The future of our energy market

A call to energise the sector and enable the future

November 2018

centrica

KPMG

Contents

Foreword	2
Vision for the energy market	3
Making the vision a reality	7
Join us	11

Foreword

It's time to reimagine energy.

We believe that customer experience can be transformed by new technology in the energy market over the next few years.

Energy. It's one of life's essentials and critical to a working economy. But the way we provide it and use it is changing.

We've already seen a significant reduction in the carbon content of the energy we produce and consume. But it's not enough. According to a recent report from the Intergovernmental Panel on Climate Change (IPCC), we face a stark future unless we redouble our efforts to decarbonise.

Building more renewables is not the only answer. We must also give customers more control over their energy needs, including how much they pay. Technology can help by bringing the source of energy production closer to customers, enabling them to generate and store their own energy and creating smart homes.

It's not just about homes and businesses either. It's also about how customers live their lives today and in the future. Electric vehicles promise to be the catalyst that will reimagine the way electricity systems operate. Again, technology will be a key component of this change by connecting assets to customers in ways that would have seemed impossible even ten years ago.

This new energy revolution will be market led, rather than policy led. It will benefit consumers and the planet. I'm excited about the leading role which Centrica will play. We have already made a big commitment, whether it be our £1.2billion investment in distributed energy and power and the connected home, or the creation of the Cornwall local energy market.

But individual businesses can't do this alone. It requires collaboration across the entire energy sector to put in place all the building blocks to make this work in a truly integrated way. So, to kick this off, we would like to bring the sector together to shape the debate, engaging with all those who have an interest in making this transition a success. Please join us.

Sarwjit Sambhi

Managing Director, UK Home
November 2018

Vision for the energy market

"Huge change is coming. Customers will be given new opportunities to manage and lower their bills, enjoy better quality service and a more tailored experience. All of this will be driven by new technology. That technology will open up exciting new possibilities, drive sector convergence, and integrate energy into many other aspects of our lives.

Here we set out how we see the future market evolving.

We are in the early stages of the transition to a new energy world that is gathering pace and momentum by the day.

In common with many other sectors, the catalyst is the disruptive force of technology. This is driving several broad trends which are having a major impact on how the sector operates, including;

- Evolution of traditional market roles and sector convergence (think ride-hailing taxi apps with food delivery services bolted on).
- Rising significance of new platforms[1] in our lives (think open-banking and home assistants).
- Increasing customer personalisation (think online retail) facilitated by exponential growth in big data.

Technology is democratising the ownership of energy, bringing together services and sectors which have traditionally been separate. It is helping to provide new solutions to the wider systemic challenges posed by the imperative to decarbonise our economy and society.

Disruptive change is set to continue. Over the next few years, the energy sector will go through a period of widespread, disruptive change, on a similar scale to the roll out of mobile phones. New technologies such as battery storage, electric vehicles and demand side response, combined with new market structures and the coalescing of platforms, will change the face of the energy sector as we know it.

This heralds a future where both domestic and business customers have a fundamentally different relationship with energy. They stand to be not only the owners of generation and storage, but also active participants in a market that has up until now been largely inaccessible to them.

Battery storage, on-site generation and energy optimisation services, all managed by smart platform technology and new peer-to-peer trading arrangements, are just some of the innovations disrupting traditional customer and business relationships.

By harnessing technology, customer experience will become frictionless and hassle free, enhancing transparency and trust in the energy market.

To survive and thrive in this new world, suppliers will need to evolve beyond traditional roles, focused on commodity and billing, to become service providers and an integral part of our homes and businesses.

These changes are already happening. Centrica is taking a leading role. Our Hive connected home technology now runs in over 1 million homes, while optimised on-site generation and distributed energy technology feature in over 5,000 of our business customers' sites.

"New technologies will change the face of the energy sector as we know it"

1. A platform is a business model that creates value by facilitating exchanges between interdependent groups.

Future of our energy market – Big Themes

Decarbonisation

Rapid growth in renewables over the past decade

30% Installed generation capacity is renewable today[1]

Decentralisation

Power is being generated closer to the point of use through decentralised energy.

