, SECAS (Smart Energy Code Administrator and Secretariat), and our service providers to implement key changes in priority order which will include the end-to-end digitisation of the SEC Modifications process; increased multi-party collaboration during the design phase; Key Performance Indicator (KPI) reporting to track delivery; and streamlined processes to enable faster delivery. There are some differences between the delivery of ECS and SEC Modifications. However, much of the process is the same, so where we make improvements in one, they can also be applied to the other.

ECS was first activated as part of the Smart Energy Code (SEC) in 2018. Because of the limited interest in the service in its current form, in late 2019 we engaged with our customers through formal governance groups and bilateral discussions to explore how ECS could be enhanced better to meet customer requirements. In 2020-21, we will be seeking the views of our customers on the following options for improvement:

- Making changes to the regulatory framework to improve the ECS value proposition, in particular the option to extend the ECS exclusivity period from 6 months to 12 months to make the investment more attractive to customers. Additionally, the scope of chargeable tailored services could be extended to include analytics products and/or bespoke test products
- Splitting the ECS delivery process into two distinct phases, providing an opportunity for a lower cost proof of concept to be developed before customers have to commit to funding the full release cost of an ECS
- Developing a process to enable a SEC Modification proposal to be converted into an ECS request without the need to repeat the assessment phase. This would benefit the proposer where a modification was unlikely to be approved through the SEC Modifications process or was not progressing through the governance process fast enough and needed to be accelerated
- Providing additional reassurance that there will be no adverse impact on core energy communication services. This would be achieved by retaining the current design for existing messages; establishing a separate end point for ECS, potentially a separate ECS 'traffic' lane; and creating a logically separate testing environment

- Making independent assurance arrangements. We will do this by aligning with SEC Modifications or policy change, adhering to design principles and policy while maintaining the confidentiality of the customer's ECS request. In exceptional circumstances where critical or sensitive ECS messages (Service Request Variants) are required, we will facilitate confidential review by the relevant industry bodies - the Security Sub Committee and the Technical and Architecture Sub Committee (TABASC)

As well as enhancing the ECS proposition and improving the end-to-end delivery of SEC Modifications based on the current ecosystem, in 2020-21 we will start planning how we can use our Network Evolution Programme to reduce further the time and cost of both processes. An example of this would be the significant increase in test automation that is planned for later in the year, which will reduce both the time for regression testing, and its cost.

5.3.2 Testing and experimentation capability

Experimentation is the catalyst for innovation. That is why we have invested in creating the right environment where we and our customers can test new products and services. We recently opened a new, state-of-the-art test facility in Manchester with 19 labs. One of these labs is specifically designed for our energy customers and their partners to experiment with the following services:

- Device pairing (e.g. in-home displays, prepayment meter interface devices, consumer access devices) and supporting manufacturers with pairing against both SMETS1 and SMETS2 assets

- Expanded testing tool. We are enhancing and expanding the existing testing tool (GFI toolset) to provide a richer capability, including virtual SMETS devices in addition to the communications hub and interface to provide customers with 'DCC in a box'

- Experimenting with current features of the DCC service such as export or load control, supporting customers and their partners in developing their energy management system solutions and new load control devices

- Dedicated customer testing environments enabling the development of our customers' own market offerings or innovations (e.g. EV charging)

This facility can be expanded to experiment with more devices and capabilities. As the SMETS1 migration programme concludes, we will be able to work with our customers and their supply chain partners to test different device model combinations enrolled on the DCC, platform and support their understanding of device-specific behaviour. We will also be able to indicate to customers which are the most common device model combinations deployed and enrolled into the DCC, to support and assist their deployment strategies.

We are also considering offering to test our customers' devices and capabilities as a DCC service. Customers must carry out a multitude of different tests on devices, firmware, interface, and business processes. This sometimes requires them to use third party testing organisations. At this stage, we do not intend to provide Smart Meter certification.

We will continue to develop our relationship with Smart Meter Device Assurance (SMDA), to understand the mutual opportunities to deliver improved outcomes from our respective expert testing capabilities for the benefit of all smart metering participants. We will also consider how we could use our new lab facility to offer a central, one-stop shop for multiple testing on our customers' behalf. By reducing duplication of testing, we can help them save time and money. As the DCC's products and service offering expands, these test services can also increase in scope to support new and existing customer requirements. We will engage with our customers to define their requirements and develop the business case over the next 12 months.

5.3.3 Potential wholesale products and services

By building the smart metering platform in partnership with the energy industry, the DCC has helped to create a network service with unparalleled reach, scale and security. This digital transformation will open a multitude of opportunities for innovation and re-use within and beyond the energy industry.

Over the last few years, an increasing number of innovators, research institutions, incubators and policy think tanks have approached us. Their primary interest lies in two aspects of the DCC platform: the data it holds and generates; and the potential to connect devices other than smart meters to the home area network. By developing services that make this data and connectivity available, the DCC could generate new revenue streams to offset and reduce some of the charges paid by our core energy industry customers.

Data services

There is considerable interest in energy consumption data as an indicator of presence and activity in the home, and also in the 'metadata' relating to messages, such as smart meter alerts (e.g. about power cuts) or commands to smart meters (e.g. load controlling commands).

These messages give valuable insight into the state of energy supply and the behaviour of consumers and could be used to help build new applications to serve consumers in areas such as social care, protection of vulnerable householders, fuel poverty, insurance and security. Many organisations, including local authorities, healthcare providers, and research bodies, have already shown significant interest in the potential beneficial uses of this data.

We intend to follow the recommendations of the Energy Data Task Force published in June 2019. We are committed to the principles of open data, giving access to the largest set of data possible while complying with privacy and confidentiality rules, at the lowest cost possible to enable and stimulate innovation.

The DCC can become a platform for mass innovation by securely and openly exchanging data. Our unique position at the heart of the transformation of Britain's energy system, and increasing energy data access, can help unlock innovation, drive growth, accelerate decarbonisation and deliver beneficial social impact.

Connectivity services

The network could be re-used to connect remote sensors securely to support smart homes, smart buildings, smart cities, or precision agriculture. For example, innovators have approached us with ideas on how this type of system could manage the environment in a home or detect the extent of saturation in the soil to manage flood risk or measure atmospheric pollution around schools. All of these uses require not only a ubiquitous and scalable machine-to-machine network, but also a high degree of security. An example is the role the DCC could play in providing connectivity services for heat pumps and other flexible energy system technologies – Western Power Distribution (WPD) FREEDOM project installed hybrid heating systems that showed how connecting systems together could be transformational in shaping future energy market dynamics. At the DCC, we are keen to support these initiatives at a national level.

Operating model

Since the DCC was formed in 2013, our organisation, governance, management, operating processes and capabilities have developed gradually, in response to the growing demands placed upon us. In the very early years, we functioned largely as a programme-centric organisation. But as aspects of these programmes were delivered into live service and additional mandated work was placed with us, we have transformed ourselves to incorporate a wider range of capabilities.

Today, the DCC is a well-rounded business, which would look familiar to others working in technology-enabled services businesses. Innovation and re-use offer the opportunity to unleash the potential that we believe exists within our network and deliver a return to our existing customers on their original investment.

However, pursuing these opportunities will also bring different pressures to bear on the DCC and will require a different way of working if we are to respond effectively. As well as maintaining and improving our successful approach to the delivery and operation of large programmes, we will also have to extend our operating model to ensure we are best positioned to take advantage of the real prospects that exist outside our core business.

This new operating model will need to address a number of key questions, including:

- How should innovation and re-use be funded? Are there alternatives to the DCC being funded solely by existing customers?
- How should the returns from successful innovation be distributed?
- How do we position the DCC in markets without the risk of challenges under competition law?
- What is our role in making energy data available to others for the purposes of innovation?
- How do we ensure that commercial confidentiality is respected when working with multiple innovation partners or commercial customers?

These questions do not affect the delivery of our large mandated programmes. But in addressing them, we will need to change our existing processes and add new ones. Two examples would be the regulatory approval process for new products and services (as required by the DCC licence); and the onboarding of new types of DCC customers, including the support they would need throughout the product development lifecycle.

