

LEARNING MADE EASY

Elexon Special Edition

# The Balancing and Settlement Code

for  
**dummies**<sup>®</sup>  
A Wiley Brand



Understand  
the BSC

Know the benefits  
of the BSC

Explore the future  
of the BSC

Brought to you  
by

**ELEXON**

Steve Kaelble and  
Elexon contributors

## About Elexon

Operating at the heart of the industry, Elexon is shaping the energy sector of the future. We manage the Balancing and Settlement Code, one of 11 major codes, setting out the rules so that Great Britain's energy system operates effectively.

We calculate the difference between how much electricity generators and suppliers said they would produce or consume with what actually happens each day. We calculate a price for these differences and ensure that generators and suppliers pay (or are paid) the right amounts of money. This is known as Settlement.

Altogether we manage around £2.5 billion in Settlement transactions per year. We also deliver Settlement services for the Government's Contracts for Difference and Capacity Market arrangements, which involves calculating, collecting and distributing funds of around £1 billion each year.

We are trusted, independent, reliable market experts. We are funded by our customers and provide our services without making profits.

We deliver an 'end-to-end' code manager service for the BSC. This includes helping new companies enter the market, ensuring Settlement accuracy, and managing changes to BSC rules to support initiatives to move to a smarter energy system. We also provide expert support to Government, Ofgem and industry.

Britain's energy sector is going through unprecedented change and the needs and demands of our customers and consumers are evolving. We are working to ensure that our systems and processes support the changes needed so that the energy sector plays a major part in helping to meet the UK Government's 'Net Zero' carbon emissions target.



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**by Steve Kaelble**  
**Plus Elexon Contributors**

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# Introduction

Who hasn't heard a lightbulb joke, or maybe a hundred of them? 'How many (*fill in the blank*) does it take to change a lightbulb?' There are countless variations, but the common thread is that installing a lightbulb is incredibly simple.

People take for granted the simplicity of many aspects of the electricity system. After all, electricity is nearly as reliable as the sunrise: it's there at the flick of a switch and pretty much any competent individual can change a lightbulb.

If you picked up this book, though, you probably already know that the electricity system is actually incredibly complex. In Great Britain, there is a competitive market, with a variety of suppliers to choose from. Many other companies perform different roles in the energy system to help gas and electricity reach end users. And eleven (yes, eleven!) major codes govern how the energy system operates.

One of those codes, known as the *Balancing and Settlement Code*, is key to making sure that consumers will see the light after they change the bulb and flick the switch. Known in short as the BSC, it's been around since the turn of the millennium, and it underpins the wholesale market in which power is generated, sold and purchased across the nation's electricity system. It's a contractual agreement signed by Parties that play a role in the electricity system. When we refer to Parties in this book, we mean companies such as suppliers and generators that have signed up to the BSC and agree to be bound by its terms.

The BSC sets the ground rules for an electricity system in which suppliers can purchase electricity from the generator of their choice, and consumers can choose which supplier provides them with power. The code takes into account the fact that contracts can be agreed between generators and suppliers in advance, but no one really knows precisely how much power will be generated or used until the moment it all plays out in real life.

Elexon's job is to compare how much electricity generators said they would produce and suppliers said they would consume, with the actual volumes that are generated and used. Elexon makes sure that everyone is paid or billed accurately for any differences.

These payments act as an incentive for suppliers and generators to help keep the electricity system in balance. That is important, as it means that National Grid, the electricity system operator, has to spend less money on taking last-minute actions to balance supply and demand.

Elexon provides an ‘end-to-end’ management service for the BSC. This means it offers a full range of services from helping companies to enter the market, to making sure that they’re meeting the rules of the BSC once they’re operating in it.

Elexon is an independent, not-for-profit organisation that serves as a ‘critical friend’ to market participants, providing advice and lots of technical support. Elexon is responsible for the systems that are needed to deliver services under the BSC, and it helps to develop changes to the code to reflect market developments and shifting regulations. It also supports the government and Ofgem (the energy regulator) in policy development and implementation.

## About This Book

*The Balancing and Settlement Code For Dummies*, Elexon Special Edition, is a primer with insights into the BSC and the arrangements that make it work. It describes the various components of the BSC, how the electricity system balances supply and demand, and how Britain’s Balancing Mechanism makes sure that energy is always there when the user needs it.

The book explains how the various Parties within the market forecast demand and contract for the power they’ll generate or use. You’ll learn about how they make bids and offers to balance out the peaks and troughs in demand, and what happens when actual usage doesn’t match what’s in the contracts. You’ll find out how Elexon stays on top of what works well in the BSC and what may need to change so that it works better. And you’ll see how Elexon’s expertise is helping the electricity sector to achieve ‘net-zero’ emissions targets and create the energy markets of tomorrow, enabling new technologies to emerge.

This book was written with insight from Elexon experts. It makes the complex just a bit easier to understand. It doesn’t have answers for absolutely every question you might have, which is why it’s a good thing Elexon’s tailored, expert assistance is easily available at [www.elexon.co.uk](http://www.elexon.co.uk).

Other sites that you may find useful are [www.nationalgrideso.com](http://www.nationalgrideso.com), [www.ofgem.gov.uk](http://www.ofgem.gov.uk) and [www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy](http://www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy).

## Foolish Assumptions

In creating this book, we make a few assumptions about you, the reader, so that we share the right information at the right level. Those assumptions are that:

- » You're involved in the wholesale electricity market, or you'd like to be in the foreseeable future.
- » You have a professional interest in learning more about how the market operates, and the rules and processes that underpin it.
- » You don't have all the time in the world to go into the microscopic details of the BSC, but you'd really appreciate a good overview.

## Icons Used in This Book

The idea here is to make it easy for you to find the information you want and need. Check out the margins and you'll see icons that help make that happen.



REMEMBER

You might not choose to read every single word on these pages. But try not to miss the words next to this icon.



TIP

This book is here to offer some pointers, including the tips right next to this icon.



TECHNICAL  
STUFF

The BSC is more complicated than changing a lightbulb, and you'll find some of the more technical details next to this icon.

In some places we capitalise the initial letters in certain words or terms like Party, Settlement, or Market-wide Half Hourly Settlement. That's because they are defined terms in the BSC.

# How This Book Is Organised

This book is divided into chapters exploring different aspects of the BSC:

- » **Chapter 1: Getting to Know the BSC** – A summary of who the code serves, an introduction to how balancing and Settlement works and how the code originated.
- » **Chapter 2: Delving Deeper into the Current and Future Electricity Market** – Understanding more about the Settlement process and how changes can be made to the BSC to support the evolution of the market.
- » **Chapter 3: Understanding Other Aspects of the BSC** – How the code, and Elexon, make the system work so that all Parties meet performance expectations. We also look at how changes to BSC rules are made.
- » **Chapter 4: Supporting Companies in the Electricity Market** – A look at how Elexon provides an end-to-end service and shares trusted expertise and information.
- » **Chapter 5: Evolving the BSC for the Future Energy Market** – How Elexon is working to digitalise BSC systems, expanding on the BSC's concepts. This chapter also looks at improvements to the process so that electricity Settlement is as accurate as possible, and how Elexon supports moves to a smarter energy system.
- » **Chapter 6: Charting the Future of the Energy Codes** – The case for reforming the energy codes to better support companies in the energy market.
- » **Chapter 7: Ten Key Takeaways about the Energy Sector** – Important points to remember as you finish reading.

## Where to Go from Here

Time to turn the page! Your journey could certainly start on the next page, or elsewhere in the book, depending on what you want to learn. If you're not in the mood to read cover-to-cover, that's fine. Just check the topic listing above and flip to the place that matches your interest. Wherever you turn, enjoy reading, and enjoy your journey towards a better understanding of the BSC!



- » Understanding who the BSC serves
- » Balancing and settling
- » Spelling out the arrangements

# Chapter 1

## Getting to Know the BSC

Life as a consumer can seem pretty simple. You go to the shop and pick up a container of milk. There may be different varieties and brands to choose from, and you also have a choice of which shop to buy from. But you don't have to think much about the process that got the milk from the cows on the farm to the container in your shopping basket.

Likewise, when you flick on the light switch in the kitchen, you barely give any thought to the complicated process through which electricity gets from a power station to your home, so that your fridge can keep the milk cold.

