

Demand Side Response

A large user perspective

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INOVYN – key dimensions

Profile

Employees

4300



Turnover

€3.5
Billion



Production

40 million
tonnes per annum



Sites

18
manufacturing
sites in
8 countries



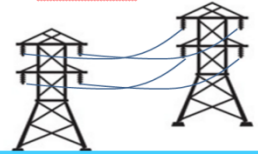
Gas Use

4,500 GWh



Electricity Use

7,000 GWh



We manufacture & have provided DSR in 8 European countries

Production sites	Chlor Alkali
Antwerp/Lillo	✓
Ferrara	
Jemeppe	✓
Martorell	✓
Newton Aycliffe	
Porsgrunn	
Rafnes	✓
Rheinberg	✓
Rosignano	✓
Runcorn	✓
Stenungsund	✓
Tavaux	✓
Tavazzano	
Antwerp/Zandvliet	✓



Everybody loves DSR

“Greenpeace report shows how both fossil fuel and renewable CHP, alongside demand side management, can help deliver a nearly-decarbonised UK electricity system at least cost in 2030.”

“DSR is an important part of our vision for a flexible energy system.”

Ofgem

“the UK could do without Hinkley’s 3.2 GW of power .. at times of peak demand simply by exploiting demand-side response to a fairly modest degree beyond ‘business as usual’. ..”

ECIU, Aug 2016

Value of flexibility will increase “potentially by orders of magnitude”.

Andrew Wright, Ofgem, Power Responsive, June 2016

“Demand Side Response could transform our energy system”

S Holliday, National Grid

“The move to a low-carbon economy is likely to increase the demand for DSR.... While there is significant potential for DSR, there are also considerable uncertainties around its current potential, and how it will develop over time.”

Frontier Economics for DECC, Oct 2015

So DSR is going to save the world. What is it?

...DSR appears to mean a lot of different things to different people

- **The “Response”**

- Peak avoidance *“hours notice, hours duration”*
(TRIAD/Capacity Mechanism)
- Response services *“minutes/seconds notice, minutes duration”*
(STOR, Frequency Response)

- **The “Demand”**

- Load shifting *Do things at a different time of day*
- Load turndown *Reduce production*
- On-site generation *CHP/diesel generation increase behind the meter?*

Delivering Demand Side Response through load turndown

The nature of “generation response” and true “demand response” are very different

- DSR cannot generally compete directly with generation
 - If you are load shifting or turning up a generator, your “cost of business” is likely higher simply because of economies of scale
 - If you are turning down load, your cost of business is significantly higher.
 - The effect of delivering response is also very different for a generator and a customer

Electricity production represents “added value” to a generator. The Demand Side “adds value” to electricity

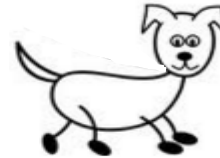
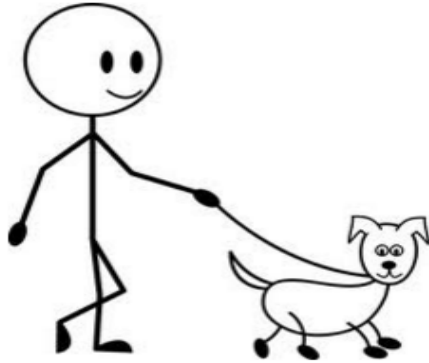
For the demand side, as more and more response is delivered, more and more of the core business is turned off

If we treat DSR as “negative generation”, we will never deliver significant quantities of demand response

Barriers to DSR

Energy Intensive Industry
Energy “team”

Large Energy User
Energy “team”



Resources to manage DSR are strictly limited

DSR and the Goldilocks problem

Too much, too little and just right

- The demand side has far better things to do than turn off, or wait at half output to turn up.
- Most users are not set up to interact with the energy market. It's not part of their normal activity

What does this mean?