31-45% Installed generation capacity decentralised by 2030[1]

Digitisation

Technology will allow optimisation of energy use and bill reductions

127m IoT connections by 2023[2]

Sector Convergence

Future market design has to provide for system wide solutions covering the whole economy including electrification of transport and heat

c.20TWh Annual demand from EVs by 2030[1]

Customer Experience

Consumer expectations are rising and utilities rank low compared to other markets

Lower Quartile Utilities are generally in the lower quartiles for customer engagement[3]

Rise of the platform

More and more, the relationship with the consumer is through a range of online platforms

275m Voice assistant devices used to control smart homes by 2023[4] globally

Flexibility

Increases the importance of storage, flexible generation DSR and active network management

12GW Battery storage could be deployed by 2021[5]

Electrification of transport

Drives the transition from petroleum based products to EVs

7m Electric passenger cars by 2030[7]

Technology led transformation

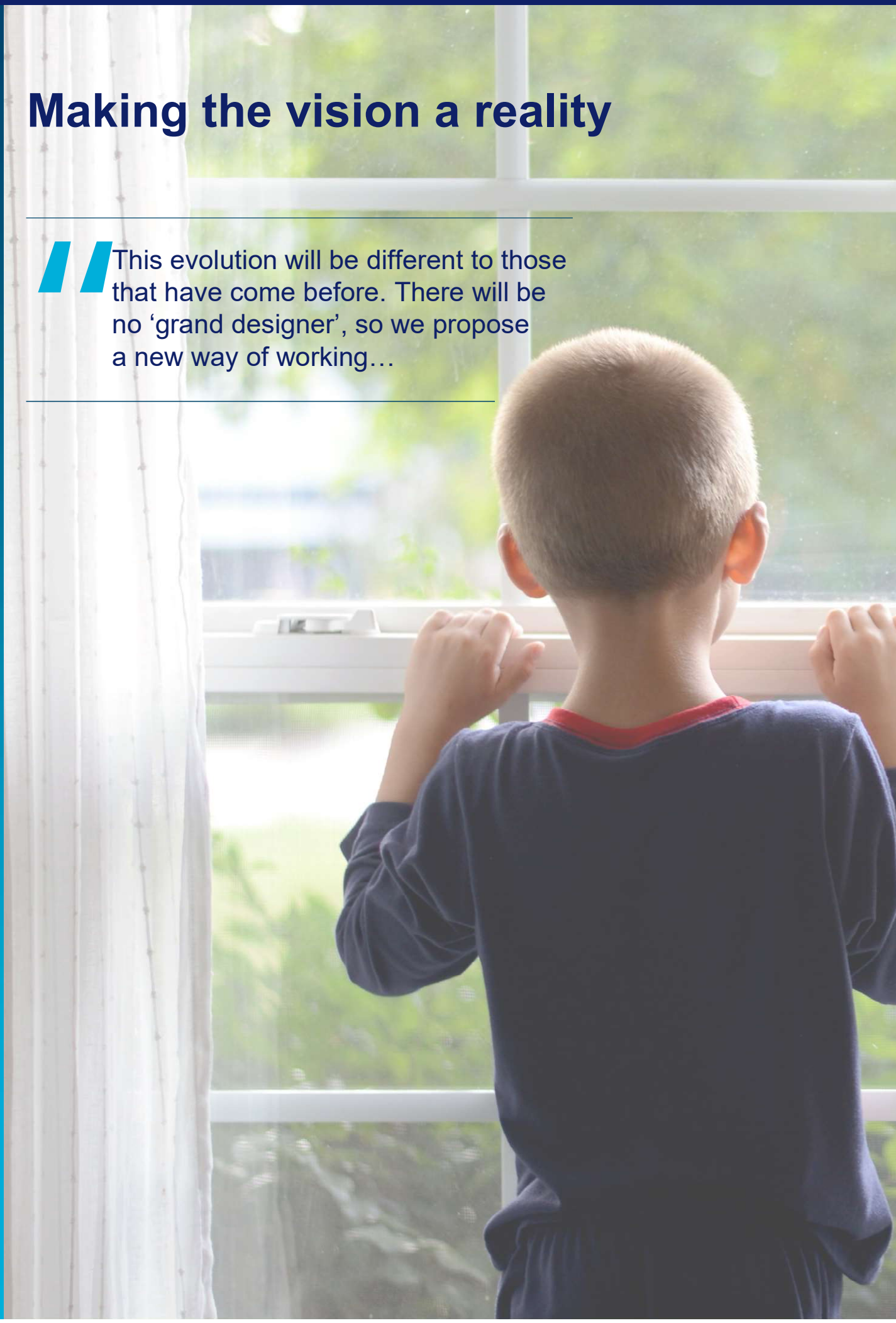
New technology and demand for more sophisticated customer offering is driving transformation

93% Of Financial Services organisations globally have plans to adopt or have already adopted a digital-first business strategy[6]

1. FES 2018 ('two degrees' and 'community renewables' scenarios) – UK figure
2. Cambridge Consultants' 2017 report for Ofcom – UK figure
3. KPMG Nunwood survey
4. Juniper – Global figure
5. APPG 2017 paper on Energy Storage – UK figure
6. Forbes - Global figure
7. KPMG analysis – UK figure

Making the vision a reality

> This evolution will be different to those that have come before. There will be no ‘grand designer’, so we propose a new way of working…



Here we consider what might be required to turn the vision into reality, including some of the challenges and the priorities in helping to address them.