This chapter sheds a little light on that process, particularly the way different players in the electricity system contract with one another to get that power to you. It discusses the Balancing and Settlement Code (BSC) which makes sure that energy companies pay or collect the right amounts of money, how those calculations are made and how the industry works to get electricity to you.



REMEMBER

Suppliers agree contracts with generators to buy electricity to supply to their customers.

Other entities are involved in buying and selling of electricity too, known as *non-physical traders*. These organisations don't generate electricity, nor do they have customers to sell it to. For them, trading electricity is more of an investment proposition, and so

it's no surprise that banks are among the non-physical traders involved in this activity. Electricity is also available to buy from other sources such as operators of battery storage.

The BSC is an agreement that helps make all of this possible. It is a multi-party contract with rules and processes to make sure that payments for imbalances in wholesale electricity supply and demand are settled accurately. It is signed by the companies that operate in Great Britain's wholesale electricity market.

These include:

- » Generators that produce most of the electricity
- » Suppliers that sell electricity to most retail customers
- » Non-physical traders (as outlined earlier)
- » Electricity Distribution Network Operators (owners of local networks that take electricity from the high-voltage networks and transport it to homes and businesses)
- » Users of electricity interconnectors (wires that connect Britain to other European countries) that take part in the BSC to trade
- » Independent aggregators that act on behalf of consumers that want to offer 'demand-side response' to the electricity system (where homes and businesses agree to reduce or increase consumption in exchange for payments). Independent aggregators can now participate in the Balancing Mechanism by registering as Virtual Lead Parties (find out more about this in Chapter 5).
- » Third party companies including owners of the high voltage networks or companies that want access to market data

## Balancing and Settlement – What's It All About?

There are many different paths a container of milk might take on its way to a buyer's refrigerator. Any particular shop must forecast how much milk customers will want to buy on any given day, and obtain that milk from a supply chain that eventually leads as far back as the cows on a dairy farm. The system is most efficient when the shopkeeper's estimate is right on target.

As for the electricity that powers the refrigerator, there's just one set of wires connecting the premises to the electricity system, and the electricity arrives through those same wires regardless of who the supplier might be.

And while it's accepted that anything you want to buy in a particular shop might be in short supply at any given time, in the electricity market it's absolutely essential that electricity is always available whenever the customer demands it.

Like the shopkeeper selling milk, suppliers of electricity must forecast how much electricity their customers will require at any particular time.

Normally, they decide which generators to obtain that electricity from, and contract to buy a specific amount of electricity from a specific generator at a particular time. That's about where the similarities between milk and electricity end.

If the shopkeeper doesn't order enough milk to meet customer demand, the shop will run out and have no milk until the next delivery. If the shopkeeper orders too much, the milk will stay in the refrigerator until it's eventually sold (or goes sour).

Nobody wants to run out of electricity, and it can't be stored economically in a large-scale way yet either. Therefore, electricity supply and demand have to be balanced every half-hour of every day.

If demand from a supplier's customers is higher than the amount of electricity that the supplier has bought from generators, customers will still get the electricity they need.



REMEMBER

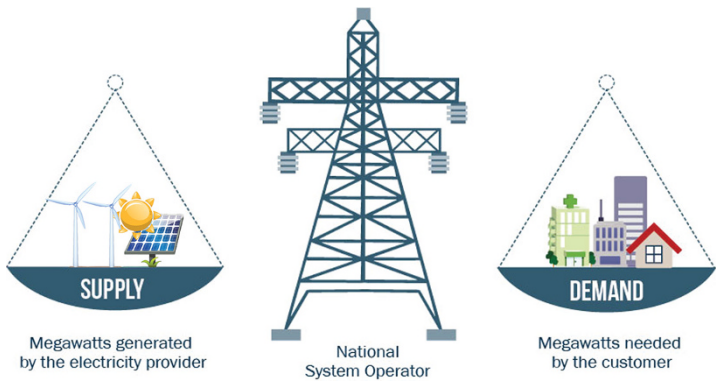
This is because National Grid Electricity System Operator (National Grid ESO for short) makes sure that the level of generation meets total demand from customers. If a generator is unable to produce the amount of electricity that it has contracted to produce for a supplier, National Grid ESO will call for another generator to step in to make up for the shortfall. Suppliers could also be asked to reduce their demand. So overall, National Grid ESO's job is to balance electricity supply and demand in real time.

Suppliers and generators are then billed later on for their part in creating any imbalances between supply and demand, and that is where the BSC comes in.



National Grid owns the high-voltage networks in England and Wales (known as *transmission networks*). They are like the motorways of the electricity system. SSE and Scottish Power own the transmission and lower-voltage electricity distribution networks in Northern and Southern Scotland respectively. A range of companies own the distribution networks in England and Wales. The lower-voltage grids are like the A and B roads and country lanes.

National Grid ESO is a legally separate company within the National Grid group, and it uses a sophisticated *Balancing Mechanism* to match supply and demand in each half-hour trading period of every day (See Figure 1-1).



**FIGURE 1-1:** National Grid Electricity System Operator manages supply and demand through the Balancing Mechanism.

For each half-hour period, National Grid ESO works out what the difference will be between the amount of electricity produced, and electricity demand. It may then accept a ‘bid’ or ‘offer’ to either increase or decrease generation, or demand to close any gaps and keep the system in balance. (We explain more about bids and offers in a moment.)



Exelon’s job as the BSC manager is to settle the score, so to speak. Exelon compares how much electricity generators and suppliers *said* they would produce, or contract for, with *actual* volumes that were produced and used. Exelon works out the prices for these differences and then makes sure that generators and suppliers either pay, or are paid, to settle any differences.

## Matching supply with demand

The electricity market measures usage in half-hour periods. For each half-hour of the day, suppliers forecast how much electricity their customers will need. They then buy that volume of electricity from generators to precisely cover each half-hour period of usage.

Once the contracts are arranged and the contract submission deadline has passed, everyone should keep to the contracts. Generators are expected to generate and deliver what the contracts say they will, and suppliers' customers are expected to use the amount of electricity that they said they would.



REMEMBER

It's not surprising that real life doesn't always work out quite as planned. For example:

- » Suppliers may have got their forecasts for the amount of electricity required wrong
- » Generators may not be able to deliver the amount they expected; for example, if there's a problem with their plant
- » There may be a difficulty in transporting electricity on the networks

National Grid ESO balances supply and demand in a number of ways, including the use of 'bids' and 'offers':

- » **Bids:** A generator can reduce the amount of electricity it produces if National Grid ESO asks it to, for a proposed price. Suppliers that can be flexible with how much electricity their consumers use can also increase their demand for a proposed price if asked by National Grid ESO.
- » **Offers:** This is where generators agree to produce more electricity than they were contracted to provide, or when suppliers agree to reduce demand from their customers. Again, these are in exchange for payments from National Grid ESO.



TECHNICAL  
STUFF

National Grid ESO has other tools for balancing supply and demand including *Frequency Control by Demand Management* and *Firm Frequency Response*. You can find more information on those here: [www.nationalgrideso.com/balancing-services/reserve-services/short-term-operating-reserve-stor](http://www.nationalgrideso.com/balancing-services/reserve-services/short-term-operating-reserve-stor), [www.nationalgrideso.com/balancing-services/frequency-response-services](http://www.nationalgrideso.com/balancing-services/frequency-response-services).

## Settling up

The whole process of contracting electricity happens in advance of the actual usage and is agreed for every half-hour period. Once each half-hour period has ended, the Settlement process begins.

Once the period is over, actual metered volumes are available. There are measurements for how much electricity each generator produced, and for how much each supplier's customers used. Metered volumes are the backbone of the Settlement process.

Elexon receives details of all of the contracted volumes for a particular half-hour. They show what the generators contracted to generate, and what the suppliers contracted to buy. Elexon adjusts for the various bids and offers that were accepted in the process of balancing supply and demand. The figures are compared with the actual volumes recorded by the meters for each half-hour. The difference between the actual volume and the contracted volume is called the *imbalance volume*.

Here are the various scenarios or imbalances that might emerge:

- »» A supplier's customers have used more electricity than the supplier had contracted for. So it must pay for more electricity to cover the imbalance.
- »» A supplier has contracted for more electricity than it used, so it will be paid for that additional electricity.
- »» A generator didn't produce as much electricity as it had contracted to do. So it must pay for the additional electricity to make up for the shortfall.
- »» A generator produced more power than it contracted for. So it will be paid for the extra power that was available (and possibly used by a supplier in the first scenario).