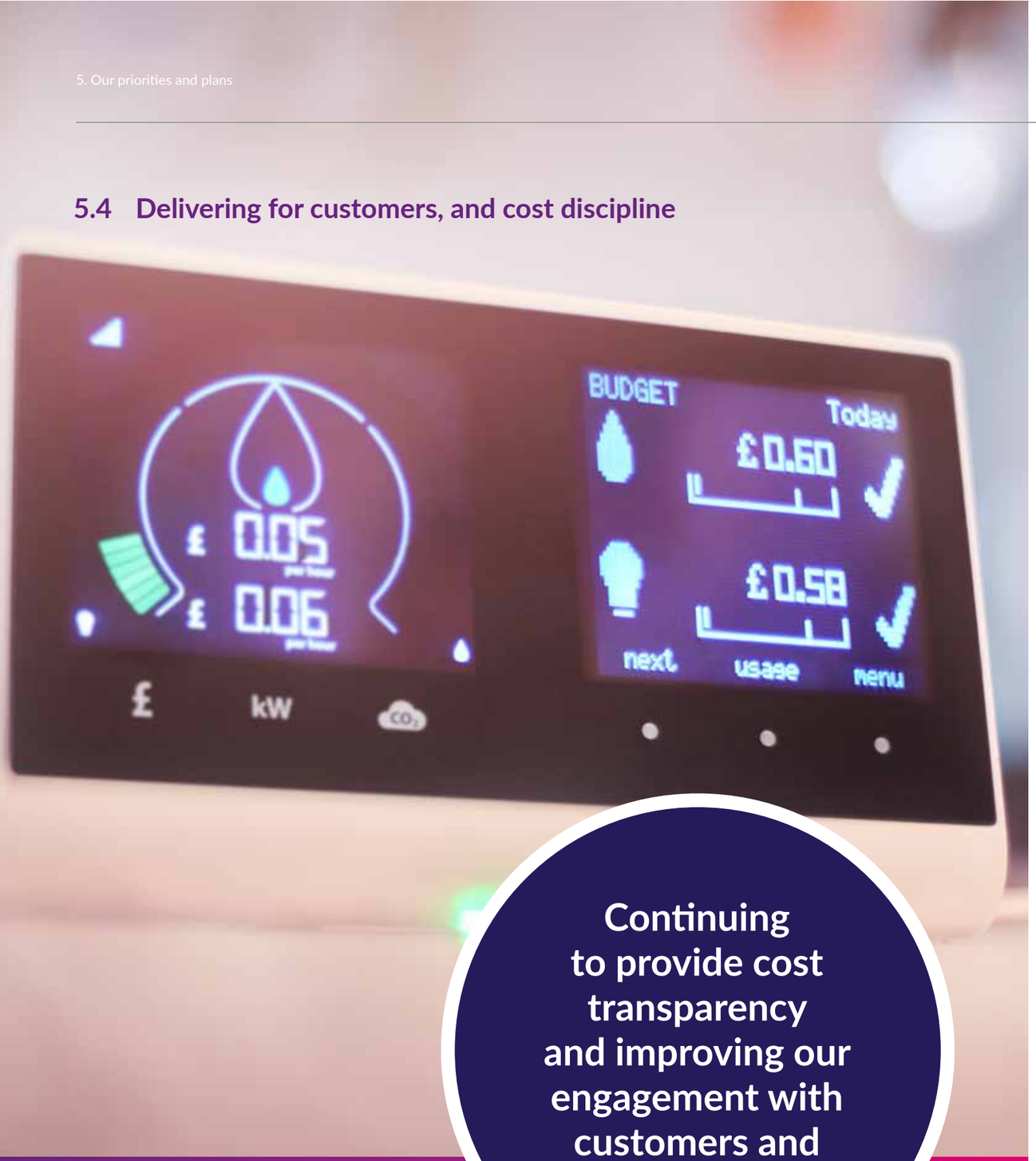
We are starting to devote some resources to thinking through these issues and developing a potential strategy for opening up the DCC to enable the delivery of innovation and re-use services. This will affect policy areas such as governance, decision making, commercial management, resource management and confidentiality. It will demand new capabilities such as technical and commercial support for innovation and business development. Finally, it will raise structural considerations, such as accounting separation.

We envisage an incremental approach, which we see as important in retaining the confidence of our existing customers, and we will start by seeking opportunities to extend our services in areas such as testing which will directly benefit our core customer base. We understand that we must take our customers with us on this journey. Indeed, our regulators are unlikely to provide the approvals we require unless we can show that customers have been fully engaged and are happy to see us proceed in this direction.

We are preparing high-level timetables and business cases to evaluate with our customers and Ofgem over the next regulatory year. This will include extensive customer engagement on how to enable innovation and re-use of the network with specific reference to the provision of testing and experimentation services, data services and connectivity services.

We very much look forward to sharing these ideas with our customers and stakeholders, obtaining their ideas in return and creating an innovation and re-use capability within the DCC which directly benefits our existing customers who have funded our activities to date. We firmly believe there is scope to go beyond this and use the DCC network to deliver a range of services, both to the energy sector and beyond, which can deliver huge value to society.

5.4 Delivering for customers, and cost discipline



Continuing to provide cost transparency and improving our engagement with customers and stakeholders

5.4.1 Customer engagement strategy

In the 2019/20 plan we set out a new strategic approach to customer engagement. Over the summer, we worked with customers to develop the detail and started to implement this in September. As conceptualised in Figure 4 below, there are three main categories of engagement that the DCC will undertake:

- **Inform.** Where activity is mandated, the DCC will engage with the industry to ensure transparency of progress and costs
- **Shape.** Where there is potential for new activity with either a value of over £1m or that will impact customers systems and processes, the DCC will share several iterations of the business case with customers. We will seek views from customers on the scope of the programme, the options for delivery and the costs and benefits of the different approaches
- **Survey.** Where there is a clear set of options for future activity, the DCC will engage by conducting a survey to gauge industry views

In order to implement this new approach, we have put in place a number of initiatives:

- Development of a customer portal offering a single location for all online interactions with the DCC (see Figure 6 below). An early version of the portal was launched in March 2020, following customer feedback, and this will continue to evolve, with additional functionality available by the summer. We are inviting all our customers to register for access now. The portal will allow customers to access and provide feedback on DCC business cases, view a forward plan of engagements by subject, review spend to date by programme, complete online surveys and submit responses to consultations. It will also enable DCC to track and evidence the views of customers to feed into its decision making.
- Following feedback, the Quarterly Finance Update has been extended to include a more detailed programme and business case update. Since autumn 2019 we have shared around half a dozen business cases with customers. We will continue to adapt format and presentation to suit customers' needs. Our bespoke business case "insight workshops webinars" are opportunities for customers to obtain DCC business case updates and to comment, challenge and debate them in detail with our Subject Matter Experts. Through this cycle the DCC presents back to customers, demonstrating "you said, we did".
- The outputs of DCC insight workshops/webinars are presented at the relevant SECAS forum for view (not decision) before presentation to SEC panel so their view can be incorporated and fed into DCC Board decisions.
- To improve transparency the DCC has offered customers the opportunity to request audits or benchmarking on areas of its business under Non-Disclosure Agreement (NDA) terms should they wish to. To date, there have been no requests.

Over the next 12 months, the service management team within DCC Operations will be adopting a refined

Figure 5 – The DCC has developed a detailed engagement process with industry

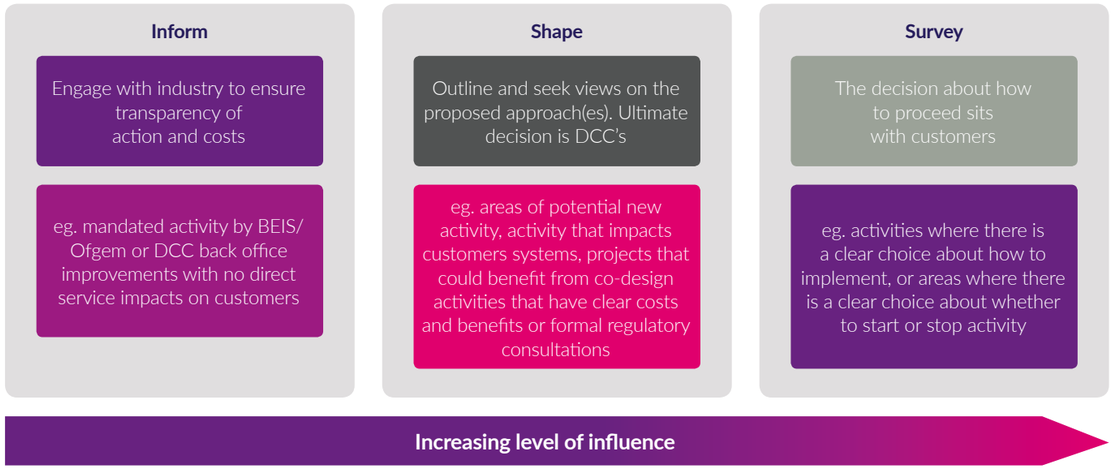
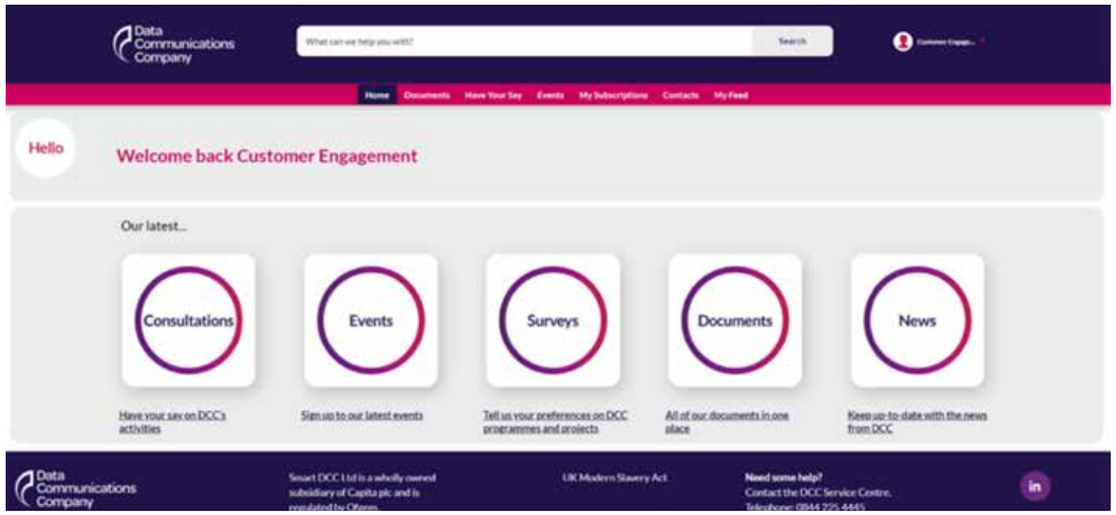


Figure 6 – The DCC has developed a simple way for everyone to see exactly what is happening in all our programmes at all times



approach which we call "One DCC". This will ensure that we have one approach, one voice and one message in our dealings with customers, making our engagement more predictable and more efficient. By adopting this way of working, those of us within the DCC who have regular dealings with customers will be aware of all past and future engagements, so that the conversations can be focused on their specific needs. We will use our existing customer relationship management (CRM) capability to capture all relevant activity and make this available across the DCC.