As the transition progresses, so the level of technological integration will inevitably increase. Insurance, care, transport and other customer propositions all stand to be "wrapped in" to services touching energy.

Automation will allow customers to switch energy services and export generation seamlessly without having to visit confusing websites.

The traditional model of centralised power generation, with suppliers selling to largely passive consumers, will no longer be the accepted norm. Increasingly, business and households will generate their own energy (becoming 'prosumers') and have more than one supply arrangement. As a result, the role of suppliers looks set to change significantly. They may cease to exist in the form we see today.

Businesses and homes will have the opportunity to become integral parts of local flexibility markets, opening up more possibilities for customers to save money. The experience of living and working in smart homes, businesses and communities will improve dramatically.

.

.

The workforce of the future will also evolve, using new tools and services to embrace innovative ways of working.

The transition will have to work for everyone. If our changing market does not work for the least well-off in society, then it will have failed.

Centrica wants to become more embedded in the very fabric of smart communities, homes, and businesses. Our role will include ensuring that smart home and business solutions are installed, upgraded and are able to function properly and remain well maintained. We will innovate, leveraging technology to respond to and shape new customer propositions.

We will have a role in enabling local energy markets, ensuring financial and operational quality are not compromised whilst offering a truly tailored product to different communities. We will make the process of home and business management more straightforward and pain-free.

This represents a fundamental change from the status quo.

Choices will need to be made as our centrally planned system, and the regulatory and policy framework that supports it, are subject to increasing pressure.

There will be a number of hurdles to overcome as well as some lessons to be learnt from other markets and countries, to ensure that the potential of this transition is realised. On that understanding, we have identified three broad areas where we believe focus is needed:

1. **The changing architecture of the energy system.** Can alternative models, such as local flexibility markets, be scaled? How do we "liberate" supplier relationships ("crack-open" the supplier hub)? How do we maximise participation and competition?
2. **Convergence and innovation.** What does sector convergence mean for sector specific regulation? How do we manage the "big data" that comes out of this? How best do we offer protection to customers in need? How do we enable innovation?
3. **International learnings.** What can we learn from markets that have made some radical choices already? What have been the trade-offs and the failures as well as the successes?

"The role of suppliers looks set to change significantly. They may no longer exist in the form we see today"

Focusing on the priorities

There are three big priorities that the sector needs to focus on in order to realise the potential benefits of the future energy markets successfully for consumers. Here we set out what we think those priorities are, why they are important and what we need to do next.

FIRST: ***Ensuring our system architecture meets the needs of future customers as it changes***

The rise of renewables has resulted in more intermittent and decentralised generation. As a result, the system is having to become more flexible and responsive. Smart meters and grids will provide a big increase in the volume of data available to energy companies and other market participants. The insight which can now be derived from data – whether about customer usage patterns or network congestion – is unprecedented.

One early consequence of this change to our system is the emergence of Local Energy Markets (LEMs) which allow local balancing and optimisation. LEMs, such as Centrica's Cornwall LEM, are being set up to respond to the wealth of system data available with the aim of harnessing flexibility to benefit customers. Early examples of LEMs have focused on solving specific local challenges. They offer a window to a possible future which could deliver significant customer benefits, including a reduced need for new infrastructure and the possibility of lower bills, as well as new concepts such as peer-to-peer (P2P) trading.

Centrica's Cornwall LEM is already enabling participants to buy flexible generation created in the local market.

The UK's first energy trading community platform has also been tested on Hackney's Banister House estate in London in a bid to lower energy costs for local residents. There, a smart home hub has been installed in 40 participating flats, allowing solar energy to be traded between residents. The UK's first ever energy transaction using blockchain was executed between residents there earlier this year.

Whether by the creation of direct relationships between consumers and/or prosumers and network companies, or between peers participating in the project, or by the creation of multiple supplier relationships, the traditional supplier-customer relationship is coming under real pressure. Decentralised platforms are now emerging alongside traditional, centralised hub relationships.

Key considerations:

- How do we enable local flexibility markets?
- Do network operators have sufficient data on the use of distribution networks or their congestion points?
- Can current trials scale up and is there a future for regional flexibility markets (a collection of LEMs)?
- What should/shouldn't network companies focus on to avoid the risk of foreclosing competition and further innovation?

SECOND: ***Learning lessons from other sectors that have recently experienced disruption***

While the energy market is in the early stage of its disruptive journey, several other sectors have already experienced substantive change. There are parallels in other markets indicating the direction that energy might take.

The financial services sector has seen fundamental change over the last few years, driven by technology and changing customer expectations. Open banking, for instance, has improved customers' access to and control over their money. It has opened banking to more competition, introduced a new platform technology and given customers new ways to avoid unpopular fees and charges.