REMEMBER

Each of these different imbalances carries a price tag. It is Elexon's job to calculate the volumes of the imbalances and determine that price. This is known as the *imbalance price*.

As time passes, more data about how much electricity was produced and how much was used becomes available, as customer meters are read. (Chapter 2 explains how the Settlement process works in more detail.)

## Determining the imbalance price

The Settlement concept is simple enough – payments go back and forth to cover the actual volumes of electricity that don't match what was in the contracts agreed in advance by generators and suppliers. Making that happen is anything but simple, of course!

Elexon has to work out what the imbalance price is for each half-hour period so that it knows what the Settlement costs should be. In each Settlement Period, every imbalance is charged for, or paid at the same imbalance price.



TECHNICAL  
STUFF

The imbalance price reflects the wholesale electricity price during any half-hour (which, of course, varies depending on market factors). It is also impacted by the Balancing Mechanism bids and offers that National Grid ESO has selected in order to balance supply and demand on the transmission system.

Complex as it might sound, there's at least one fairly simple take-away. The cost of energy imbalances creates a financial incentive for generators and suppliers to be as accurate as possible when forecasting how much electricity they need to produce, and how much consumers are likely to use. The contracts that they agree should match those forecasts as much as possible.

## THE STORY OF THE BSC

The BSC was first introduced as part of the New Electricity Trading Arrangements, or NETA, which took effect in March 2001. These are the current rules for the wholesale electricity market in England and Wales. Prior to this was the Electricity Pool, which introduced a competitive electricity market in 1990.

Four years later, these arrangements were extended to cover Scotland and so the name changed to the British Electricity Trading and Transmission Arrangements, or BETTA.

The aim of NETA and BETTA was to have a more transparent and competitive wholesale market with clearer governance arrangements through Ofgem, the energy regulator.

Millions of consumers enjoy the benefits of the BSC, whether they're familiar with those three initials or not. The BSC helps to make sure that supply and demand on the electricity system are kept in balance, so that consumers receive reliable supplies.

- » How Settlement works to protect the industry and consumers
- » Supporting evolution of the market

# Chapter 2

## Delving Deeper into the Current and Future Electricity Market

If you read Chapter 1, you have a feel for who is impacted by the Balancing and Settlement Code, as well as an overview of the way it works. But the ultimate question always is, ‘why?’

In the case of the BSC, two key parts can help to answer that question. There’s the ‘right now’ part, which is how the BSC helps the energy markets to operate smoothly. By doing so it provides assurance to electricity companies that sign up to the code, and ultimately for electricity consumers.

The ‘for the future’ part has to do with how the BSC should adapt to support the evolution of market arrangements and the improvements they’ll bring to industry players and customers alike.

This chapter explores in more detail how electricity Settlement works and how the process protects the industry and consumers. It also provides a quick overview of the importance of looking ahead, anticipating changes that will be needed in the BSC, and laying the groundwork for evolution in market arrangements.



# How Does Electricity Settlement Work?

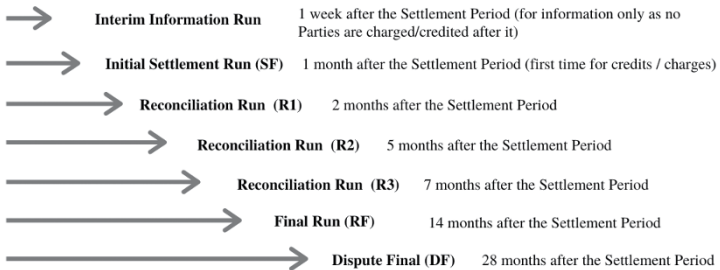
Chapter 1 talked briefly about how Settlement works. In this chapter we go into a bit more detail.

Each of the half-hour *Settlement Periods* are settled in isolation from all the other periods around them. Elexon processes meter readings to calculate the generator or supplier's imbalance position. This is simply done by comparing the metered volumes to the volumes in the contracts agreed between Parties for each half-hour Settlement Period.

Elexon then works out the imbalance prices for each Settlement Period, based on the cost National Grid ESO incurred for the balancing actions it took. Parties are paid (or charged) that price per volume of imbalance.

Electricity companies that are signed up to the BSC (known as Parties) are paid (or charged) through a series of six *Settlement Runs* – calculations carried out between one and 14 months after the Settlement Period (unless there is a dispute over data, in which case it is 28 months after). See Figure 2-1.

### Settlement Run Timetable



**FIGURE 2-1:** Settlement Runs.

Some customers (particularly larger consumers and power stations) know the impact it has on them quickly. This is because their volumes are recorded every half-hour (by meters which register consumption or generation in half-hour intervals) and are submitted into the Settlement process.

Many meters in households or smaller businesses are non half-hourly meters which can only record energy use over longer intervals. These meters are only read once or twice a year, so as time passes their actual volumes replace estimated volumes. As the Settlement Runs progress, the more accurate the picture becomes.



Elexon specifies the rules for all Metering Systems through metering Codes of Practice (CoP). It is responsible for compliance testing of these meters and assuring the communication protocols used to retrieve metered data.

A risk-based approach is used where the requirements, such as accuracy, become stricter the higher the volumes of energy being measured.

For a meter to be used for Half-Hourly Settlement it must be capable of meeting the requirements of the relevant CoPs and be able to provide information which can be downloaded and validated by a Half Hourly Data Collector (HHDC) or the Central Data Collection Agent (CDCA) so that data can be submitted into Settlement. A HHDC works on behalf of a supplier to retrieve, validate and process meter readings. The CDCA collects meter readings from sites connected directly to the transmission system, licensable generators connected to an electricity distribution system (one of the lower-voltage networks) and some license-exempt generators connected to a distribution system.

For Non Half Hourly Meters (for example, those used in many homes) it is up to the Registrant of the meter (for example, a Supplier) to be certain that the method for collecting data from it is suitable.

## Supporting the Evolution of Market Arrangements

Among its many important roles, Elexon works with industry participants to develop proposals to change BSC rules. This is critical for ensuring that BSC rules continue to evolve, to meet changing requirements and technologies, as well as mitigate concerns, issues or problems.

You can find a lot more detail about how that change happens in practice in Chapter 3. But in the meantime, it's worth considering some of the reasons why the code needs to be readily changeable.



REMEMBER

The bottom line is, it's essential to have the ability to adapt BSC rules, as they underpin the way the electricity sector is run. If the administration of the electricity markets gets stuck in the past, how could the industry accommodate new technology and business models?

Take, for example, the Government's commitment to 'net zero' emissions by 2050. That's key to combating climate change, which has enormous quality-of-life implications for every human being on the planet. Those aspects of decarbonising the economy that involve energy will require new business models and new technologies, along with changes to the rules to enable those developments.

Alternative generation models, such as solar panels at home, will almost certainly be part of that ultimate societal goal. So might peer-to-peer energy trading, as neighbours agree to share electricity that they generate. Advances in battery technology will make home electricity storage more feasible. Owners of electric vehicles will have a keen interest in how and when those vehicles are charged and at what cost.

That's just the beginning of the potential for change in the energy sector. There are plenty more changes on the way. Elexon, the energy regulator and the Government, are exploring whether retail market arrangements need to be changed to allow new types of energy service companies into the market, that look very different from the suppliers we know today. Read Chapter 5 for more details on changes like this.



REMEMBER

All of these advances are tremendous opportunities for the future, and all will have a significant impact on the way energy is traded and balanced. Experts at Elexon are always anticipating the way market arrangements might evolve, and how the rules will need to evolve to stay ahead.

Change of this type doesn't necessarily happen overnight (which is why people think of it in terms of *evolution*). Major reforms may

come with significant lead times, but it's never too early to start thinking about them. That's a key focus of Elexon expertise – how changes to the BSC both today and in the future can unlock benefits for consumers. That kind of thinking benefits suppliers and people with innovative ideas that they want to bring to the electricity market. Ultimately, changing the rules can make the system better for all consumers.