5.4.2 Customer experience improvements

Customer journey improvements

In 2019 we adopted a continuous improvement (CI) approach in order to improve our service levels and the experience of our customers.

We monitor customer sentiment by measuring how easy we are to do business with at key touchpoints along their journeys. In 2018 we began measuring a Customer Effort Score (CES) on our incident management journey and benchmarked ourselves (via Gartner) against IT providers, utility providers and wholesale utility providers. By using our new CI approach, we managed to improve our CES in just 12 months to surpass our target of achieving 'best in class' against the IT provider and wholesale utility benchmarks.

The objective is now to maintain and continue to improve our incident management journey while bringing online a further eight customer journeys that will all be individually benchmarked, such as knowledge management, through a self-service interface and the ability for customers to locate smart meter faults by running remote diagnostics. We aim to achieve 'best in class' across these new journeys by April 2021. The integration of our feedback software (Qualtrics) with the Salesforce platform is an important enabler of this improvement.

As the delivery of new services draws new customers to the DCC system, we will continue to improve and, where possible, digitise the onboarding process. We are also refreshing and evolving aspects of the service which were introduced early in the DCC's life, reflecting the growing scale of our business and the insights we have gained into customer usage. For example, the Order Management System has been redeveloped in the light of customer feedback. In future, customers will benefit from a much enhanced, nationwide system which is more integrated with their own ordering and logistics processes.

Continuous improvement

During 2019 we introduced a 'DCC Smart Way' programme of continuous improvement training. The purpose of the programme is to build our capability to deliver improvements in productivity, cost efficiency and Customer Effort Score. We have now trained around 15% of our staff to Six Sigma 'yellow belt' standard, including staff from all functions across the DCC. First-year annualised benefits of >£310k already exceed the <£100k cost of the investment in training.

Our focus for 2020 is to continue building our capability and culture, and to extend our continuous improvement projects to engage both our customers and service providers.

Retendering of the service desk

The current service desk is provided to the DCC under contract. This is being retendered and redesigned as an outcome-based contract which will allow us to provide a more manageable and transparent service for our customers. This reprocurement is planned to be completed by Q1 2021. As part of the retendering process we are taking input from 16 leading suppliers, both local and global, who have demonstrated world class service delivery in this area.

5.4.3 Driving costs down

Controlling supplier costs through contractual measures

The structure that the DCC uses in agreements with strategic suppliers is broadly similar to the Government Legal Service Master Services Agreement (MSA). However, the DCC has chosen to enhance the MSA provision in some of its agreements.

Mechanisms the DCC uses to seek redress for service providers failing to perform and/or meet their obligations include:

- specific deductions of the monthly service fee for breach of minimum service levels;
- incentivised project milestones centred around a revenue retention sum that reduces to a zero balance where a number of days delay has been exceeded;
- the reimbursement of testing costs where the service provider is at fault;
- the reimbursement of DCC costs in instances of service provider delay;
- indemnities that allow the DCC to reimburse third parties for service provider fault;
- the provision of enhanced scrutiny and step-in for persistent service failure and material breach.

Cost transformation: Smart Savings Programme

To further support the principle and delivery of value for money, the Smart Savings Programme was launched in Regulatory Year (RY) 18/19 to reduce costs for our customers while increasing the efficiency and effectiveness of our processes.

Since its launch, £343m of cashable savings have been realised (RY 18/19 £107m; RY 19/20 £236m).

Highlights of our RY19/20 achievements are:

- In June 2019, we opened our first dedicated premises in Manchester housing office space and test labs. Bringing user interface testing (UIT) in house will deliver £96m of cash savings over the next eight years (up to RY 27/28) as we reduce reliance on supplier facilities
- SMETS1 commercial negotiation resulted in savings of £37m
- The completion of the switching design, build and test contracts has resulted in £24m of savings driven by commercial negotiations
- SMETS2 contract negotiations have resulted in savings of £7m
- £3m of cashable savings have been driven by internal initiatives designed to challenge existing costs and processes.

In line with previous years, cashable cost saving targets have been factored into RY 20/21 and future year charging statements. Building these targets into our baseline figures commits us, in effect, to achieve a minimum cash saving target. The target for RY 20/21 has been set at £15m. In addition to the delivery of cashable savings, we will develop improved reporting of efficiency, capturing progress across the business and addressing feedback from the recent (RY 18/19) price control submission.

DCC price control framework

While the Smart Meter Implementation Programme (SMIP) is overseen by the Department for Business, Energy and Industrial Strategy (BEIS), we are regulated and governed by our licence and held accountable by the energy regulator Ofgem. One of the key aspects of our licence stipulates that, as a monopoly, we must ensure that our customers obtain value for money from their contribution to the delivery of the SMIP and other activities covered by the licence, such as faster switching. The DCC is subject to an annual process of scrutiny through which we are required to demonstrate that money has been spent in the most economic and efficient way.

As part of that process, we report to Ofgem in July each year on all of the costs that we incurred during the previous Regulatory Year, together with an explanation for any material variances between the actual costs incurred and the forecast costs agreed with Ofgem in previous submissions. Ofgem reviews these costs and has the

power to refuse any costs which it does not believe are justified. In respect of last year's outcome, circa £1m was disallowed against a total of £375.7m.

We strive hard to deliver value for money for our customers on everything we do, particularly on external costs which form the lion's share of the DCC's costs. The External Contract Gain Share (ECGS) mechanism incentivises the DCC to negotiate savings on our supplier contracts. We achieved savings for our customers by refinancing existing contracts to the end of the DCC's licence term and in last year's price control we were allowed to retain a share of around £8m of these ECGS savings.

Our margin is at risk if we do not perform well against our targets on SMETS1, Release 2.0, Switching and our Operational Performance Regime (OPR). If we miss milestones, we lose margin through mechanisms in the Price Control. These incentives are designed to encourage the DCC to perform efficiently.

Ofgem is in the process of reviewing the Operational Performance Regime (OPR). In its February 2020 decision on the RY18/19 Price Control, Ofgem confirmed its intention to amend the DCC's incentive scheme and broaden it beyond operational measures to include customer engagement and value for money reflecting DCC's now wider obligations.

OPR provides the DCC with the largest financial incentive of all the schemes we are subject to. Over the coming year, the DCC will need to build on the work it has already carried out and engage with Ofgem's review to ensure good outcomes for the organisation and a regime that delivers what our customers want. Ofgem is proposing to consult in spring 2020 before taking a decision later in the year to enable implementation of a new regime from 1 April 2021. This will require modifications to the SEC and changes to the licence, both of which will need significant input from the DCC.

5.4.4 Assessment criteria to determine business development objectives

Using good governance, clear decision-making points and a sound assessment prioritisation process will ensure our development is enabled fairly and our costs and incurred economically and efficiently. We identify below our high-level criteria on which we assess our development priorities.

- **Impact on live service** – how might the activity impact on our core services or our ability to deliver them?
- **Customer value** – does the activity create value for our customers, through direct cost savings and efficiency or reduced charging through new or diversified services?
- **Targeted intervention** – how does the activity align with our business development priorities? Do we have a sufficiently balanced portfolio to achieve our aims?
- **Value add proposition** – is the activity appropriate for a licensed monopoly, could the market deliver it better? Is it permissible under the regulatory framework?
- **Industry demand** – is there interest from SEC Parties; does it meet a need?
- **Feasibility** – is the desire outcome achievable; can we make it happen?

Subject to the scale of the initiative we undertake a cost-benefit analysis taking into account the costs to the energy industry, an assessment of the potential impact on core DCC Services and, where there is a decision to take forward the initiative, an investment case for the work required during initial development phases.

We continue to ensure these criteria remain valid and appropriate. As identified within section 5.3 of the plan, the DCC has started to consider how it can enable innovation in line with our licence objectives. We will develop a business case for this activity and engage fully with industry as part of our planning and seek to re-visit our assessment criteria, as necessary, in conjunction with this activity.

Our priorities remain the delivery of core services and Smart Energy Code Modifications for our customer base.

In relation to the latter, we have sought to establish, with SECAS, guiding principles for prioritisation of modifications – to reflect differing industry and business benefit across proposed change and the capacity constraints that exist across our Service Providers. It is important to note that prioritisation of modifications sits fully outside the DCC's remit and is governed by industry through the appropriate channels.

