

How Can Future Retailers understand Customers' Network Needs and enable optimum capacity at least cost

I will get to an answer to this question by following the trail to it in this route

- 1) The 2050 Big Picture
- 2) The D's
- 3) Here and Now DSO opportunity
- 4) Answering the question – the Suppliers
- 5) Other Stuff

Before doing so, I should set my stall out in three ways;

- 1) Nail my colours to the mast – Having worked in the Central Electricity Generating Board and been a commodity trader at an investment bank I have seen both sides of the markets debate. I believe firmly in market disciplines and that when faced with the choice between markets and central planning, markets are the least worst option. However we must recognise the backlash to markets, with many against liberalisation and privatisation.
- 2) The zeitgeist of the newly named Climate Emergency changes everything. Before 2019, we could not suggest to put a woolly hat on. Now we can face our customers/citizens as they face us and ask what they are prepared to do in the call to arms.
- 3) There is a big question about piped gas. By far the most substantial energy policy decision of our generation is what gas will flow through what pipes in 2050. For example, hydrogen, biogas, fossil methane with Carbon Capture Use and Storage. Personally I see the fullest possible extent of electrification of heat and transport as the answer and a concomitant reduction in gas infrastructure.

1 The 2050 Big Picture

Throughout the Blair-Cameron era I sensed no real commitment in parliament and public to the 80% CO₂ reduction by 2050 targets, when the choices became hard. More recently I have seen a stronger commitment, engendered by the Climate Change Committee, to working out scenarios to resolve the gaps in the fourth and fifth carbon budgets, but still no appetite to face the public with hard choices. Still to suggest the voters put woolly hats on to be warmer would be death to a ministerial career. Whatever we may think about the means of gaining attention, the recently named Climate Emergency now presents the opportunity to face our customers and citizens with their responsibility to work together on the challenge. The Brexit debate, me-too, the gig economy, plastics, sustainable diet and others are changing society and attitudes to climate change can go into the mix of everything in flux.

Before the Climate Emergency was called, the most common belief was that technology would solve the issues. On the consumer side that means *procuring* devices that *automate* consumption management. My belief is that the move to zero net carbon and the appreciation in popular culture of the need to do so, means that we will change the “rhythm of life” in which the way we live, work and travel will be responsive to ambient weather conditions.

My challenge to the “technology will solve” protagonists is that there was no clean-secure compliant DECC 2050 pathway without very substantial demand side response. This remains the case in the BEIS/Mackay development of these pathways.

If we need active citizen involvement in the low carbon journey then we had better work out how to do this, with brings me to the “D’s”

The D’s

The driving D’s are Decarbonisation and Digitisation. The former leads to Decentralisation firstly of power generation due to the dispersion of energy source, and this physical decentralisation leads to decentralisation of control of supply/demand balance. This, in concert with digitisation and citizen involvement, leads to the Democratisation of participation in energy markets, for example local energy markets. Other D’s follow, such as the Diffusion of research and development into consumer markets and the need for a sharper set of policy Decisions (for example, the role of piped gas).

I believe that decentralised democratised markets will have four categories;

- i) Energy (including reserve, capacity, interruption, delayed return to service)
- ii) Voltage support
- iii) Reactive power support
- iv) Other complex (inertia, power quality, etc.)

To develop decentralised democratised markets requires both change in regulatory market architecture and regulatory culture in moving away from price socialisation. Both of these are hard and we will have to experiment. In the here and now, the big opportunity in decentralised democratised markets is in local energy markets to resolve distribution network constraint.

Which brings me to the Distribution System Operator (DSO);

3 Here and now opportunities with the DSO

Many market models may work. One possibility is to have nodal pricing in transmission at the grid supply points, probably similar to a Location Marginal Pricing model. Thence a modified and simplified LMP locational pricing model in the Distribution System, as granular as secondary substation or even meter point, and halfhourly. To be manageable, in reality, the nodal markets would be grouped into zones (which may split on a dynamic basis) and times would be grouped into a form of peak and off peak. However, for specific times in specific places, the price signal will be sharper and more granular in both time and space.

Since the DSO will be able to see the ends of the network via the smart meters, the diagnostic potential is enormous, and since consumers will want to automate, price signals from the DSO (whether direct or via supplier) will cause device response and hence the DSO essentially has a big SCADA system.

We are now seeing local energy markets being trialled. There are various different features such as community energy production and local heat but the most interesting development right now is distribution network deconstraint. Where newly connected or newly increased demand or production constrains the network, the networks can as an alternative to reinforcement encourage coordinated demand side management to keep flow through specific points below specified levels. Peer to peer coordination is becoming increasingly important. The standard metaphor is two electric vehicles downstream of a relay with capacity for one – how do they arrange both to charge fully without overloading the system.

4 Answering the question - the suppliers

The development above then raises various questions for suppliers, for example;

- i) Should the local market be for suppliers and not prosumers – depending on your viewpoint this either protects consumers from complexities and high prices or it denies them the opportunity to reduce costs by market engagement
- ii) Who should be allowed to contract with prosumers; one, some or all of peers, suppliers, DSO, TSO/ESO, aggregators of various description
- iii) If there are many parties contracting with prosumers, how to we assess meter level use of system charges and who collects them
- iv) What does Universal Service mean here – for example mandated universal access to all products, physical connection for all but with no price constraint, price constraint for basic service

If pressed to answers, my thoughts are;

- i) Since going from 80% reduction to zero net carbon changes everything, it is essential that consumers have direct access to sharp price signals
- ii) We do need to trial new parties contracting with consumers, but a vast free for all looks too risky, and hence some form of coordination through an evolved Supplier Hub. For example the DSO price signal is routed through the supplier
- iii) For the same reasons that all wholesale energy contracts feed into the balancing and settlement system, all prosumer contracts should also do so, so that the grid can remain balanced and resilient
- iv) Universal service is collapsing and must be revisited. One model to consider is Local Authority provision of Universal Service and the LA then works with providers of gas, power, water, waste water, telco, internet and basic banking.

What should suppliers do ? We variously need to lead, follow and get out of the way according to the specifics of proposed changes. Broadly speaking I think this means support the development of the Supplier Hub regulatory model, encourage innovation and ensure that not only are our customers protected during this journey but that no one is left behind in a market developed only for the most choice enabled people. Every customer has different needs, with the most choice enabled wanting access to markets and the least choice enabled needing us to keep them warm. The here and now challenge for us is working out when and how our customers are vulnerable and how we can help. Data restrictions and difficult financial circumstances in the industry both present significant challenges.

5 Other stuff

In the short term I think we can redesign our market incrementally by developing and testing a variety of solutions for distribution deconstraint. Still though we are just at the foothills.

We need to look forward at a variety of scenarios, for example;

- i) No gas
- ii) Electric vehicles all shared and on the move most of the time
- iii) Super decentralisation of ancillary services to meter points (volts, reactive power, frequency, local networks)
- iv) Self reliance from the grid by maintaining the essential services of lighting, communications and computing with low voltage circuits supported by batteries

Chris Harris. Head of Regulation and Compliance, npower.
Executive Fellow of Decision Science, London Business School.
Chris.Harris@npower.com 07989 493912

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