- » Credit cover
- » Delivering change to the BSC
- » Assuring performance and handling non-compliance
- » Reporting on the electricity system

## Chapter 3

# Understanding Other Aspects of the BSC

Chapter 1 went into detail about how the electricity market works in terms of contracting for generation, balancing supply and demand, and settling up the imbalances between what was planned in advance, and what actually happened. The BSC also spells out a lot of additional arrangements and processes so that the market operates smoothly.

This chapter discusses the collateral that Parties operating in the markets must put up to guard against any risk that they can't pay their bills for imbalance charges. It talks about how the BSC can be changed to fix problems and evolve with the times. It provides insights into mechanisms for ensuring that all Parties are performing as expected. And it spotlights the kind of market reporting that keeps everyone properly informed.

## Credit Cover

The electricity market moves at a fast pace. When it comes to imbalance Settlement, there's a new story to tell every half-hour of every single day. That's a lot of opportunities for the various market players to experience swings in cash flow. BSC Parties therefore need to maintain enough credit cover.



REMEMBER

*Credit cover* essentially refers to collateral that's lodged by BSC Parties to cover any payments that will be required to settle imbalances.

If any Party involved in the electricity market can't meet its imbalance charges for whatever reason – that is to say, if it defaults on the payments it owes – all of the other Parties may have to pick up that cost proportionally.

Credit cover is basically a security deposit that reduces the risk those other Parties (and their shareholders and customers) face. Credit cover can be arranged via cash deposited with Elexon, a letter of credit or an approved insurance product. If a Party defaults, the amount owed is recovered from that credit cover, so that the other Parties don't lose out.



TIP

Companies should put up funds roughly equivalent to a month's worth of their potential imbalance Settlement costs with a 25 per cent top up to act as additional headroom. This should be enough to cover all of the potential debts that could be run up during the time between when a debt is incurred and when payment is ultimately due.

How much credit cover are Parties required to put up? Actually, the precise amount is not specified or mandated, and a company can suffer consequences if it doesn't lodge enough. Elexon offers guidance on how to calculate the amount of credit cover required.

Under the BSC, that billing time frame is 29 days. Therefore, Parties are required to pay their imbalance Settlement no more than 29 days after the Settlement date (the date that the actual flow of electricity took place). This means that in most cases Parties get a new bill every day.

Imagine that a Party is required to pay an imbalance Settlement covering a flow of electricity that was measured on 1 June. That means the bill must be paid within 29 days, or by 30 June. Now, imagine that the Party on 30 June declares that it's not able to pay. By that point in time, 29 additional days of potential imbalances have occurred. That's why Parties should plan to put up enough collateral to cover their potential indebtedness for a 29-day period.



REMEMBER

There are other things to consider too. For example, how a Party's imbalance would be affected if there was a plant trip or system outage. Demand for electricity can also spike during an unexpected cold snap. That's why it's wise to prepare to put up more

credit cover at short notice for these events. The credit cover can be increased during business hours.

## Delivering Change to the BSC

The BSC dates back to about the beginning of the current millennium. It's not exactly new. But it's vital to note that the BSC is a living, breathing document, not something that was carved into stone, never to change.



REMEMBER

The people who wrote the BSC knew that it would need to evolve. For that reason, the BSC includes its own *change process*, so that it can react to any concerns or issues and be able to proactively change to meet future needs.

The change process allows for changes to be made to the BSC itself, its systems and its Code Subsidiary Documents (CSDs). Most changes are decided by Ofgem, unless they're not material in nature.

While the BSC provides high level rules for how balancing and Settlement is carried out, the CSDs provide additional detail on the obligations in the code. One of the most important types of CSDs are the BSC Procedures (BSCPs). The BSCPs define the relationships, timescales and interactions between electricity market participants. They also specify the information and other outputs to be exchanged between them, and the method for providing the information.

The process involves development of, and consultation on rule change proposals. These proposals are then referred to the independent BSC Panel, made up of industry experts and consumer representatives who vote on whether to approve or reject a proposal (or make a recommendation to Ofgem on whether the change should be approved). When making recommendations, Panel members have obligations to consider if the proposal better facilitates a number of objectives for the BSC, including efficient operation of the high voltage system and promoting effective competition.

The Panel also has a non-voting representative from Ofgem, National Grid ESO and the electricity distribution network operators.



REMEMBER

BSC Parties raise the majority of change proposals for the code, while Elexon raises the majority of changes to the CSDs.

Proposals have different progression routes depending on the complexity, urgency and nature of the change.

For example, housekeeping changes can follow an expedited process. Large, complex changes are assessed by work groups made up of industry experts before the proposals are brought before the Panel for a recommendation.

There are also different procedures that depend on whether or not the change will alter the legal text of the BSC itself, or the CSDs.



TECHNICAL  
STUFF

If the legal text needs to be revised, it's called a *Modification*. Otherwise, the term is a *Change Proposal*. Exelon cannot raise Modifications itself, but it does analyse issues and propose solutions, which can be adopted by a BSC Party and raised as a Modification. Exelon can raise Change Proposals, as these are more practical changes to BSC processes. Under the BSC arrangements, once a solution has been developed for a Modification, or a Change Proposal, Exelon must consult on it and assess the impact on BSC documents as well as systems and processes used by Exelon and the industry.

BSC Parties need to complete the Standard Modification Template if they're proposing changes that would alter any part of the legal text of the BSC. If the proposed change is approved, any related BSC systems or CSDs would be updated as well.

If a BSC Party has a problem but isn't sure what the solution should be, it can raise an *issue*. Exelon looks at the current arrangements and possible solutions, and then brings its findings to a group of industry experts for consideration.

If you're not a Party to the BSC and you have a change to propose, there's a process for that, too. Non-BSC Parties can encourage a BSC Party to raise a Modification or Change Proposal on their behalf. Or, they can apply to the BSC Panel as a third-party applicant to raise a Modification Proposal.

The Panel will decide whether or not to accept the request. If it does, the Modification Proposal can be raised and it will follow the usual process and timetable for a Proposal. If the Panel rejects the request, the third party is free to appeal that decision to Ofgem, which has powers to overturn it. Parties can appeal to Ofgem too, where they believe the Panel has wrongly designated a non-Party to raise a Modification.



# Assuring Performance and Handling Non-Compliance

As you can see, Settlement is a complex process and Elexon's job is to make sure that it is as accurate as possible for both electricity companies and consumers.

To achieve this, part of Elexon's role involves checking that all BSC Parties (and the agents that work for them) follow rules on accurate submission of data to the process. Elexon does this through the Performance Assurance Framework (PAF).

The PAF requires that:

- » Suppliers and supplier agents (that provide services such as installing and reading meters and processing meter data) must exchange data between each other efficiently and accurately
- » Volumes of generation and consumption and trading charges must be calculated and allocated correctly



TECHNICAL  
STUFF

Elexon carries out this Settlement assurance on behalf of the Performance Assurance Board (PAB) whose role is to oversee the assurance framework. The PAB is made up of industry experts. It is a sub-committee of the BSC Panel.

Elexon carries out a variety of performance assurance activities through the year, at the direction of the PAB, to assess and prioritise risks to Settlement. This includes confirming whether Parties are complying, and identifying any issues that need to be addressed.

The annual cycle for performance assurance activities begins with a methodology Elexon maintains for identifying and evaluating Settlement risks – held in the risk register. For example, one risk is that meters aren't registered correctly, or at all. This could result in errors in recording consumption, which leads to inaccurate Settlement.

Elexon drafts an operating plan for the PAB, which sets the risk mitigation priorities for the year. Elexon uses a set of *Performance Assurance Techniques (PATs)* to help mitigate these risks.

These techniques include reviewing performance data, auditing Parties against their obligations and requesting action by Parties to rectify issues. The PATs that are best suited to mitigate each risk are described in the operating plan.

These techniques are divided into four categories:

- » **Incentive:** Gives participants and their agents an added reason to comply with the BSC.
- » **Preventive:** Designed to stop risks manifesting in the first place.
- » **Detective:** Detective techniques, as the name suggests, allow Elexon to detect risks to Settlement and any non-compliance with the code.
- » **Remedial:** Remedial techniques are used to correct issues that occur once risks manifest.

PATs are applied to the Parties which could cause, or help control a risk. These performance assurance Parties are:

- » Suppliers
- » Meter Operator Agents (which install, commission, test and maintain meters)
- » Data Collectors (appointed by Suppliers to retrieve, validate and process metering data)
- » Data Aggregators (appointed by Suppliers to aggregate metering data received from Data Collectors)
- » Distribution Network Operators (owners of lower-voltage electricity networks)

Using the PATs, Elexon assesses whether there are any issues that might impact on the accuracy of the Settlement process, or result in a Party not sufficiently meeting its obligations under the BSC.