6. Network utilisation and capacity planning

We report regularly on the performance of our products and services through a variety of different channels including monthly, quarterly and annual performance reports – all of which will be available from our Technical Operational Centre. In the context of our development plans over the next five years, the following snapshots summarise the current condition of the system – and assess its future capacity.

Volume of installed smart meters

Smart meter installations grew ten-fold over the course of 2019 and as of March 2020 over 4 million smart meters are commissioned on the DCC's network. Figure 7 below shows the total number of commissioned devices by type between January 2019 and March 2020..

Network coverage

Communication Services Providers are approaching maximum contracted Smart Meter Wide Area Network (SMWAN) coverage levels across Great Britain. We have targeted our Communication Services Providers to have delivered the maximum contracted coverage levels of at least 99.5% in the North Region and at least 99.25% in the Central and South Regions by the end of 2020: see Figure 8 below.

Figure 7 – Installations have grown 10 fold in the last year

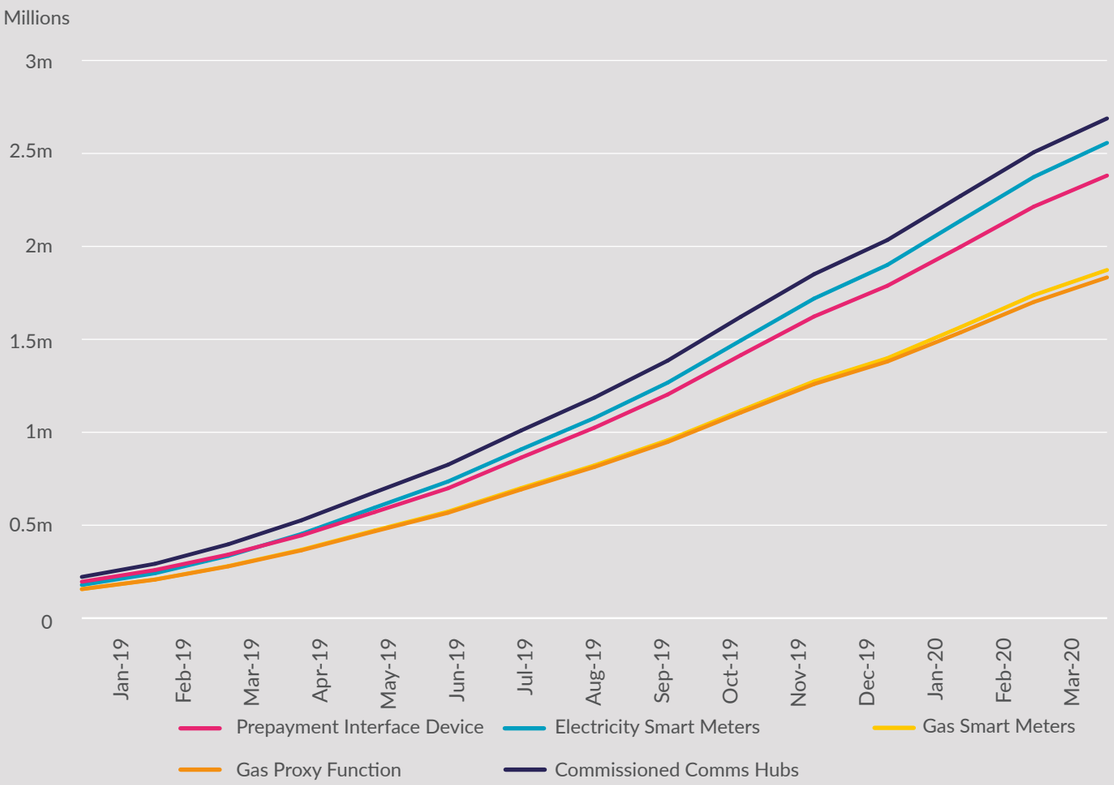


Figure 8– Communications service providers are approaching maximum converage levels across the UK

CSP South

Date Due	Percentage of Properties Covered	Delivered
01/01/2018	97.75%	✓
01/01/2019	97.75%	✓
01/01/2020	97.75%	✓
01/01/2021	99.25%	✓

CSP Central

Date Due	Percentage of Properties Covered	Delivered
01/01/2018	97.75%	✓
01/01/2019	97.75%	✓
01/01/2020	97.75%	✓
01/01/2021	99.25%	

CSP North

Date Due	Percentage of Properties Covered	Delivered
01/12/2018	99.25%	✓
01/07/2019	99.35%	✓
01/01/2020	99.40%	✓
01/06/2020	99.50%	

Historic incident levels

The number of incidents per Communications Hub has reduced and stabilised over time: see Figure 9 below.

The spikes in incidents were caused by the introduction of new functionality on the Self-Service Interface (SSI) and by system limitations that counted several interactions on the same incident individually. The team continues to make it a priority to reduce the number of genuine incidents. The downward curve of incidents per installation demonstrates the extensive service improvements that the the DCC has delivered this year to improve processes while also working with customers to reduce the number of post-commissioning obligation failures. We continue to engage with service providers and device manufacturers to reduce incident volumes even further.

Alert Incident types Volumes

As the SMETS2 platform scaled up, it became clear that the number of alerts generated was significantly higher than was anticipated and referenced in the Invitation to Submit Final Tender (ISFT) document. After careful analysis, we determined that there were several distinct groups of alert types: customer behaviour, meter issues, pre-payment interface device (PPMID) issues, Comms Hub issues and most commonly, interoperability issues between meter, PPMID and Comms Hub variants.

Through 2019 and 2020, the DCC has worked through all of these issues and has taken action to reduce significantly the volume of alerts. We have also increased the scale of the DSP solution in order to manage this higher-than-anticipated volume of alerts. We have shared the results of these activities on a monthly basis with industry, both directly on a one-to-one basis and more broadly through SECOPS. Key actions include direct liaison with customers to inform and agree remediation plans, to work with DCC suppliers to both fix issues and mitigate impacts and to work collaboratively with customers and meter manufacturers to analyse and mitigate interoperability issues.

This work has been successful in driving positive collaboration across multiple parties and delivering reduced system demand through effective alert reduction and pro-active scaling: see figure 10 below. As we move into increased migrations of SMETS1 meters, we are applying the same approach to both reporting progress and working with our customers and external suppliers to mitigate risks.

Test Lab capacity

The DCC's 1,200-meter test lab facility at Brabazon House in Manchester provides flexible and modular space to support our customers' testing requirements. It can scale up by 40% if needed. In our test labs we aim to develop a clear understanding of usage profiles, for example for future releases, firmware upgrades and new device types. Our customers and Other Users are also able to use these facilities as experimentation environments for their respective innovations.

Forecasting of core communication and connectivity capacity

The DCC performs regular capacity planning in order to meet service users' business needs and to anticipate demand from potential new requirements.

Figure 9 – The DCC has elimated incident double counts and made significant progress on improving service quality over the last 12 months

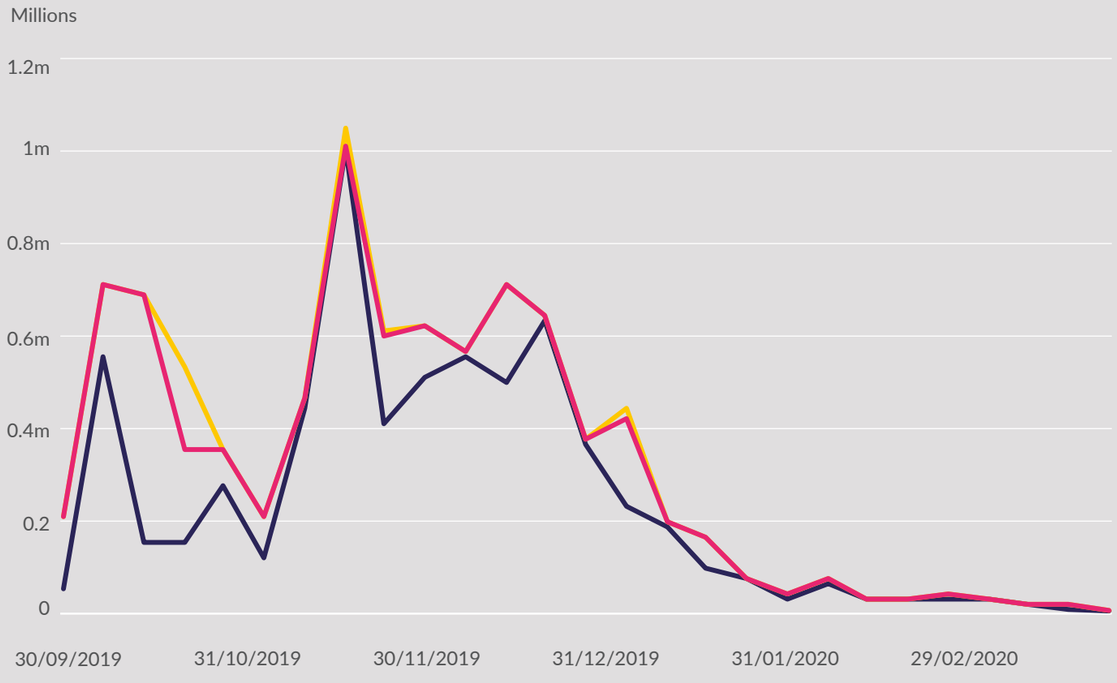


Figure 10 – The DCC has introduced proactive alert management in May 2020, dramatically reducing alert levels to industry from legacy meters

