# New Power

## REPORT

SEPTEMBER 2017

# MEET THE CUSTOMERS OF 2030

Smart meters and big data will offer consumers new ways to interact with energy suppliers. We consider some future relationships.

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Is the value in resilience planning?

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New meter data show rollout stalling in 2017

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Skimmed or full-fat?

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EUA chief says it is time to consider life after Rough

'There are lots of wild cards that will place stresses on the system and they are building up much faster than we assumed.'

*Simon Harrison, Mott MacDonald and FPSA*

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# The New Power Interview

## SIMON HARRISON, MOTT MACDONALD & FPSA

Changes in governance are vital to keep the industry fit for purpose through major change. Janet Wood spoke to Simon Harrison about pan-industry work on that issue – and how it affects price reviews on the horizon

When I speak to Mott MacDonald's Simon Harrison it is shortly after the Future Power Systems Architecture (FPSA) project (see box) has delivered its Phase 2 report. Harrison chairs the delivery board for the project and I want to understand how the industry's structure can make the necessary changes. I'm also keen to know what has to happen now, before we are fixed into new long-term price controls for the networks.

Harrison takes me back to some unexpected outcomes of FPSA Phase 1, which looked at the functionality that the electricity system would have to display to be able to deal with a decarbonising energy system in 2030. It found 35 "new or significantly different functions" that the electricity system would need.

### BIOGRAPHY

Simon Harrison is chair of the FPSA project delivery board and the IET energy policy panel.

He has a PhD in electrical and electronics engineering from Southampton University.

In 1991 Harrison joined Ewbank Preece, which was acquired by Mott MacDonald three years later.

In 2014 he became group strategic development manager at Mott MacDonald, providing support to the board in growing and developing the business.

"One feature of those 35 functions that was that they were clustered much more closely than we expected around the consumer and around the piece of the electricity system outside the visibility of a traditional utility setup," Harrison says. And there were more surprises. Energy bodies such as distribution companies or National Grid talk about the world "beyond the meter", by which they mean on customer sites. "Interestingly, if you talk to people who work in community energy and smart cities and so on, if they talk about "behind the meter" they mean what happens in the utility. That was interesting. It all depends on where you stand."

Harrison says there are now "a whole bunch of activities and stakeholders and all sorts of people doing really exciting stuff, which offers both a challenge and an extraordinarily interesting range of solutions". It is also invisible in the current way in which the industry works and is governed.

One outcome of that realisation was to send researchers back to their models. FPSA greatly expanded its stakeholder base, says Harrison. Initially, "we nodded to this world behind the meter, but we didn't reflect it". "What we realised was the richness and complexity of that world is as great, if not greater, than the richness and complexity of the utility world and it's where all the action is happening." But he says: "It's a very fragmented world." SMEs, communities, smart cities, even individuals, "are people who are thinly resourced and for whom electricity is not a top priority". They do not want to spend their time thinking about industry govern- >

## FUTURE POWER SYSTEMS ARCHITECTURE

The Future Power System Architecture (FPSA) project brings together industry professionals, academics, policymakers and other stakeholders to assess the challenges to be faced in the electricity system by 2030 and to identify new functionality required. It is a collaboration between the Institution of Engineering and Technology (IET) and the Energy Systems Catapult (ESC), undertaken with the support of Department for Business, Energy and Industrial Strategy (BEIS).

It focuses on a transformed electricity system. "We do talk about other vectors, but we set some boundaries around the electricity system to avoid boiling the ocean and also to deal with the fact that lots of the dynamics of the electricity system are quite fast compared with other energy systems. If we looked at the whole thing we might miss that granularity and I think that's important," says Simon Harrison.

In FPSA Project Phase 2 a broad group of stakeholders, including 'beyond the meter' market entrants tested the outcomes of the first phase, which had identified 35 functions required to make the change, against predicted future requirements. FPSA3 will map out the delivery of new power system functionality in more specific terms.

ance – and forcing that on them would stifle innovation, Harrison implies. But without a connection between the two, "the innovation will be lost or go to other countries, or they will do stuff that ends up breaking this system and causing it to behave in unpredictable ways".

> "Transformational change means very different things depending on your perspective

FPSA 2 set about identifying barriers: how hard was it to get the 35 functions that had been identified in place, and what were the consequences if the change was not made? The answer was that "almost all of the functions are difficult and the consequences of not implementing them are almost always high". "In other words, this is a really thorny problem and it is important. The barriers were there for a whole range of reasons. A lot of the reasons boiled down in the end to how the whole industry is governed and how change is governed."