These obligations include sending data flows on consumption or generation and taking action to correct things. Corrections can come in the form of amending the data submitted to Settlement to fix errors. They can also involve a company needing to physically fix meters if they aren't registering electricity flows properly. The

test is whether any risk to Settlement will manifest in a significant way.

Ultimately, if a company is found in breach of the BSC it could be expelled from the code (or have its 'qualified' status removed if it's a Party agent) and not be able to operate. It could also have its license removed by Ofgem.

The results and findings of these PATs and how well they've mitigated the risks are reported to the PAB, with proposals for any further action. They're also summarised in the Annual Performance Assurance Report.



REMEMBER

The BSC Panel and the PAB produce a series of documents each year that identify the steps in the performance assurance process (and report on it):

- » **Risk Evaluation Methodology:** Known as the REM for short, this document sets out how the PAB identifies, evaluates and assesses the materiality of Settlement risks.
- » **Risk Evaluation Register:** RER for short, it describes the risks identified by the methodology. It sets out the root causes, available controls, affected Party types and a forecast financial impact for the coming year.
- » **Risk Operating Plan:** It describes how the PAB is prioritising the risks and the plan for how Elexon should deploy the PATs to mitigate them.
- » **Annual Performance Assurance Report:** This report outlines the results of the risk evaluation and risk assurance procedures for the BSC year.

## Reporting on the Electricity System

Elexon provides a wide variety of detailed information on the electricity market. As the electricity system becomes smarter, access to (and use of) this data is becoming ever more important.

The data Elexon provides includes information on the operation of the wholesale electricity market and trading arrangements.

Exelon uses a variety of channels to make the data available to BSC Parties and other market participants:

- » Data available at [www.exelon.co.uk](http://www.exelon.co.uk), including insight articles where Exelon staff draw attention to key trends.
- » Publicly available data provided through the Balancing Mechanism Reporting Service (BMRS) website ([www.bmreports.com](http://www.bmreports.com)). It includes up-to-the-minute information on the electricity system, and historic data.
- » Party-specific Settlement information available to companies via the Exelon Portal ([www.exelonportal.co.uk](http://www.exelonportal.co.uk)) or web service interfaces from Exelon IT applications.

The BMRS is a free online resource, which is the one-stop shop for operational data related to the electricity Balancing and Settlement arrangements.

The BMRS is used extensively by BSC Parties, traders, energy analysts and academics as a means to understand the dynamics of the electricity market.

The data is used to support trading decisions and help market participants understand balancing activities by National Grid ESO. It also provides real-time and forecast insights about generators' capacity.

The BMRS is also the Inside Information Platform (IIP) for Great Britain. This means that market participants use the BMRS as the reporting service for 'inside information' to comply with the EU's regulation on energy market integrity and transparency (REMIT for short). An example of what REMIT requires participants to disclose is information about planned or unplanned outages for electricity infrastructure. The BMRS therefore improves transparency of the wholesale market arrangements.

Other information on the BMRS includes fuel mix data, which can show real-time, forecast and historical generation information by fuel type (wind or nuclear for example) and generating plant.

Exelon also publishes indicative Settlement data such as market imbalance volume and imbalance prices. All data on the BMRS platform can be accessed via Exelon's Application Programming Interfaces (API) and through a real-time messaging system.

- » Serving from beginning to end
- » Providing trusted expertise and information

# Chapter 4

## Supporting Companies in the Electricity Market

The introduction mentioned that Elexon provides an ‘end-to-end’ management service for the BSC. In this chapter we explain what that means.

### Providing Trusted Expertise and Information

Elexon manages the operation of electricity Settlement and the process to change the BSC. It is an independent not-for-profit organisation serving as an unbiased ‘critical friend’ to market participants. Elexon also advises companies that want to enter the electricity market. This includes explaining their obligations to them under the BSC. For new entrants and innovators, Elexon can help them to understand how their particular business model can fit in with the existing rules.

In addition, Elexon’s role involves providing expert support advice and solutions to the Government and the energy regulator Ofgem on policy development and implementation. For example, Elexon is playing a key role in delivering reforms that support

development of electricity storage, new business models entering the market and the roll-out of smart meters.

These services are rated highly by market users (in fact, Elexon has achieved the highest net satisfaction rating among all of the energy code bodies for three years running (2017-19) in Ofgem's code administrators' performance survey).

Those entering the electricity market quickly recognise that Elexon exists for a whole lot more than just the BSC and Settlement. The organisation provides a wide range of expertise and information to help companies in the market to succeed.

## Meeting the OSMs

Elexon's Operational Support Managers (OSMs) provide dedicated, high quality customer support and guidance on BSC arrangements.

Each Supplier, Supplier Agent or Distribution Network Operator that signs onto the BSC is appointed a dedicated OSM who becomes their primary contact at Elexon.

The OSM is there for each of these companies to provide dedicated support and answer questions. OSMs also deliver regular, tailored reporting information and provide guidance to companies.



REMEMBER

The OSMs can help Parties understand what's expected of them with regard to compliance, but it's important to note that the responsibility for compliance rests with each BSC Party.

OSMs do not provide advice on business practices or commercial interactions, but can provide a wealth of detail on industry and Settlement processes.

Here's some of the information that BSC Parties can expect to receive from their OSM:

- » **Weekly performance reports for Suppliers:** These come out on Mondays and include a range of performance data relating to each Supplier. The OSM is available to review the reports as needed, to discuss how performance is progressing, what the market trends are and other topics.
- » **Monthly dashboards for Suppliers and Meter Operator Agents:** These include details of the company's performance

against Settlement risks identified by the Performance Assurance Board (PAB) (see Chapter 3 for an explanation of the PAB's role). Risks are colour-coded with red, amber or green marks.

» **Scheduled calls and visits:** OSMs typically schedule a catch-up call on a quarterly basis, and a face-to-face visit once or twice a year.

## Getting help from the OSM



REMEMBER

In addition to the services outlined above, the OSM is there to provide support during the BSC audit for those who are required to have one annually. The BSC audit is one of the Performance Assurance Techniques that Elexon and the Performance Assurance Board (PAB) use to make sure the companies are following the BSC processes properly, such as sending and processing the data in the right way and within the prescribed timescales.

Elexon contracts out this audit service and selects the companies to be audited based on a number of factors, including size, growth rate and performance against the other performance assurance techniques. The OSM notifies those who are subject to an audit and can participate in an audit planning meeting as needed.



TIP

All communications between the company being audited and the auditor should include a copy to the OSM. There's an audit closure meeting to wrap things up, and the OSM will participate in that too.

The OSM is also there to support Elexon's Error and Failure Resolution (EFR) team and the Parties that must enter EFR for underperformance. This might be if a Party isn't meeting the Settlement performance obligations, or the BSC audit identifies a process that isn't being carried out. OSMs monitor information to identify concerns at an early stage. They work closely with Parties, the EFR team and the PAB to address the issues.



REMEMBER

There are various reasons why Parties enter the EFR process including earning three consecutive red marks on a particular risk, as noted in the monthly dashboard (or the BSC audit), highlighting that a process isn't being carried out correctly. The EFR process should help to solve the problem.

Other areas where the OSM may be able to help companies include understanding the impact of specific BSC Modifications.

You can find more information about the OSM service at [www.elexon.co.uk/about/elxon-key-contacts/operational-support-managers-osms/](http://www.elexon.co.uk/about/elxon-key-contacts/operational-support-managers-osms/).



**TIP**

## ARRANGING TRAINING SERVICES

The Elexon seminar 'Introduction to the energy market' is very popular among new entrants to the electricity market. It takes place five times a year. But that's just the beginning of the expert training that's available through the organisation. A whole menu of training opportunities, videos and webinars are aimed at helping Parties better understand the BSC and their obligations.

An OSM can offer ideas about the kinds of training that might be appropriate; however, Parties themselves can determine what best suits their needs and talk to their OSM to request training. Best of all, Elexon's training resources are free for BSC Parties.



