

## Sentec's view

### Introduction

Sentec has proposed a consumer model for automated Demand Side Response (DSR), for discussion, which is intended to encourage innovation and allow genuine commercial market forces to find a fair price for DSR and create an effective and vibrant market.

In this response Sentec has taken a fresh approach, not constrained by current industry practices and structures. When presented at an international forum last year, this approach received considerable interest and triggered the white paper linked below.

### Sentec's proposed model

This model was outlined in our recent white paper, "[Driving demand response - Catch 22](#)". The main thrust of this is around the provision of widespread DSR delivered through automated means, rather than general behaviour shifts driven through TOU etc. The essential details of this are summarised below:

#### **DSR revenues flow through a few third-party "aggregators"**

- Preferably, these are consumer-facing businesses with an online presence
- Consumers actively engage with these businesses already
- Aggregators benefit indirectly from the increased online customer engagement
- They should not be companies who are already involved in the supply of electricity

#### **DSR appliances communicate over familiar public IP networks (e.g. WiFi)**

- Consumers can buy DSR-ready appliances in a regular retail transaction
- Consumers self-connect the DSR appliance to their own home (WiFi) network
  - Not via a smart meter or a utility network
- Consumers register the DSR appliance with their choice of aggregator using an online website
- The appliance provides, on command, DSR, which is verified via the consumer's (WiFi) network
  - Consumers only get credit if their device(s) actually provided a verified response
- Consumers are paid by the aggregator for the verified DSR that their appliance provides
  - Cash, vouchers, services, rewards

#### **DSR "aggregators" sell on the aggregated DSR to DNOs etc**

- They can negotiate deals covering the whole of the UK
- They can sell DSR with a mixture of real-time pricing and forward contracts, as they see fit
- They can balance conflicting local vs. national drivers
- Competition, not regulation, sets the value of DSR
- All the existing mechanisms for balancing and settlement are unaffected

#### **DSR operates entirely independently from tariffs and energy suppliers**

- Consumers can continue to switch suppliers and choose tariffs as they do now
- Energy suppliers may still separately use TOU to encourage general load shifting

## Precondition I

### Question 1

*Are there any additional key challenges associated with revealing the value of demand-side response across the system? If so, please identify and explain these challenges.*

The challenges are large, because the value of DSR is dynamic and accrues to different parties at different times.

To value DSR, different operators at several different points in the network must make a judgement about how much they are prepared to pay in exchange for, e.g., a potential deferral or reduction of capital investment in their network, prevention of damage, keeping expensive generation offline, disconnecting renewable generation, etc.

Let's imagine that a cable has capacity  $X$ ; beyond  $X$ , the cable may be damaged or become unsafe. Suppose the load on the cable is at, say  $0.3X$ , DSR has little value to the owner of the cable. However, as the load approaches  $1.0X$ , the value of DSR increases, as the TO or DNO may be prepared to pay increasingly large amounts to avoid overloads and consequent damage or potential customer outages, or to reduce the losses in the cable and improve their efficiency.

At the same time, elsewhere on the network, a DNO with large amounts of distributed generation may be having voltage control issues as a result of low local demand and mid-day sunshine (a common feature in suburban solar PV installations), and may value increasing the load locally to prevent fines from an over-voltage event. The closer the voltage gets to the upper limits, the more the DNO may be prepared to pay to keep within limits. And on another part of the network, where there may be maintenance taking place and additional load is being taken on an adjacent transformer, a DNO may wish to use DSR to keep local loads low and prevent the transformer from overheating. In these types of scenario the benefit to the network operators becomes predicated on their clear understanding of the capacity constraints on their networks or where pinch points or areas of weakness exist.

It is Sentec's view that the "optional" competitive mediation above is an essential part of any DSR system, and not an optional component. This is because there are too many parties with potentially conflicting requirements. There is a hierarchy of local, regional and national priorities, and an independent aggregator will be able to trade these off against each other. This is actually a good thing, because it drives genuine competition: which party is prepared to pay more to have local demand increase or decrease at any given time? In such a competitive market, the value of DSR should ultimately find its own level, rather than be set through regulation.