How can governance be addressed? Harrison takes a step back to highlight "something we did incidentally, but it might be the most enduring part". Everyone agreed that we are facing a transformational change, "but when you talk to people about what that means they say very different things depending on their perspective. So National Grid lives in a command and control world and sees how to deal with it in a command and control world… When you talk to SMEs about grid – they talk about the same stuff that Apple talks about." In response, "we came up with a set of lenses that were later called social perspective". "What they do is describe what these different types of stakeholder want from the system."

> "New participants are thinly resourced and electricity is not their top priority

Now, he says, FPSA wants to do more to bring people to have conversations that find connections between these worlds.

### RADICAL CHANGES IN INDUSTRY GOVERNANCE

With that in mind, I bring Harrison back to the next steps. How can governance – largely through industry codes – be changed radically? Harrison says: "Pretty well everyone agrees that the current governance mechanisms – the code panels and so on – are far too slow for the agile flexible system that we need. They don't have any forward-looking capability. They are very unapproachable to non-utility companies and stakeholders and the knowledge barriers are very high."

There are other problems. Codes operate independently, "so there is no whole-system concept and there is no governance of what happens on the consumer side of the meter". Without being a "spy in the house" or making it too complex, "we need some level of co-ordination that allows us to make the most of the opportunity beyond the meter, and also to give consumers, and companies that play in the consumer market, the opportunity for a different experience in their use of electricity".

The FPSA group looked at how to make change from the ground up. "One of the problems of code panels is that you take five years to decide something and it's written into the code and then if you want to change it, it's another five years. We think we need something that works as a solution for the time being, but when things change it can bring in a new solution.

"We came up with a technique that we borrowed from the software industry that we called the 'enabling framework'."

This is a catch-all term for what may be quite varied ways of implementing an industry function. It might be as simple as a group of people who want to get involved, connecting using social media so the barrier to participation is not too high.

Will these groups take on the 35 functions iden- >

tified by FPSA? Harrison says it is not necessarily about mapping on to those – more agility and variety is needed. Circumstances evolve on the electricity system, so a group formed around one issue may evolve or dissolve, "so it would be very different to the very rigid style of code panels that we have at the moment".

> There are lots of wild cards that will place stresses on the system and they are building up much faster than we assumed

There will be a need to provide resources so technical information is available. Some overarching direction is still required and Harrison proposes an "enablement organisation" that co-ordinates and manages the groups.

Is that a regulated or a licensed body? He says these are open questions. There is "a possibility that it's virtual and another is that you set up something bespoke for purpose".

## TAKING THE NEXT STEPS

How do we move from the current rigid codes to this dynamic approach?

"You respect that the existing arrangements are there for a reason and that we gradually, over time, migrate away from them," says Harrison. He thinks that "as you start to implement some of the functions using the enabling frameworks – assuming we went that way – you would be derogating from a code". "Once the trial was complete then the derogation would become permanent and gradually the code would become more varied. Over time, for a particular code panel, the business would gradually wither away."

> Rewarding change and keeping costs low are going to have to be reconciled during RIIO 2

Harrison says use-cases are the next stage, initially theoretical but maybe using real-world cases such as electric vehicle charging or a big new housing development, "so we understand what the pinch points are, what measure of agreement is easy to achieve, and where you need to resort to something that is more determined".

What kind of timetable is needed to move from one to the other? "We have designed it for the system of 2030, but that is not very far away in terms of codes and so on. There are a lot of wild cards there as well. We have based our analysis around National Grid's Gone Green [now renamed Two-Degree] and Consumer Power scenarios, and they have assumptions on things like electric vehicle penetration. But [for example], a million electric vehicles on the road by 2022 – as National Grid has assumed – might turn out to be wide of the mark. There are lots of wild cards that will place stresses on the system and require this kind of change – and they are building up much faster then we assumed."

In fact, Harrison hopes for trials over the next four or five years "so we can start using it in earnest – but we have to be aware that that might have to move faster".

That timetable, I note, coincides with the second half of Ofgem's current RIIO price review period for electricity. Discussions about how to manage the next period are already under way. Harrison says: "One of the things that we have been saying, and that Ofgem understands, is that if we get RIIO 2 right it could be a really good enabler for this change and if we get it wrong it could be a very difficult blocker."

## THE FUTURE FOR RIIO

Talking about RIIO, I ask Harrison about a recent open letter from Ofgem in which it warned that network companies would face a tougher financial regime. Is that the right approach, if we might want something quite different from the system?

Harrison says rewarding change and keeping costs low, "are two issues that are going to have to become reconciled during RIIO 2; the starting gun has just been fired on that debate." And he thinks "there are a lot of quite encouraging signs in the letter about how Ofgem wants to reposition the industry to enable change".