## IN THIS CHAPTER

- » Supporting the rule change process
- » Digitalising BSC systems
- » Expanding Half-Hourly Settlement
- » Widening access to the Balancing Mechanism for aggregators
- » Balancing markets across the continent

# Chapter 5

## Evolving the BSC for the Future Energy Market

**E**lexon experts are helping to guide the electricity market to a variety of exciting places. This chapter talks about how Exelon is working to enable the benefits of new technology such as smart metering and electric vehicles to be realised.

The chapter also covers digitalising the BSC and explores the work being done to integrate balancing energy markets across Europe.

### Supporting the BSC's Rule Change Process

Britain's energy system is changing rapidly. More than 30 per cent of our electricity now comes from renewables. New technologies such as battery storage, *blockchain* (using digital ledgers to record online transactions) and software applications mean there are new ways to produce, trade and use energy.

The BSC needs to adapt to serve this new system, and enable new businesses that want to enter the market and offer new products and services to consumers.

As outlined in Chapter 3, certain processes are built into the BSC so that the rules can be changed to support these new developments. One excellent example of how this works involves allowing multiple suppliers to serve a consumer using a single household meter.

Currently it is very difficult for consumers to be served by more than one supplier at a time through their meter, under the BSC rules. This arrangement has been mostly fine up until now, as people tend to buy the majority of their electricity from one supplier.

In the future, consumers may want to buy and sell electricity from multiple suppliers.

They will need their meter to still accurately register what they're using at home, and what they're exporting to the networks, for example, through household electricity generation equipment. Elexon set out how the BSC could be amended to allow this in its policy document 'Enabling customers to buy power from multiple providers', which you can find at [www.elexon.co.uk](http://www.elexon.co.uk).



TECHNICAL  
STUFF

As a result, a Modification Proposal (P379) to change the BSC rules was raised by a new entrant company for assessment by the industry. (The term Modification is explained in Chapter 3). The change would mean that the amount of electricity that the consumer uses (or sells) could be separately accounted for and itemised through the same meter, so that the consumer gets the right bill for any electricity they buy from one or more suppliers. They would also be paid properly for any electricity they sell back to suppliers, community energy schemes or other Parties that they may want to trade electricity with.

If this change goes ahead, it may benefit new developments and business models. For example, manufacturers of electric vehicles (EVs), or the companies that lease them, could offer the cars to consumers on a simple per-mile basis, including the electricity needed to charge them at home. Changing the BSC rules would allow the meter to account for the electricity the customer uses for charging the vehicle at home to be separated from the rest of

their consumption. In this way, the electricity for charging the EV, is apportioned to the manufacturer or leasing company rather than the consumer.



REMEMBER

Settling household consumption in these future scenarios will become more complex. However, it's important for the BSC to enable new developments, which are the shape of things to come in the smarter, more flexible energy system.

Smart meters will play a critical role in helping future scenarios become a reality. They record a consumer's consumption every 30 minutes, and the amount of electricity they send back to the networks. Smart meters can be read remotely without the need for the meter to be physically read by somebody. This will end the practice of bills being based on estimates, which will improve the accuracy and timeliness of customers' bills, and the Settlement process in general.

## Digitalising the BSC

Great Britain's electricity market was created thirty years ago. The IT systems and processes that make it work were established then and have been growing and changing incrementally ever since.

Currently, these systems are being overhauled so they can serve the industry of the future, when technology such as smart meters will provide much more detailed information about energy use.

Elxon is responding to this by developing a new digital platform – a software solution that will support the increasingly complex changes in Britain's energy system.

The platform will be flexible and scalable to adapt to new developments. As well as smart meters, these developments include increases in the number and type of participants in the electricity market. The sort of energy products that companies offer is also expanding.

The current systems that support the BSC need to be changed. For example, if changes are made to BSC rules, they often have to be implemented separately across a number of different IT systems, instead of being done once on one system. The processes to register new market participants and encourage ongoing compliance with the BSC can involve users having to complete forms by hand.



REMEMBER

Elexon's new platform will automate the BSC significantly. It is also scalable, so it can handle a significant increase in the volume of meter readings resulting from Market-wide Half Hourly Settlement (explained in more detail later in this chapter).

The platform is being delivered in stages and, once established, it will allow Elexon to offer more efficient and effective BSC services to customers.

Three key features form the initial part of Elexon's new platform as shown in Figure 5-1.

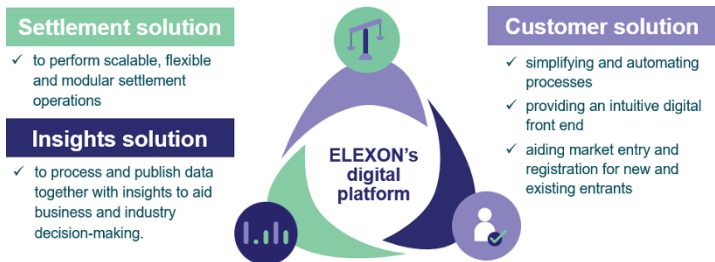


FIGURE 5-1: Elexon's digital platform.

Elexon manages a wide variety of data on the electricity market. Data such as this will play a huge part in helping to transform the energy markets. Elexon wants to make this data more widely available, so it has raised BSC Modification P398 which proposes that all data that it holds is assumed to be openly available, unless the BSC Panel decides that there is a specific reason why it should not be.

## Expanding Half-Hourly Settlement to Domestic Customers and Small Businesses

The whole electricity system is based on Half-Hourly Settlement, and electricity supplied for use by the largest customers (typically industrial companies) has been priced and measured in half-hour periods for many years.

But the Half-Hourly Settlement concept doesn't apply to all households and businesses, and around 30 million household and

small business customers are not part of these arrangements. This decision, made in the late 1990s, was mainly due to the then-prohibitive cost of installing 30 million Half-Hourly capable meters.

Fast forward 20 years and, with advances in technology, ‘smart’ electricity and gas meters are now widely available and are being installed. Smart meters can send Half-Hourly readings directly to the consumer’s supplier without the need to physically read the meter. Consumers can also see their energy usage in real time through an in-home display linked to the meter.



REMEMBER

Smart meters have lots of benefits for consumers and the industry. For that reason, Exelon proposed a number of years ago that the electricity industry should adopt *Market-wide Half Hourly Settlement* (MHHS for short).

In 2017, the energy regulator Ofgem announced a review to progress this. Exelon has led Ofgem’s working group to design the Target Operating Model and transition approach for moving the whole electricity market to MHHS, including households and small businesses.



TIP

One immediate benefit of MHHS to consumers is that it allows wider use of ‘time-of-use’ tariffs, which reward customers for reducing their energy use during peak demand (and price) times.

The fact that smart meters record consumption for every half-hour is a financial incentive for consumers to join in the process of smoothing out the peaks and troughs of energy demand, which the old meters could not enable.

Through a ‘time of use’ tariff, consumers will find it easier to provide *demand-side response* (DSR) where they reduce or increase consumption when asked to do so by a network operator, a supplier or an independent aggregator.



TIP

For example, they could save money by running their washing machine at times of the day when there’s surplus electricity from renewables on the system. They could also be rewarded for reducing demand, or selling electricity directly to the networks from on-site generation or from an electric vehicle when it is needed.

The smoothing out of demand peaks has wider benefits, as it helps to make the electricity system more efficient and cost-effective overall.

Greater use of smart metering also helps to build the business case for electricity storage, and it encourages development of electric vehicle charging technology. Smart meters could also help peer-to-peer trading, when consumers buy and sell electricity to and from each other.

Ofgem has given its preliminary approval to the Target Operating Model and transition approach that Elexon designed with the industry working group. Further Ofgem working groups, to which Elexon is also providing technical leadership, are now developing this in more detail, ready for implementation.



REMEMBER

Ofgem is expected to make the final decision on whether to mandate MHHS in late 2020. The mandate would require all suppliers to retrieve and process their household consumers' Half-Hourly electricity consumption for use in Settlement, unless the consumer opts out.

## Wider Access to the Balancing Mechanism for Demand-Side Response Aggregators

In the future there will be more opportunities for consumers to provide DSR and take advantage of supplier 'time-of-use' tariffs.

The combination of moving to MHHS and smart meter technology can help consumers to provide more DSR. Independent aggregators can help them with this.