Separately, the investment market has been transformed, allowing retail customers to take more active positions, e.g. by allowing more direct, real-time control of pensions and investments. At the same time, more people have enjoyed increased protection through the introduction of mandatory workplace pensions.

Many of these developments look set to be mirrored in the energy market, with the more active customers being able to trade or manage their energy. At the same time, low-cost managed services for other customers could be implemented alongside protected offerings.

Logistics and retail have also seen wide ranging changes. Online shopping and home delivery, alongside mobility as a service, have transformed the movement of goods and people, as well as the nature of work itself.

The increasing complexity of the smart home and business will require more physical tasks of installing, maintaining, repairing and replacing equipment, from solar panels to intelligent home management systems. This will require a labour force that is able to respond quickly and is trusted to operate within customers' homes.

It is quite possible that a new 'digitally enabled' workforce will be created from a pool of localised technicians, who may need to be multi-skilled and able to work with a wide range of devices. They may well be aided in this by technological developments.

Key considerations:

- How do we manage data, ensuring individuals have a choice about their personal data, but that non-personal data is made more transparent?
- How do we ensure vulnerable customers are protected?
- What does sector convergence mean for sector specific regulation?
- How do we plan for the workforce of the future?

THIRD: *Learning lessons from international markets*

Because the drivers of disruption are global, many energy markets around the world are experiencing similar changes. We can learn from markets which have already experienced some of these changes in customer experience to ensure that best practice is emulated and downsides are avoided. The UK is also, in many respects, at the forefront of the global transition. Many of the solutions enacted by the UK will be useful for other international markets too. Some international examples include:

- **California**, where the state's management of the dramatic uptake of subsidised rooftop solar has resulted in price increases and affordability issues. For the UK, it is important that any future initiatives do not lead to unsustainable prices rises, but ultimately provide customers with the opportunity to reduce their bills.
- **Germany** recently modified its balancing market, relying on stronger pricing signals and later gate closures of auctions to place more balancing responsibility onto market participants. Balancing market costs reduced significantly in the process, despite the high penetration of renewables, resulting in savings for consumers. For the UK, this shows that rethinking how markets operate can lead to improved outcomes.
- **New York** has embedded the Reforming the Energy Vision (REV), which facilitates the deployment of distributed generation with granular pricing signals planned to encourage location specific development. This concept could be applicable in the UK to avoid capacity constraint pinch points.
- In **South Australia**, in response to the 2016 blackouts, new connection standards have been implemented that strengthen the investment case for strategically located storage in order to increase security of supply and provide flexibility. For the UK, it will be important to consider how to incentivise the procurement of commercial storage as a grid management tool.

Given the pace of change and varying market dynamics, there is no one country that the UK can look to for a solution. However, it is clear that increasing flexibility, more efficient network operation, exploration of new market parameters and more localisation will be critical for success in the UK's energy markets.

Key considerations:

- What is the most cost effective and secure way to manage intermittent generation?
- To what extent can changing the parameters and operation of markets have an impact on cost of services?
- How can networks be incentivised to minimise system costs through procuring flexibility?

Join us

> The sector can come together to tackle these issues collaboratively, to deliver meaningful change and unlock the significant customer benefits available.

The scale of the challenge facing the energy industry requires a shift in mind-set and approach. No one organisation has a monopoly on good ideas, and the answers themselves are likely to continue to evolve as the pace of change quickens.

There will be a role for everyone in solving the challenges and to shape a future that works for customers. It doesn't make sense for companies and industry segments to attempt to solve all the issues in silos.

Instead, we believe it makes sense to work collaboratively, creating a network to debate and, hopefully, solve the complex issues facing the energy sector in a dynamic and approachable way.

That is why we are holding a series of events bringing together members of the industry both big and small, government departments, regulators, customers and others to consider the key aspects of the future market design and the policy issues that need to be addressed.

Our aim is to work with others to take the conversation to the next stage, facilitating debate to help deliver a truly customer-led energy transition.

It won’t be easy, but the potential prize is huge and we’d love to have you on the journey with us.

Next Steps

Working together

Over the coming months Centrica and KPMG will be working together to explore the future of our energy market. We are looking for views from those who know the market best, the energy sector and consumers.

Encouraging the conversation

We will be holding events and publishing our findings. Please sign up to our mailing list to stay informed on the discussions and outcomes.

Connect with us and join the discussion

Follow us - https://twitter.com/centricaplc

Email us - See overleaf

Join us!

Contact details

Nick Park
Director of Policy and Insight
nick.park@centrica.com

Simon Virley
Partner, Head of ENR
simon.Virley@kpmg.co.uk

Paul Clark
Head of Policy
paul.clark3@centrica.com

Michael Smart
Associate Director Power & Utilities
michael.smart2@kpmg.co.uk

centrica

KPMG