### Question 2

*Can current regulatory and commercial arrangements provide the means to secure demand-side response being delivered? If not, what will regulatory and commercial arrangements need to deliver in future?*

It is very unlikely that DSR will flourish under the existing or proposed regulatory and commercial arrangements. There's not enough entrepreneurial thinking and input to stimulate investment in DSR appliances and controls. The proposed financial interactions around DSR are too closely based around using the existing pricing and charging mechanisms between the different operators. These are rigid, complex and closed to outside parties, and were designed with very specific objectives in mind. DSR is only going to thrive if there is innovation and competition, and that needs some open mechanisms to encourage money to flow and to provide visibility to those businesses outside the closed utility world that need to create the DSR-aware appliances and controls that are at the heart of providing the actual "response" in DSR.

In the shorter term, because of the existing structure of the market, it is likely that some level of regulation will be necessary to oblige DNOs to provide interfaces to allow them to request DSR based on location, kW and price, and for other operators or third parties to bid for and fulfil those requests. A mixture of real-time DSR bidding and buying/selling ahead on different timescales is likely to make for the most competitive arrangement. To make this work, a common, and open, mechanism should be specified by the regulator, preferably using an approach which is fit for the 21<sup>st</sup> century, and extensible to allow the market for DSR-like services to develop over time.

### Question 3

*Is current work on improving clarity around interactions between industry parties sufficient? If not, what further work is needed to provide this clarity?*

The question is based on the preconception that DSR values will be transacted directly between the existing industry parties. Trying to adapt the existing interactions for a purpose for which they were not intended is unlikely to be successful, and will likely prevent outside businesses from taking part in providing DSR. Sentec's view is that it is better to leave the existing balancing and charging interactions alone, and allow DSR to flourish in its own entirely separate ecosystem. An individual operator will understand how DSR affects both their charges through these closed industry interfaces, as well as their own CAPEX and OPEX (or TOTEX) in delivering their services, and will choose how to use DSR to their best advantage.

## Precondition 2

### Question 4

*Are there any additional key challenges associated with effectively signalling the value of demand-side response to consumers? If so, please identify and explain these challenges.*

The question implies several preconceptions:

- a) Foremost of these preconceptions is the idea that the end customers' financial benefit from DSR is delivered through tariffs or price by their energy supplier. This goes directly against the principles of simplifying tariffs that have been proposed recently, and fails to realise the opportunities and benefits that consumer-facing companies can bring by delivering the benefits of DSR separately from the charges for consumption. A 5% earned discount on £1000 annual utility bill spread over 4 quarterly bills is likely to be quickly forgotten or ignored – it's not ringfenced, and it's delivered with the "bad news" of a hefty bill. By contrast, a £50 "bonus" earned and delivered separately to a consumer on something that they value is likely to be more memorable and "sticky": tradable supermarket loyalty points, gift vouchers for an online retailer, a free tank of petrol for their car, subscription to a music download service, etc. The process of registering for DSR should be a simple on-line process when you buy a smart appliance, perhaps even with cashback, rather than something akin to the rather cumbersome and ill-trusted change of supplier/tariff process that most people are not motivated to engage with.
- b) There is no need to wait for the smart meter rollout and the associated communications channels to enable DSR. There are other methods of achieving DSR, for example via the almost ubiquitous in-home wireless networks which already exist in consumer premises. Home owners are already strongly motivated to maintain their in-house networks and it is likely that this would be further incentivised through earning rewards for their participation in the DSR scheme.
- c) There is a preconception that DSR is "on" or "off". That's not the case, because the value to each party in the network is extremely dynamic depending on network conditions. So the idea that there is a simple "signal" is itself misconceived.

### Question 5

*Do you agree that signals to customers need to improve in order for customers to realise the full value of demand-side response? Does improving these signals require incremental adaptation of current arrangements, or a new set of arrangements?*

See answer to question 4 above: adapting the current arrangements is fundamentally the wrong approach. It is only through using the ubiquitous public broadband network to communicate with DSR-aware devices that DSR will ever reach any degree of scale, and only through achieving scale will DSR actually deliver any benefits to the industry parties. Unlike energy billing, DSR doesn't need to depend on the same network as (eg) smart meters and can be independent of the rollout and use existing communication networks.