TECHNICAL  
STUFF

An *independent aggregator* is basically a company which negotiates with energy suppliers or network companies on behalf of consumers, ensuring that, for example, a consumer is paid for reducing consumption when the gap between supply and demand is tight. Aggregators can perform this role for a wide range of consumers and businesses, and it's likely that they will play a bigger role in the electricity system in the future.

Elexon has worked to open up the GB Balancing Mechanism (BM) so that independent aggregators can access it. This is known as *Wider Access* and it is important for the development of the smarter electricity system. (As explained in Chapter 1, the BM is a marketplace used by National Grid ESO to balance electricity supply and demand close to real-time).

Previously, independent aggregators could only offer services in the BM if they were affiliated with a licensed energy supplier. However, since December 2019, the BM has been opened to independent aggregators (that don't have this affiliation). Independent aggregators are known as *Virtual Lead Parties*, or VLPs, within the BSC.

## Balancing Markets Across the Continent

Elexon and National Grid ESO have partnered to develop the industry arrangements that will enable GB participation (including generators, aggregators and VLPs) in *Project TERRE* (Trans European Replacement Reserves Exchange).

TERRE is a pan-European market for trading reserve electricity. Through TERRE, operators of the high voltage networks (transmission system operators) in the participating countries will be able buy reserve electricity in this new market. For example, a British generator that has reserve electricity to sell could trade it with the owner of the high-voltage grid in France.



VLPs represent a type of BSC Party that only participates in Settlement by offering balancing energy. That is to say, they aren't generating or supplying electricity themselves; instead they act as an aggregator by virtually 'gathering up' electricity that isn't being used by consumers (for example, businesses) and offering it for sale to National Grid ESO.

Introducing the VLPs required Modifications to the Grid Code (the technical code managed by National Grid for connection to and development of the National Electricity Transmission System) and to the BSC.

These changes have been implemented by National Grid ESO and Elexon respectively. This is another example of how Elexon uses its expertise in adapting the BSC to help drive innovation and improvements.

Delivering the Project TERRE and VLP arrangements is a major step forward for meeting the European Electricity Balancing Guideline mandate, which is about increasing harmonisation of European electricity markets.

The Wider Access arrangements allow demand-side participation on a level playing field with traditional generation, suppliers and aggregators. The arrangements pave the way for a valuable potential source of additional revenues for DSR providers.



To qualify for Wider Access, an independent aggregator has to become a VLP by enrolling in the BSC. They would also need to control at least 1 megawatt (MW) of capacity, which could be power generation equipment or battery storage for example. You could also be an aggregator with agreements in place with DSR providers that can either reduce or increase demand by at least 1MW.

Involvement in Project TERRE depends on a few factors. Again, you would need to have at least 1MW of flexibility capacity, capable of either increasing or reducing demand. You would also need to be able to respond to a signal from the Transmission System Operator to increase or reduce demand within 30 minutes.

As an example, sites that are taking part in Demand Turn Up (DTU) where market participants can provide DSR to National Grid ESO are able to participate in TERRE. (You can read more information about DTU at: [www.nationalgrideso.com/balancing-services/reserve-services/demand-turn](http://www.nationalgrideso.com/balancing-services/reserve-services/demand-turn))

The BSC arrangements allow providers to offer electricity into both the BM and TERRE at the same time, if they want to.

Balancing energy volumes exchanged through Project TERRE will be activated via an auction performed by a trans-European platform called LIBRA. The LIBRA platform matches the needs posted by transmission system operators across the EU with the bids that the providers post.



## IN THIS CHAPTER

- » Why the energy codes need to be rewritten
- » Spelling out the issues with the codes
- » Realising the benefits of consolidation and simplification

# Chapter 6












## Charting the Future of the Energy Codes

The energy system in Britain is changing radically, with more renewables, more innovation and new technology playing a big part in it. Energy codes such as the BSC play an important role in the system and this chapter is about the case for completely overhauling these codes.

### Why Rewrite the Rules?

The energy codes are the commercial arrangements and legal contracts that energy companies must sign up to in order to do business in the gas and electricity markets.

This book focuses on the BSC, which Elexon uses to manage the wholesale electricity market. It is one of 11 major codes across the gas and electricity sectors. They're managed by 6 code administrators (including Elexon). There are also five delivery bodies (which provide the IT services and support that delivers each code one of which is Elexon). Figure 6-1 shows all 11 codes together with the bodies that manage them. Besides the BSC, the other codes deal with different parts of the gas and electricity sectors including the retail markets, and the energy networks.

Electricity Only			
Code:	Managed by:	Code:	Managed by:
Balancing and Settlement Code (BSC)		The System Operator Transmission Owner Code (STC)	
Master Registration Agreement (MRA)		Distribution Connection and Use of System Agreement (DCUSA)	
Connection and Use of System Code (CUSC)		Distribution Code (D Code)	
Grid Code			
Gas Only		Gas & Electricity	
Code:	Managed by:	Code:	Managed by:
Uniform Network Code and Data Services Contract		Smart Energy Code	
Supply Point Administration Agreement (SPAA)		The New Retail Energy Code (REC)	Still in development. We explain more on Page 8.
Independent Gas Transporters Uniform Network Code			

**FIGURE 6-1:** Who manages which code.

Many organisations, including the Government, Ofgem and Elexon, think that 11 codes is too many. Elexon believes that the codes need to be consolidated and then simplified to improve the user experience for market participants.

The energy system in Britain is changing as it moves away from the traditional centralised model where a smaller number of large, fossil-fuelled power stations produced most of the electricity and the job of the networks was to funnel that electricity in one direction – to consumers.



REMEMBER

The system has rapidly become more decentralised as these large, ageing power stations close and increasing numbers of smaller, localised renewable sources take their place. In the future, more consumers will play an active role in the energy market. New technology such as smart meters and electric vehicles will offer them more ways to interact with the electricity system, for example, by selling some electricity they generate at home to suppliers, and adjusting how much energy they use to take advantage of ‘time of use’ tariffs (explained in Chapter 5).

The energy codes were developed incrementally after the energy markets were privatised in the 1990s, and they have served the industry and consumers well. But they weren’t written with this decentralised model in mind, and they don’t really lend themselves to innovation or cutting-edge business models.

Britain’s energy systems and markets are becoming smarter, as new and existing businesses develop different products and services for consumers. The rule change process for the codes needs to be speeded up so that it supports fresh approaches and innovative ideas by companies that want to deliver something new for consumers.

## Considering Simplification and Consolidation

The Government and Ofgem have set out options for reforming the code arrangements. Among the outcomes they want to achieve are that:

- » The codes deliver on the strategic direction set for the energy system by the Government and the regulator
- » The codes are more agile and responsive to change in the sector

The reform options include one or more code managers working with a separate strategic body which oversees the development of the energy sector. Alternatively, an integrated rule-making body could combine the code managers’ role with that of the strategic body.

Elexon strongly supports the consolidation and simplification of the codes. It will take years to complete and the Government and Ofgem will develop their proposals further before finalising them. Elexon is committed to working constructively with them on the reforms.



REMEMBER

There are a wide range of benefits to the industry and energy companies from consolidating and simplifying the codes. They include:

- » Supporting moves to a smarter system
- » Consistency and common practices across all the codes
- » Making it easier for companies to engage in the codes
- » More agile and speedy rules changes
- » Removing redundant or unnecessary rules and processes
- » Cost savings for the industry

## IN THIS CHAPTER

- » Implementing smart metering and greener power
- » Benefiting from competition
- » Creating a more flexible system
- » Getting power from here to there
- » Understanding the terminology

# Chapter 7

## Ten Key Takeaways about the Energy Sector

If you've reached this part of the book, well done! Before you close it, read on for a collection of simple key takeaways regarding the way the system works and where it's headed in the future.

### Getting Smarter

Just as mobile phones have become smarter, so have electricity meters. Electricity meters have traditionally been the box under the stairs that nobody really looked at. But they are going to come out of the shadows.

Momentum is building towards the day when all homes and businesses will have smart meters. When that happens, it will be much easier for consumers to see and control their energy usage and how much energy they are producing with a few taps on a smartphone.

## Getting New Business

As smart technology continues to develop in the energy sector, new businesses are entering the market. In Chapter 5 you saw how aggregators can help customers sell back electricity they aren't using. In the future, new business models will emerge that nobody has even thought of yet, offering consumers new ways to get the best value out of the energy market.