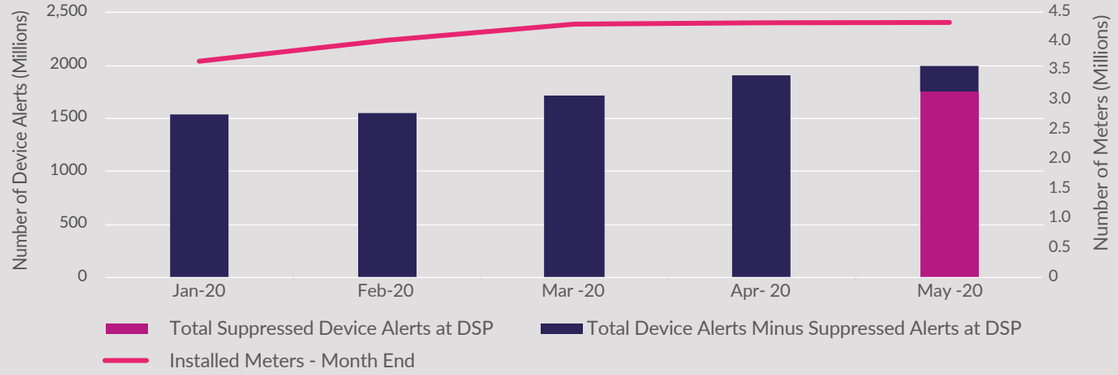
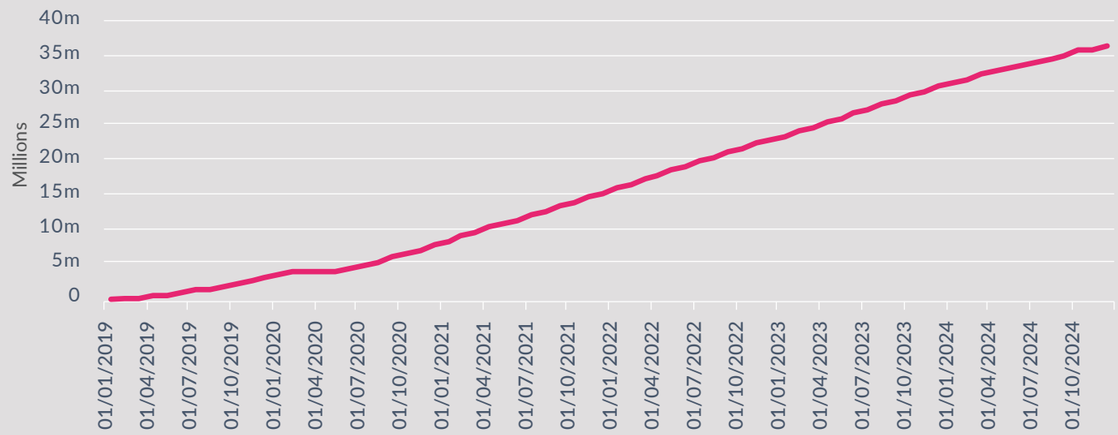


Figure 11 – SMETS2 cumulative smart meter volumes (as of May 2020)



The DCC monitors and models service traffic, service performance, service utilisation and the supporting infrastructure. We engage with our partners to build strategic plans that address the future requirements of the service and enhance its resilience and agility as it scales.

All devices generate service request messages, which our customers forecast quarterly for the following 8 months. We combine these with operational insights in order to create a long-term aggregate forecast of traffic through the communications infrastructure. We are also working with our customers to understand their needs for value-added services and any new services that would re-use our network.

We use performance information, forecasts and customer insights to ensure we can scale our network, systems and service centre in line with demand.

Impact of COVID-19

In the wake of the COVID-19 pandemic, installation volumes decreased by 95% during the nationwide lockdown as non-essential visits were halted. A return to pre-lockdown volumes has begun, but is likely to take many months, with meter installations across 2020 expected to be significantly below 2019 levels.

While the nationwide lock-down has led to a temporary pause in the number of meters being installed and growth of network traffic has slowed accordingly, the DCC is ready to accommodate growth post-COVID-19.

The following projections were created prior to the COVID-19 outbreak.

Forecast of SMETS2 volumes and service requests

In line with meter volumes forecast to grow (see Figure 10 on the previous page for SMETS2 projections), we also expect growth in service requests. Current service request forecasts are below available capacity: see Figure 12 below. The DCC monitors the volume of service requests and has the ability to adjust service capacity to respond to different forecast scenarios.

The term “Service request” refers to a command that is sent to a device from a service user. Figure 12 shows how the current volume of service request messages compares against the maximum contracted capacity profile for the Communications Service, also referred to as “ISFT5 Profile 5” (Invitation to Submit Final Tender 5; the largest predicted volume of service requests that service providers bid against).

Service centre capacity

Our capacity planning for the service centre is based on demand forecasting and predictive analytics. Figure 13 below provides our projections for service centre resourcing in the context of growing levels of demand and complexity of issues.

The relationship between meters and full-time employees (FTEs) is not linear, as the number of incidents requiring human interaction is expected to fall as the DCC’s technology matures. Since December 2019 the team has implemented various process improvements which equate to a saving of 8 FTE. The DCC also provides customers with a range of tools to promote self-service.

We strive to find the correct balance between staffing levels and demand, constantly looking for ways to improve self-service options

Figure 12 – The DCC Proactively manages service request capacity to stay ahead of forecast demand

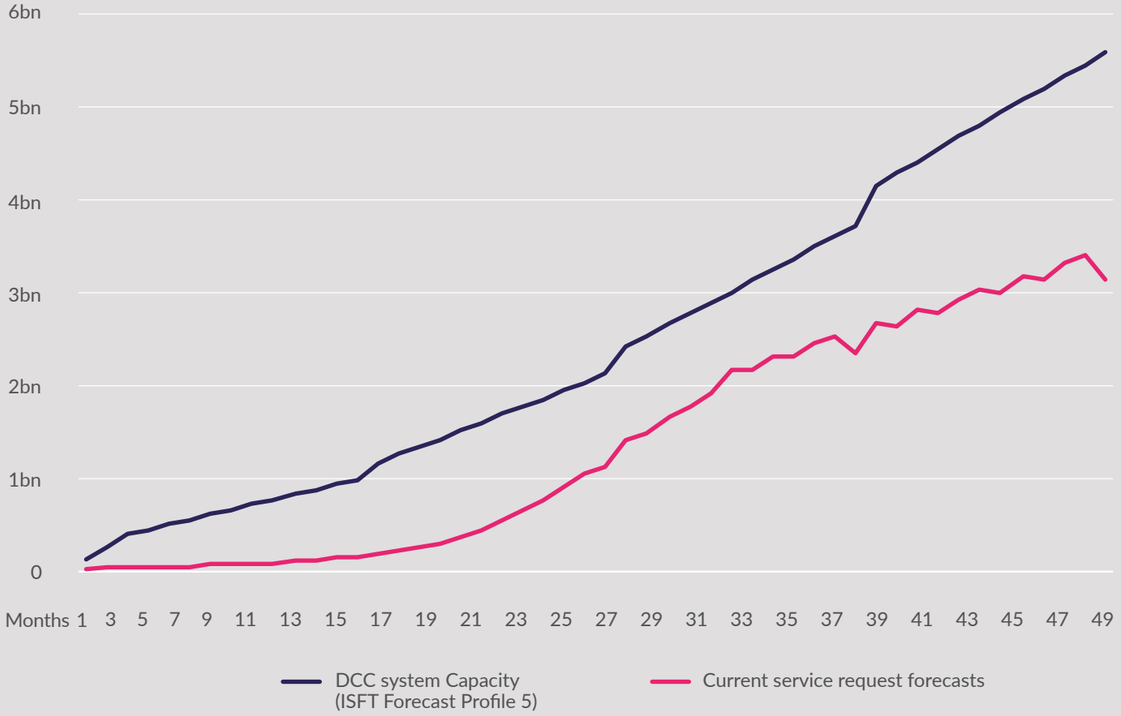
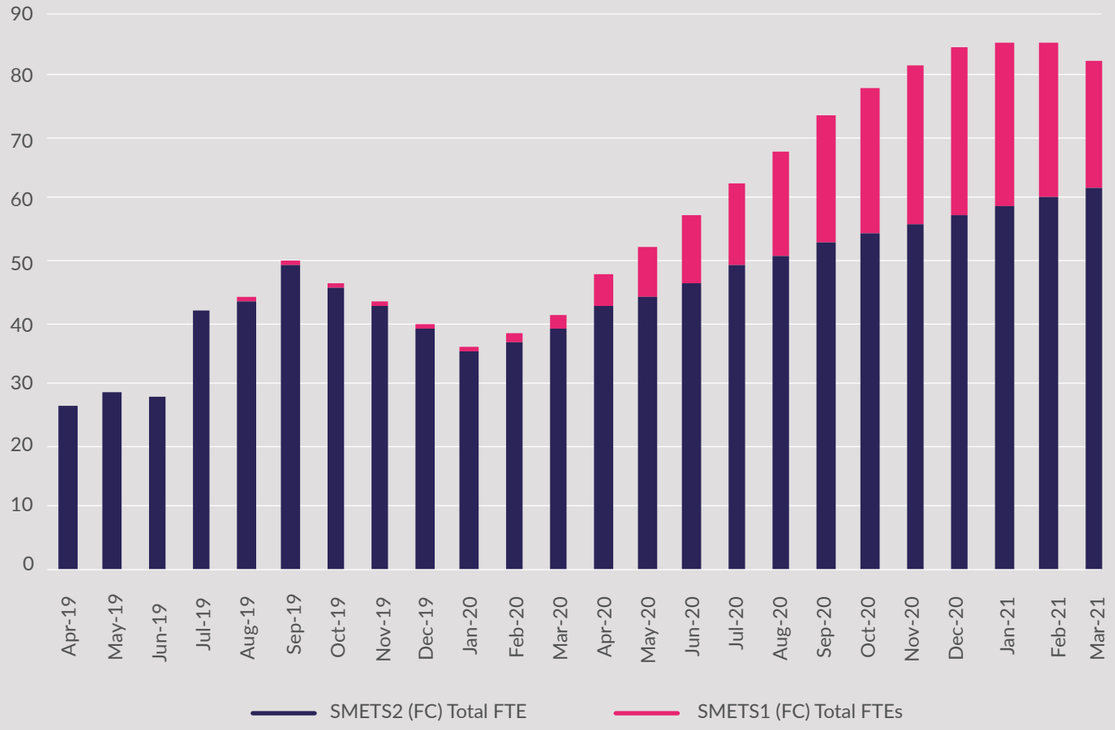