## Question 6

*To what extent can current or new arrangements better accommodate cross-party impacts resulting from the use of demand-side response?*

Using an independent aggregator and providing competition provides a framework where cross-party impacts have a financial value. The aggregator can trade off different parties against each other in the way that they contract. Having several competing aggregators will mean that there is fair competition on price for providing DSR in these circumstances.

## Precondition 3

### Question 7

*Are there any additional key challenges associated with customer awareness and access to opportunities around demand-side response? If so please identify and explain these challenges.*

Consumer “awareness” by itself won’t achieve any progress in DSR if there is no means for them to engage: they have to be able to, and motivated to, buy a DSR-enabled device, and fundamentally these don’t exist at the moment. This is because there is no incentive for manufacturers to invest in product development, as there is no market for consumers to make a return on their investment in a DSR-aware device – nobody trades DSR across the UK at the moment. Imagine, though, walking into your local electrical retailer and seeing an appliance labelled as “Smart” with a sticker that says “earn £50/year when you register this appliance on your WiFi network”. Consumers don’t need to understand exactly how DSR works in order to consider buying in.

### Question 8

*Is any additional work needed to explore the role of third parties in helping customers to access and assess demand-side response offerings?*

Yes, this is the key to making DSR a reality in the UK. Once again, much of the discussion in the consultation assumes that customers will have to be sophisticated and enter into a complex new contract with their energy supplier in order to get any benefit from DSR. With a different perspective, nothing could be further from the truth, if the aggregation of DSR benefits is via several competing and completely independent third parties: a consumer should be able to

- walk into their retail electrical store
- buy a DSR-appliance just like they buy a “Smart TV” or a laptop
- take it home and connect it to their own home wireless network, themselves
- register it on a third party online retailer website, just like registering any other new purchase
  - using an existing account if they already shop with the retailer
  - registering the address so that it can be located on the electrical network
- begin receiving benefits for the appliance from the online retailer each time it actually delivers DSR
  - perhaps even starting with a “signing up” bonus
- from their online account, track the benefits they receive and choose how to spend them
  - and potentially control how intrusive/aggressive the DSR behaviour is to suit their personal needs

There’s no change to the consumer’s interaction with their energy supplier. Their tariff remains the same. They can still switch energy supplier, and retain all the benefits of their separate, ringfenced DSR account/appliance. If they end up using less energy as a result, they keep that benefit too.

The online retailer is the aggregator. They contract with the local DNO and sell aggregated DSR competitively to maximise their returns. They make a margin on this, and pass on some of the benefits to their DSR customers. Provided there are several competing online retailers acting as aggregators, the market will set the prices and margins without any need for regulation – DSR can operate in its own unregulated ecosystem.

## Conclusion

### Question 9

*Are there additional preconditions for delivering the right environment for demand-side response? If so, please explain what these are and why they are important, as well as attaching a priority relative to those challenges we have already identified.*

Automated DSR is ultimately delivered by appliances that are DSR-aware, which don't exist at the moment. There are no technical hurdles involved – the technology is known and mature – but there is commercial risk to manufacturers in undertaking the product development without sufficient certainty of being able to sell the resulting product and recoup their return on investment. The end appliances may be more expensive as they contain additional electronics to deliver the DSR, and consumers won't necessarily buy these if they can't see an immediate way to recover the additional cost.

So some funding to encourage the early development of DSR-ready products and/or to subsidise the selling price and/or incentives the early purchase of DSR-ready appliances may be necessary to get DSR off the ground. Alternatively, some incentives that encourage on-line retailers to step up and invest in the necessary IT infrastructure to begin to offer DSR aggregation services may be more appropriate – this would then give prospective manufacturers of DSR-ready devices some confidence that the market will develop, and de-risk their product development.

### Question 10

*Do you agree with the priority and timing we have attached to addressing each of the key challenges identified above?*

A number of the “key challenges” become low priority if the model of competitive third-party aggregators is followed, but the priorities seem to have been set on the assumption that the existing charging and balancing mechanisms are at the heart of a future DSR implementation. On that basis, we don't agree. Although the challenges are predominantly commercial, not technical, the focus appears to be far too much on the internals of the industry, rather than considering the bigger ecosystem of consumers and manufacturers of equipment. DSR will fail to take off unless there an unbroken link between all the relevant parties, not just those who are involved in the actual supply of energy today.