He suggests consumers are tolerant of returns being earned by network companies if they arise from innovation, but not tolerant "if it is essentially by exportation of incumbency". It's about getting the incentives right.

He says new markets are becoming more important as distribution network owners (DNOs) transition into system operators (DSOs). "Balancing at distribution level – or even more local balancing – is potentially going to become significant." Should we transpose the transmission-level model to distribution level, or is a different model needed? He says: "Potentially I can imagine that DSOs might be wanting to buy ancillary services. I can see why that could be the case. Some ancillary services are more inherently local, like voltage support, whereas something like frequency is inherently a national thing."

But he highlights another approaching change. "A lot of the value at the moment – even now – is in the transport of electrons. But the value is moving much more towards capacity, with high levels of renewable energy. There is quite a lot of change in play at the moment which is going to need a lot of >

## DATA AND SOFTWARE REQUIRE CO-ORDINATION

Simon Harrison thinks "the FPSA programme would be completely in agreement that data is fundamental" to changing the industry. Exeter's Catherine Mitchell proposed a "data room", possibly part of an independent system operator, that would be available to all industry participants. Harrison says "we are very clear that it's hugely significant", but FPSA has not looked at questions of ownership. But he says: "When do you start thinking you are looking at the digital twin – which is effectively the information associated with any physical asset." Curating the digital twin and leveraging that information so that you can create value from by combining it with other information "in many ways is at the heart of the smart world".

Software development has traditionally been cautious and often slow in the utility world, and fast and unconstrained elsewhere. Harrisosn says in future we will have surprises, "because they won't be what the energy industry would have designed. There will be something else, and some of them could potentially offer huge opportunities for the other players in the industry by solving a complicated problem in a low-cost way". Equally, however, they could pose risks if, for example, "all the electric vehicle chargers belonging to Nissan Car switched on at once". He notes that "electric vehicles are just happening anyway, no-one is trying to engineer it". That's just one of a whole range of changes that currently are uncontrolled. "The important thing is that you have co-ordination."

new thinking on markets going forward."

As some individuals and companies start to shift away from using the grid full time, he warns we have to be mindful, "otherwise you do get into the so-called utility death spiral, where the wealthy go it alone and the network costs all end up being picked up by the poor". "I would say that is definitely something that needs to be on the list of things to think about for RIIO 2."

How much of the new architecture do we need for RIIO 2, and how much will we be in transition during that period?

> "We have been asking BEIS and Ofgem to provide clear statements of direction

Harrison notes that the transition from DNO to DSO is "fairly well organised", with the Energy Networks Association (ENA) "open networks" work, which includes a DSO definition. Some DNOs are also publishing their plans. But he says the "tricky question" is how far we can progress along the "fairly radical path that the FPSA is setting out". He says: "We are not sure ourselves in FPSA that we quite know the answer to that and we are going to have conversations with Ofgem about it. The most important thing for RIIO 2 is that it doesn't close things down so it has plenty of flexibility for radical change over the period – if indeed we still end up with price control periods and not something else."

Is there a possibility of a transitional arrangement, rather than a familiar price-control period? "The environment in which it will be playing is one where there is a huge amounts of unpredictability. If it can't accommodate that, it will require a lot of messy *ad hoc* intervention as we go through the period, which will be painful and may also be seen as risky by the network companies."

Is there a case for shorter price control period? He says: "You want to incentivise long-term investment but you also want agility and the recognition that the landscape will change. The open letter consultation asks about the alignment of the transmission and distribution price control period, which I can imagine might have some good sense." It will become more and more difficult to have a review that covers a long period, he admits.

### THE BEIS/OFGEM ASK

Is the broad structure, with Ofgem carrying out regular price reviews, still fit for purpose?

"There is all sorts of work being done on this by the University of Exeter and others [subscribers log in to see *New Power*'s interview with Exeter's Catherine Mitchell], but the fundamentals of utilities being natural monopolies I think still apply. There are some interesting questions around whether there is a more integrated role across utilities that might result in either local authorities or private companies acting in geographic domains looking across most multiple infrastructures. If you look at whether the smart city agenda is leading, that may be implied."

That takes us back to FPSA's social lenses and the need for a sense of direction and common understanding. Do we need more political leadership from BEIS?

Harrison says: "We have been asking for BEIS and Ofgem to provide some clear statements of direction to the whole industry to get thinking really seriously about this." He wants them to make proposals on how to move forward and about the role government needs to play. "At the moment we haven't quite seen it. They are very supportive and keen to know what's going on and challenge." But he wants those bodies to "stick their necks out" and say "there is real transformational change coming; it may mean that industry becomes very, very different and we think you should all go away and look at that very seriously.

"…that hasn't crystallised, and it would be helpful if the government said it." NP