Figure 13 – The DCC carefully plans service centre staffing to meet forecast demand



7. Financial summary

Introduction and background

This section sets out the DCC's financial summary for the next five years, RY2020/21 to RY2024/25, in accordance with the Charging Statement and indicative budget published in April 2020.

The impact of the COVID-19 pandemic has not been factored into these numbers. As meter installation rates slow down, we anticipate cost forecasts to change. We are carefully monitoring the situation and any impact it may have.

We continue to follow our key principles, which are to:

- Challenge costs with Service Providers, ensuring rigorous and robust processes and ensuring strong internal controls
- Be as clear and transparent as possible
- Reduce the volatility of cost movements by forecasting as accurately as possible
- Identify cost savings at every possible opportunity, such as refinancing and internal resource profile
- Only spend money where appropriate and beneficial to our customers.

There are many ways in which we engage on budgets throughout the year.

- The financial summary below is correct as of 7th April. We update our forecasts every quarter. We engage with customers on Finance via webinars and face to face meetings. More detail on our finance engagement plan and budgets is available on the DCC website: www.smartdcc.co.uk/customer-hub/charges
- Through the Price Control process, we engage with customers and stakeholders, who also have the opportunity to comment on Ofgem's review of the DCC's costs
- Engagement on business cases for individual initiatives

41 https://www.smartdcc.co.uk/document-centre/charging-methodology-statements-budgets/ (for 21/22 to 23/24 only)

The DCC's financial framework

The DCC operates under the Smart Meter Communication Licence ('the Licence'). At a high level, the Licence sets out what the DCC should deliver and how it should spend and then recover the funds necessary to deliver those services. The DCC passes all of its costs through to energy suppliers and networks through the DCC Service Charges.

Due to the DCC's licence, we are subject to an annual regulatory price control assessment, which is carried out by Ofgem. As part of this assessment, Ofgem scrutinises all of the DCC's costs to ensure they are economic and efficient. If any costs are found to be unacceptable, Ofgem will direct the DCC to return this amount back to its customers through lower future charges.

The DCC fixes charges for one year at a time, and these are usually refreshed in April each year. To allow its customers to plan adequately, the DCC makes revenue forecasts available to its customers regularly throughout the year in the quarterly indicative Charging Statement and budget publications. the DCC also hosts regular finance updates for customers where our finance team explains any movements in the forecast from quarter to quarter. In December of each year the revenue is set and converted to indicative charges which then take effect from the following April.

Our finance team operates a finance business partnering model. This enables the team to be close to the detail of the business, to better understand cost drivers and influence the business, and this model is working very well. In addition, we continue to enhance our supplier management function in order to strengthen commercial negotiations and achieve maximum value for money.

As part of the continuous improvements we make in relation to forecasting, we keep all risks and opportunities under review – this is discussed in more detail below. This activity is challenging due to the uncertainty we continue to face particularly in relation to new programmes, which are often subject to external governance, specification and decision-making. We also face general challenges as we forecast the cost and activity of 'first of its kind' programmes of work that have never been undertaken before.

The DCC cost types

Internal costs

The DCC's Internal Costs relate to resources, IT and other costs which are described in more detail below. Also included within Internal Costs are the costs associated with External Service Providers which do not provide Fundamental Service Capability. For example, this includes the SMKI service, Parse and Correlate, service desk, billing platform and business intelligence and management information systems.

External costs

External Costs are the costs associated with the Fundamental Service Capability. They relate to costs included in the original base contracts (as procured by Government before the DCC licence award) plus any subsequent changes that have been, or are expected to be, agreed with each of the CSPs and DSP (which may include future enhancements to the the DCC service). It also includes new Fundamental Service Capability procured for SMETS1 and the Switching Programme. We often refer to the providers of Fundamental Service Capability as Fundamental Service Providers (FSPs).

Other costs

We use the category of 'other costs' to describe a range of other costs and adjustments also included in our forecasts. These are generally costs that are different in nature to Internal and External Costs, are adjustments and/or are beyond our control. These costs are described in more detail below.

Communications Hubs

The costs of Communications Hubs (CH) devices that are forecast to be delivered to customers in each regulatory year are captured in this category. These costs relate to the maintenance, leasing and financing of CH assets. The profile of CH device costs is based on the latest available volume forecast that is received from customers each quarter.

42 https://www.smartdcc.co.uk/document-centre/charging-methodology-statements-budgets/

The DCC total cost summary

The DCC forecast summary from RY2020/21 to RY2024/25 is shown below in Table 1.

Total DCC costs	RY2020/21	RY2021/22	RY2022/23	RY2023/24	RY 2024/25
Internal Costs	96.7	89.6	79.7	73.8	70.2
External Costs	453.9	358.2	303.5	293.9	292.3
AltHANCo	25.7	24.0	16.4	16.5	15.1
Other costs	41.6	38.9	37.1	33.3	33.3
Sub total	618.0	510.7	436.7	417.5	410.9
Communications Hubs	41.4	59.4	90.6	127.3	171.9
Explicit Charge items	3.5	8.6	22.7	32.5	35.0
Total	**662.9**	**578.7**	**550.0**	**577.3**	**617.8**

Table 1 – the DCC forecast summary (£m)

The total cost forecast for RY2020/21 is £662.9m, which is £0.2m higher than the Estimated Allowed Revenue number reported in the RY20/21 charging statement published on 31 March 2020. The £0.2m difference reflects the Alt Han correction factor, which reduces the amount to be recovered from customers through charges. The cost forecast for RY2021/22 – RY2023/24 of £578.7m, £550.0m and £577.3m respectively is equivalent to the Estimated Allowed Revenue as stated in the indicative budget published on 7 April 2020.

The majority of the DCC's costs are External Costs. Internal Costs represent around 15% of the total forecast costs for RY2020/21.

The projected volume of CH orders is due to increase significantly over this time period as installation of SMETS2 meters continues to ramp up.

Table 2 summarises the DCC's forecast costs across the three key DCC programmes.

Total DCC costs	RY2020/21	RY2021/22	RY2022/23	RY2023/24	RY2024/25
SMETS2	390.1	337.1	306.5	294.3	289.9
SMETS1	127.4	97.8	73.1	69.5	69.0
Switching	33.2	12.8	3.5	4.0	3.7
Other costs	67.3	63.0	53.5	49.8	48.4
Sub total	**618.0**	**510.7**	**436.7**	**417.5**	**410.9**

Table 2 – the DCC forecast by programme (£m)

43 We anticipate that switching programme costs after go-live will be recovered by RECCo, however we have included these costs here for completeness.

This breakdown is illustrated in Chart 1 below and is described in more detail in the two sections below.

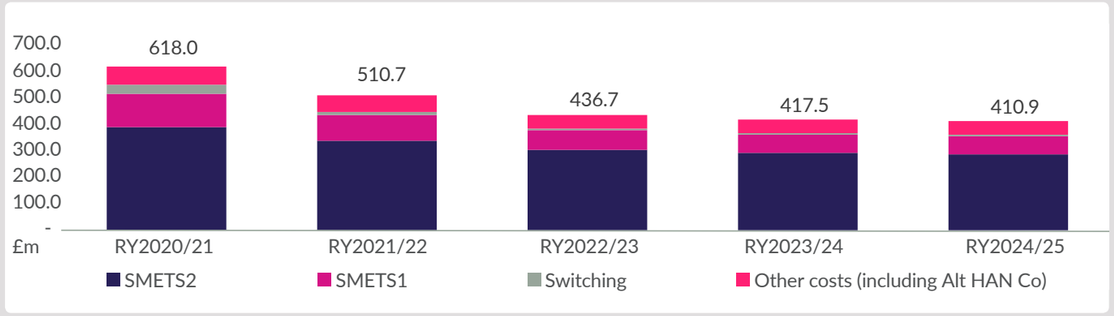


Chart 1 – the DCC forecast by programme (£m)

The DCC forecasts on the next page for RY2020/21 to RY2024/25

Year on year movements

Chart 2 sets out the movement in the DCC forecast from RY2020/21 to RY2024/25 based on the 'charges view'.