## Getting More Choice for Consumers

Exelon and the industry are working on potential BSC rule changes, one example being that customers could have multiple suppliers through the same meter (see Chapter 5). This could give them more freedom to shop around for the best deals to suit all their electricity needs in future. Making rule changes like this shows how energy codes can adapt to change and enable new types of businesses and products to enter the market.

## Getting Electricity from Your Neighbour

Electricity customers contract with one supplier at a time for all their needs. But what if you could buy some electricity from a conventional supplier, and the rest from your neighbour, or from a local solar generator down the street? These are the exciting developments that the electricity industry is preparing for. Exelon is already preparing for such scenarios.

## Getting Faster Switching and Better Tariffs

Ofgem is working with the industry to speed up the time it takes for consumers to switch their energy supplier. Combined with the roll-out of smart meters, this will make it easier for consumers to shop around and find the best tariff. Market-wide Half Hourly Settlement for electricity will play a big role in making this happen (see Chapter 5).

## Getting Greener

The electricity industry, the Government and the regulator are working hard to promote a sustainable energy future, with more power supplied from renewables. And in 2019, the Government signed legislation to commit the UK to a legally binding target of net zero emissions by 2050.

Around 30 per cent of Britain's electricity comes from renewable sources compared with around 5 per cent a little over 10 years ago. And in May 2019 a new record was set when Britain went for 18 days without using any coal-fired power stations.

## Getting More Efficient

New technology, smaller scale electricity generation equipment and greater energy efficiency can help households and businesses to reduce their electricity bills. In the future, consumers will have opportunities to play a more active role in the electricity market by selling back electricity that they aren't using.

## Getting More Competitive

The full roll-out of competition in Britain's energy supply market started in the late 1990s. Initially, there were relatively few suppliers to choose from and for many years the largest energy suppliers had a market share of greater than 90 per cent in energy retail. Nowadays, more than a quarter of all electricity customers are with independent suppliers (that is, companies other than the largest suppliers). This is good for competition, as it gives consumers more choice. As we explain in this book, Elexon provides plenty of support to companies to help them enter the market and stay in compliance with BSC rules. The BSC also enables competition by making sure that costs for Settlement are apportioned accurately between generators and suppliers.

## Getting Simpler to Understand

Energy codes, including the BSC, have a role to play in ensuring that the system runs smoothly. There are 11 major codes governing the energy system altogether, overseen by six code managers. The Government and Ofgem want to reform the code arrangements, and Elexon supports moves to consolidate and simplify the codes.

It is important to have simpler arrangements. The codes should not be a barrier to innovation or to new businesses entering the market.

## Getting Better Technology

To support rapid changes in the electricity market, the essential services that deliver the BSC need to be overhauled. Elexon is developing a new digital platform that will support the increasingly complex changes in Britain's energy system (explained in more detail in Chapter 5).



# Glossary

The energy sector is full of jargon, and by now you have probably read through enough of it to last a lifetime! Most of the acronyms in this book are explained as you read through it, but here's a list of some particularly useful ones.

**Aggregators:** Aggregators negotiate with suppliers or network operators on behalf of consumers. For example, they ensure that consumers are paid for reducing consumption when the gap between supply and demand is tight. Aggregators can either be affiliated with a licensed supplier, or they can be independent (that is, not affiliated with a supplier).

**The Balancing Mechanism:** Electricity cannot be stored economically on a large scale yet, so it must be produced at the time of demand. When National Grid ESO predicts that there will be a discrepancy between the amount of electricity produced and what is being used, they may accept a 'bid' or 'offer' in the Balancing Mechanism (BM) to either increase or decrease generation (or consumption). The BM is used to balance supply and demand in each half-hour trading period of every day.

**Blockchain:** A type of digital ledger technology which records transaction data in 'blocks' rather than in rows and columns in a database. The blocks are closed by a type of cryptographic signature called a *hash*: the next block begins with that same hash; a kind of wax seal. That's how it's verified that the encrypted information hasn't been manipulated. Each person in a peer group holds a copy of the complete ledger.

In the energy sector, blockchain could have many applications. For example, residents in a block of flats could trade electricity they generated between themselves, with the transactions recorded by blockchain.

**The BSC Panel:** The BSC Panel is made up of independent industry experts and representatives from National Grid, Ofgem, Distribution Network Operators and Citizens Advice. Its role includes assessing proposals to change BSC rules. If a BSC Change Proposal meets defined Self-Governance criteria (which cover a range of considerations including impacts on market competition), the BSC Panel may pass a determination on the proposal directly. Otherwise the BSC Panel makes a recommendation to Ofgem which then acts as the ultimate deciding authority.

**BSC Parties:** Any company that has acceded to the Balancing and Settlement Code (by signing the BSC Framework Agreement).

**Code Subsidiary Documents:** These provide additional detail on the rules and obligations in the BSC. This includes the supporting procedures, specifications, methodologies and requirements. They give advice, for example, on how to raise Modifications.

**Data Collectors and Data Aggregators:** *Data Collectors* are responsible for the retrieval, validation and processing of metering data from Half Hourly, Non Half Hourly and Equivalent Meters for all Metering Systems registered in Elexon's Supplier Volume Allocation systems (SVA). The SVA is the method for working out how much each electricity supplier's customers use in a Settlement Period. *Data Aggregators* are appointed by suppliers to aggregate the metering data received from Data Collectors and provide this aggregated data to Elexon.

**Demand-side response:** This is where homes and businesses agree to reduce or increase consumption depending on the needs of network operators or electricity suppliers. They do this in exchange for payments. Smart meters will make it easier for consumers to take up these opportunities in the future.

**Electricity distribution networks:** Regional electricity networks (known as distribution networks) are owned by local electricity distribution system operators (LDSOs).

They connect to the transmission networks and step down the voltage so that electricity can be transported to homes, smaller businesses and Independent Distribution Network Operators (IDNOs). IDNO networks are directly connected to LDSO networks.

**Electricity transmission networks:** Transmission networks are the high-voltage grids (up to 400 kilovolts) that act like the motorways of Britain's electricity system. There are three major transmission networks in Britain, owned by National Grid, SSE and Scottish Power.

**National Grid Electricity System Operator (ESO):** National Grid ESO is a legally separate company from National Grid group. The ESO uses transmission networks to manage flows of high voltage electricity through the system until it gets to electricity distribution networks.

**The Target Operating Model (TOM) for Market-wide Half Hourly Settlement (MHHS):** A set of services required to deliver data on how much electricity is being used by consumers and *prosumers* (people who produce as well as use electricity) across the market, for each half hour of the day. This data would be provided to a central body (such as Elexon) for use in Settlement calculations and for other innovative purposes (such as a community energy scheme or peer to peer trading). The Elexon-led Design Working Group developed the design of the TOM on behalf of Ofgem. The Design Working Group was made up of experts from Elexon, the industry and other representatives including from Ofgem.

**Virtual Lead Parties (VLPs):** VLPs represent a type of BSC Party that only participates in Settlement by offering *balancing* energy. They don't generate or supply electricity themselves; instead they act as an aggregator by virtually 'gathering up' changes in consumption by consumers (for example, businesses) and offering it for sale to National Grid ESO.

**Wider Access (to the Balancing Mechanism):** Previously, independent aggregators could only offer services in the BM if they were affiliated with a licensed energy supplier. However, from December 2019, the BM has been open to independent aggregators.

Corporate Strategy

With the support of our stakeholders and partners, we will simplify and consolidate complex and fragmented services, develop new market solutions and actively facilitate innovation for the benefit of GB energy markets and the UK economy



[elexon.co.uk](http://elexon.co.uk)

**ELEXON**

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# Get to grips with the Balancing and Settlement Code

Electricity supply and demand are balanced every half hour of every day. The BSC is there to iron out the differences between supply and demand, and it can get pretty complex! Grab your copy of *The Balancing and Settlement Code For Dummies* to ensure that you stay up to speed with all the latest developments. Dive in to discover all about contracting electricity, determining the imbalance price, how the BSC is evolving to be fit for the future and much, much more.

## Inside...

- Recognise the importance of the BSC to the energy industry
- Realise the benefits of the BSC, who it serves and how it originated
- Understand how supply and demand for electricity are forecast
- Explore industrial and consumer energy supply challenges and solutions
- Be inspired by what is being done to help innovation in the sector

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