The total cost forecast for RY2021/22 is £84m lower than RY2020/21. This variance is explained as follows:

- External Costs are £96m lower due to the majority of SMETS1 and Switching setup costs occurring in RY2020/21. In addition, mid-way through RY2020/21 the end of historical DSP setup costs that have been financed are paid off
- Internal costs £7m lower as SMETS1 and Switching activity reduces and the cost challenge increases
- Other costs are £4m lower, largely due to lower Alt Han costs and Margin awarded to the DCC
- CH costs are £18m higher due to the larger volume of CHs expected to be enrolled and a full year of costs for those that were enrolled part way through RY2020/21
- Explicit Charges are £5m higher largely due to Alt HAN Explicit charges.

The total cost forecast for RY2022/23 is £29m lower than RY2021/22. This variance is explained as follows:

- External Costs are lower by £55m, this is largely as no setup costs are expected for SMETS1 and Switching. As explained above, mid-way through RY2021/22 financing for historical DSP setup costs come to an end, resulting in RY22/23 being the first full year without these costs
- Internal costs reduce by £10m as the headcount decreases and challenge increases
- Other costs decrease by £9m largely due Alt HAN costs
- CH costs are £31m higher due to incurring a full year of costs for those that were enrolled part way through RY2021/22
- Explicit Charges are £14m higher largely due to Alt HAN.

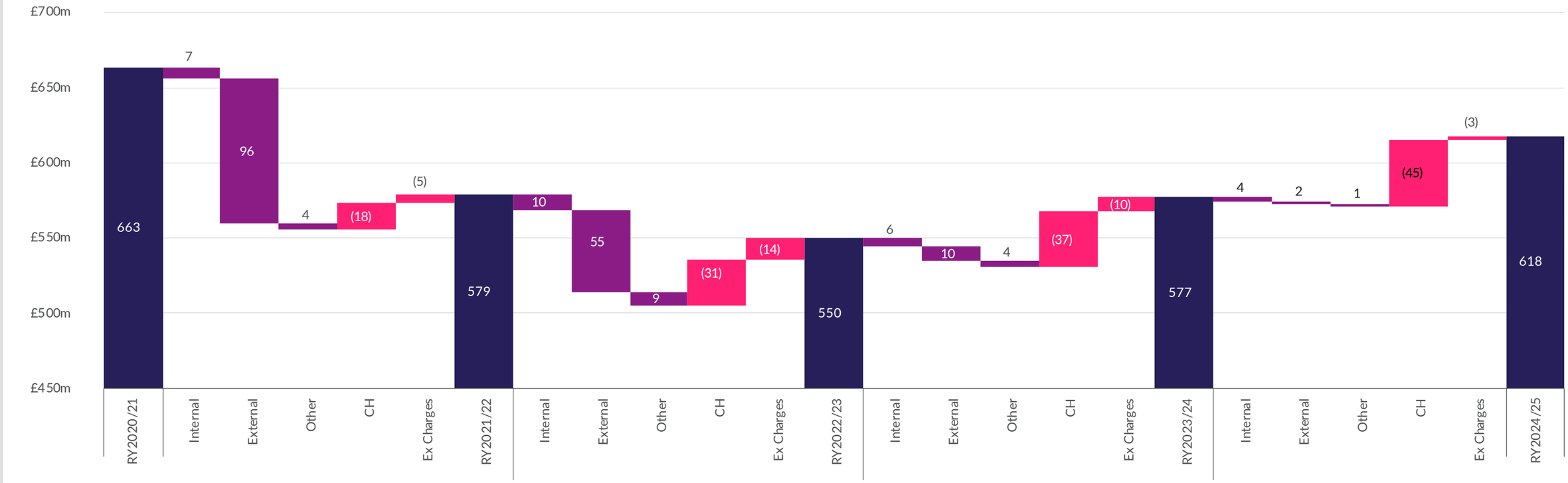


Chart 2 – the DCC forecast waterfall by key cost drivers (RY2020/21-RY2023/24)

The total cost forecast RY2023/24 is £27m higher than RY2022/23. This variance is explained as follows:

- Lower External Costs by £10m as a number of Programme costs decrease slightly, such as SMETS1 and Half Hourly Settlements
- Lower Internal costs by £6m as headcount decreases and challenge increases
- Lower Other costs by £4m due to Alt HAN costs and lower margin costs
- CH costs are £37m higher due to incurring a full year of costs for those that were enrolled part way through RY2022/23
- Explicit Charges are £10m higher largely due to Alt HAN Explicit charges.

The total cost forecast for RY2024/25 is £41m higher than RY2023/24. This variance is driven by CH costs being £45m higher due to incurring a full year of costs for those that were enrolled part way through RY2023/24.

Internal Costs

Internal Costs	RY2020/21	RY2021/22	RY2022/23	RY2023/24	RY2024/25
SMETS2	84.3	82.5	76.1	69.9	66.8
SMETS1	6.7	3.3	2.2	2.2	1.9
Switching	5.7	3.8	1.4	1.7	1.4
Total Internal Costs	**96.7**	**89.6**	**79.7**	**73.8**	**70.2**

Table 3 – Internal Cost forecast by programme (£m)

Table 3 sets out the Internal cost profile by programme from RY2020/21 to RY2024/25. SMETS2 Internal costs are forecast to reduce over the period as efficiencies are realised.

SMETS1 and Switching costs reduce as programme activity comes to an end and we enter an operation-only phase.

Internal Costs	RY2020/21	RY2021/22	RY2022/23	RY2023/24	RY2024/25
SMETS2	84.3	82.5	76.1	69.9	66.8
SMETS1	6.7	3.3	2.2	2.2	1.9
Switching	5.7	3.8	1.4	1.7	1.4
Total Internal Costs	**96.7**	**89.6**	**79.7**	**73.8**	**70.2**

Table 4 – Internal Costs forecast by sub-category (£m)

Resource costs reduce from RY2020/21 to RY2024/25 as the SMETS1 and Switching activity reduces. In addition, the DCC has included resource efficiencies.

Non-Resource costs reduce as SMETS1 and Switching activity enters into an operation-only phase.

External Costs

Table 5 below sets out the External Cost forecast by programme.

External Costs	RY2020/21	RY2021/22	RY2022/23	RY2023/24	RY2024/25
SMETS2	305.8	254.6	230.5	224.4	223.0
SMETS1	120.6	94.6	70.9	67.3	67.0
Switching	27.5	9.0	2.1	2.3	2.3
Total External Costs	**453.9**	**358.2**	**303.5**	**293.9**	**292.3**

Table 5 – External Cost forecast by programme (£m)

- SMETS2 costs reduce year on year between RY2020/21 to RY2024/25 as a result of the assumption that we will have paid off all DSP financed set-up and release costs by October 2021.
- SMETS1 costs reduce each year between RY2020/21 to RY2024/25 as set-up costs reduce.
- Switching costs reduce each year between RY2020/21 to RY2024/25 as set-up costs reduce.

External Costs	RY2020/21	RY2021/22	RY2022/23	RY2023/24	RY2024/25
Set-up costs	291.9	184.3	141.4	136.5	133.0
Fixed operational costs	152.2	164.9	155.0	150.8	152.7
Performance incentives	9.2	7.0	5.6	5.1	5.1
Impact assessments/projects	0.6	2.1	1.5	1.5	1.5
Catalogue services	–	–	–	–	–
Total External Costs	**453.9**	**358.2**	**303.5**	**293.9**	**292.3**

Table 6 – External Cost forecast by sub-category (£m)

Table 6 sets out a breakdown of External Costs by its key sub-categories. We explain each category below.

Set-up costs

External set-up costs relate to the design, build, test and implementation of systems, infrastructure and processes. The cost profile for these activities reflects the original DSP and CSP contracts under which live operation was set to commence in October 2015 as well as contract changes since they were awarded in 2013. It also includes the development costs associated with the SMETS1 and Switching programmes. Generally, the payments of these costs are aligned to specific milestones agreed with each Fundamental Service Provider (FSP) and are often financed over a period of time.

Set-up costs also include forecasts relating to change requests yet to be finalised and the cost of future releases. As these activities are finalised and authorised, the costs are re-profiled as necessary between set-up and fixed operational cost lines.

We include future release provisions which relate to the expected cost of new activities that are planned to be delivered through the enduring release delivery model over the coming years. For example, this might include SEC modifications.

Fixed operational costs

Fixed operational costs cover the ongoing operation and maintenance of the service. Over the period of the rollout, operational costs are set to increase as we support a growing number of meters and messages.

The temporary increase is due to the migration costs for the SMETS1 programme.

Other

There are also a number of other areas of External Costs. These include:

- Performance incentive payments which are payments that we would make to DSP and CSPs for achievement of key milestones in line with contracted terms
- Impact assessments and project costs to reimburse the FSPs for producing detailed resource breakdowns and activity plans for impending contract changes and for undertaking specific projects. We have included provision for impact assessments and projects based on the previous history of changes agreed and our current best estimate of the volume of change in future years
- Catalogue services are products and services that can be purchased from FSPs at an additional pre-defined cost. Many of these services are procured as and when customers request them and are usually recovered via Explicit Charges.

Other costs

Other costs	RY2020/21	RY2021/22	RY2022/23	RY2023/24	RY2024/25
Baseline Margin	8.5	8.5	7.3	3.4	3.2
External Contract Gain Share	5.9	3.2	2.6	2.7	2.9
Pass-Through Costs: SECCo	8.3	7.2	7.2	7.2	7.2
Prudent estimate	20.0	20.0	20.0	20.0	20.0
Other costs	(1.1)	–	–	–	–
Total other costs	**41.6**	**38.9**	**37.1**	**33.3**	**33.3**

Table 7 – Other cost forecast (£m)

Other costs are summarised in Table 7. These are generally costs that are different in nature to Internal and External Costs, are adjustments or are beyond the DCC's control. Each aspect is described below.

Baseline Margin (BM) and External Contract Gain Share (ECGS)

In RY2020/21, the amount of BM is £8.5m and ECGS is £5.9m – both values were determined by Ofgem in its final price control decision on RY2018/19 .

The Baseline Margin represents the amount paid to our parent company in relation to Smart DCC Ltd, the base values for which are set out in the licence. The values we forecast also include any incremental margin awarded by the regulator (which can include margin for new programmes such as the switching programme). All of the Baseline Margin is placed at risk under incentive regimes and so can be reduced by the regulator to reflect the DCC's performance against those incentives.

The ECGS is also paid to our parent company and reflects the DCC's share of negotiated External Cost savings made to date. These savings have been achieved by refinancing the set-up costs in the FSP contracts.

Pass-through Costs

Pass-through Costs consist of fees payable to Ofgem where the current assumption is that this will be nil for the foreseeable future; costs associated with SECCo Ltd which are consistent with the SECCo budget approved for consultation by the SEC Panel in December of each year; and AltHANCo costs which are consistent with the Alt HAN budget also approved in December each year (this value is set out in Table 1). We pass through these costs to the DCC's customers via the DCC charges. For RY2020/21 the DCC expects to recover £25.5m on behalf of AltHanCo, £8.3m on behalf of SECCo and nil on behalf of Ofgem.

Prudent estimate

We always seek to ensure that all costs we incur represent good value for money and are economic and efficient. However, as with most complex programmes, the development of the DCC service involves a level of emergent change which gives rise to elements of uncertainty and risk. Consequently, actual costs may vary from those anticipated in the Charging Statement.

While the DCC's approach to setting charges provides certainty to its customers, it does not provide the DCC with sufficient operating liquidity to ensure that it can meet its financial commitments in months when cash outflows exceed cash inflows. For this reason we recover an extra amount referred to as the prudent estimate.

The intent of the prudent estimate is to ensure that the DCC remains cash positive and meets its financial commitments throughout the year and, as far as is possible, that Service Charges do not need to change during the Regulatory Year. Generally, we estimate this value so that it is equivalent to approximately three weeks' operating liquidity in relation to Internal and External Costs – however we have taken the decision to cap this at £20m for RY2020/21 onwards.

The DCC charges revenue

The DCC costs are generally converted into five key charges categories, they are:

- The Fixed Charge – which recovers the Estimated National and Regional Fixed Revenue
- The Fixed CH Charge – which recovers the Communications Hubs Device Revenue
- The Fixed Alt HAN Charge – which recovers the Alt HAN Fixed Revenue
- Estimated Explicit Charges Revenue – which recovers costs associated with Explicit Charge items as and when they occur
- Estimated Elective Services Revenue – which recovers costs associated with Elective Services, of which none currently exist.

44 Ofgem, 27 February 2020, 'the DCC Price Control Decision: Regulatory Year 2018/19': https://www.ofgem.gov.uk/publications-and-updates/dcc-price-control-decision-regulatory-year-201819

45 This is set out separately as it is recovered from its own specific charge (Fixed Alt HAN Charge)

Further detail on the DCC charges is set out in the Charging Statement.

Most of the costs set out in this section reflect the profile in which the DCC will incur costs, rather than the profile in which the DCC recovers costs through charges. Whilst this information is broadly aligned with the latest indicative budget published on 7 April 2020, it does not include correction factor adjustments.

Table 8 shows how the costs described above are converted to revenue values which set the way in which we recover costs from our customers.

Total DCC charges	RY2020/21	RY2021/22	RY2022/23	RY2023/24	RY2024/25
Internal Costs	96.7	89.6	79.7	73.8	70.2
External Costs	429.8	337.5	291.6	282.3	281.0
SECCo	8.3	7.2	7.2	7.2	7.2
Baseline Margin	8.5	8.5	7.3	3.4	3.2
ECGS	5.9	3.2	2.6	2.7	2.9
Prudent estimate	20.0	20.0	20.0	20.0	20.0
Disallowed cost	(1.1)	–	–	–	–
Main correction factor	–	–	–	–	
Estimated Regional and Fixed Revenue	**568.2**	**466.0**	**408.5**	**389.3**	**384.4**
Total Communications Hub Fixed Revenue	**24.1**	**20.7**	**11.8**	**11.7**	**11.4**
Alt HAN costs	25.7	24.0	16.4	16.5	15.1
Alt HAN correction factor	(0.2)	–	–	–	
Estimated Alt HAN Fixed Revenue	**25.5**	**24.0**	**16.4**	**16.5**	**15.1**
Communications Hubs costs	41.4	59.4	90.6	127.3	171.9
Communications Hubs correction factor	–	–	–	–	
Estimated Communications Hubs Revenue	**41.4**	**59.4**	**90.6**	**127.3**	**171.9**
Estimated Fixed Revenue	**659.2**	**570.1**	**527.3**	**544.8**	**582.8**
Estimated Explicit Charges Revenue	3.5	8.6	22.7	32.5	35.0
Estimated Elective Services Revenue	–	–	–	–	
Estimated Allowed Revenue	**662.7**	**578.7**	**550.0**	**577.3**	**617.8**

Table 8 – the DCC forecast summary 'charges view' (£m)

Correction factor

When costs are converted to charges, we apply a correction factor. This is an adjustment to account for the over or under-recovery of charges for prior years. This is the difference between what the DCC has charged and the costs the DCC has incurred.

46 This is because the correction factor is a non-cash adjustment made to reflect over/under expenditure in previous years.

Interpreting our forecast

Managing risk

We continuously measure risks and opportunities, and we report on these regularly to our customers. We keep under review the extent to which the latest base forecast (this is the published forecast) might be affected by risks associated with the assumptions we have made. We also assess potential opportunities to incur less cost compared to those in the latest base forecast.

Risks	Opportunities
Network Evolution	Network Evolution
Alt HAN Co worst case budget	Alt HAN best case budget
Innovation	Innovation
SMETS1 EDMI build costs and increased meter volume	

Table 9 – Risk and opportunities

Network Evolution

This is considered both a risk and opportunity on the forecast given the uncertain nature of the placeholder costs included at the time of publication. DCC is in discussions with BEIS and in consultation with industry about the scope and delivery.

AltHAN Co

AltHAN Co provide a base forecast to DCC together with a low and high forecast. DCC reflects the base forecast in its Charging Statements, meaning there is both potential upside and downside on the base forecast presented.

Innovation

If DCC was to undertake activities on Innovation there would be both a risk (cost implication) and opportunity (profit shared with customers) in undertaking this. Any decision to include this in forecast charges to customers would be subject to business case.

SMETS1 EDMI build costs and increased meter volumes

At the time of the cost forecasts it was uncertain, and therefore a risk to the base forecast, as to whether DCC would be instructed by BEIS to migrate the EDMI meter cohorts. There is also a risk to cost forecasts should the number of SMETS1 meter installs exceed the volumes assumed within the base forecast.

Items not included in our forecast

Table 10 sets out the cost areas not included in the latest forecast and the supporting rationale.

Programme	Excluded cost area	Rationale
SMETS2	Catalogue services	A number of catalogue services are volume related, we have made a high-level assumption on the volume of these requests. We have excluded costs associated with large volumes of additional orders for catalogue items.
	Future GBCS changes beyond 3.1	Unknown cost forecasts
SMETS1	Costs directly incurred by our customers in interfacing with the DCC SMETS1 system	Any additional costs which may be directly incurred by our customers when interfacing with the DCC system, such as data migration. This was excluded as the costs were uncertain.
	Contingency	We have included no contingency
Switching	Contingency	The business case contingency is not included within the base numbers
Comms Hubs	Stock level charge (included within Estimated Explicit Charges Revenue)	Stock level charges are not included in Comms Hub revenue as these costs are included within the Estimated Explicit Charges Revenue.
General	Potential further increase in Alt HAN costs	Potential further increase in Alt HAN costs as per their worst case budget
	Any potential further ECGS or BM awarded in future years	We have only included External Contract Gain Share and incremental Baseline Margin that has been allowed by Ofgem. We have not included any cost in the forecast for potential future amounts.
	Costs or benefits associated with delivering Value Added Services	There are no current indications of the likely scope, timing or scale of potential Value Added Services.
	Any elective services	It is not yet clear if there will be any elective services, therefore this was excluded at this time.

Table 10 – Excluded cost areas