- DSR is (generally) best suited to high value, infrequent actions
- If DSR is used too infrequently, the users will have almost no experience of providing it! *it might not be there when you want it*

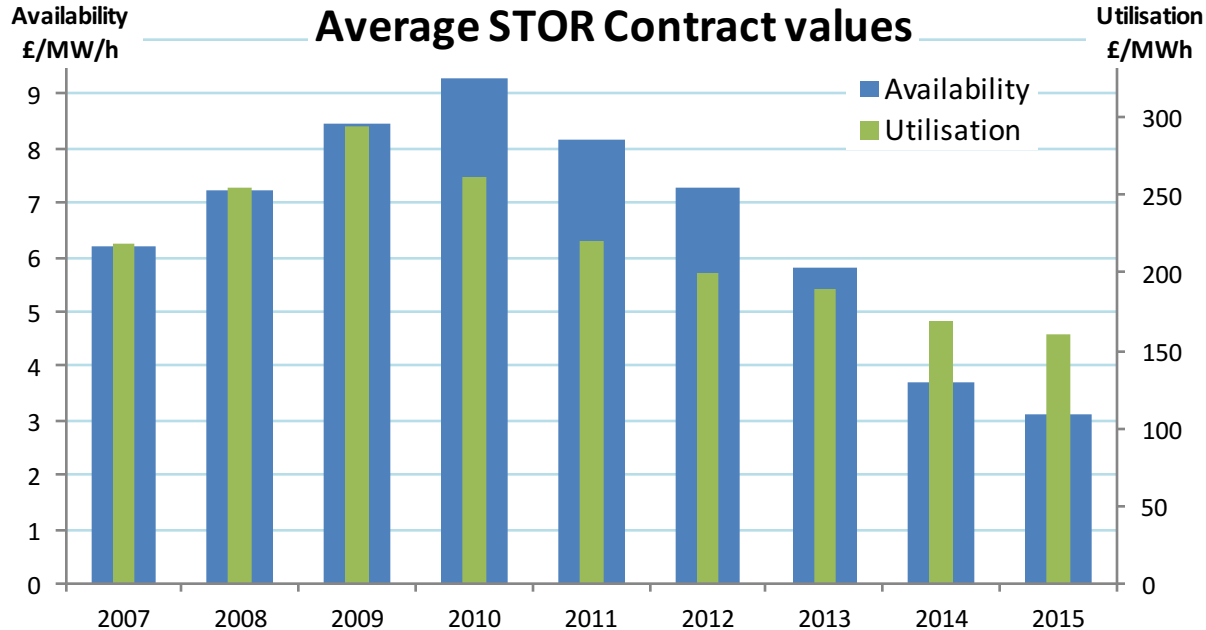
Unlocking Demand Side Response

Demand Response is diverse and distributed

Generator	Demand Response
Limited number of technical options	Highly varied processes
(largely) focussed into discrete units	Large number of smaller units
Core business	Not core business “have a business to run”
Business understands market & risks	Risks little understood.
	Value available has to encourage business to take risks they do not understand

Everyone is talking about DSR, what is the value?

The “importance” of DSR isn’t obvious in STOR contract values



STOR = Short Term Operating Reserve
Data from National Grid

What can we learn from the UK's most effective demand response scheme?

In 2015/6 NG estimate that Triad avoidance reduced peak demand by 1.7GW.

What are the features of Triad avoidance that make it “work”?

- Simple
- Easy to understand
- Good value for a discrete number of actions focussed into a known time period
- Happens every year – allows energy managers the opportunity to develop experience.
- Suppliers provide “access to market” through “triad warnings”
- No competition from large generators

And even then it's a hard sell to a manufacturing manager

An Industry view of “TRIAD”

Even though it is simple, and high value, it’s a hard sell, particularly if production is lost with reducing certainty of reward....

- “You don’t know what you are doing”
- “If we have restart problems it’s YOUR fault”
- “You are issuing warnings like confetti”
- “How can it be a Triad today – you said it was going to be one yesterday”
- “No-one has factored in wear & tear costs”
- “....but it’s warm!”
- “....but it’s Friday!”
- “We will only stop if it’s DEFINITELY a Triad tonight”

Enabling DSR

Can we build the DSR that everyone says we want?

- If all we need/want is access to embedded generation, then we are probably on the right track
- If we want true demand response
 - For “peaks/capacity” – Look at why TRIAD works
 - For other response – recognise that DSR cannot easily compete with generation.
 - Look at the expected usage.
 - Look at the value package
 - And to aggregate the wide array of processes and response, and help manage the risk there is probably a role for aggregators/suppliers (which adds extra cost)

Demand Side Response

What about the future

The current value of DSR is sufficient to encourage increasing participation from embedded generation units.

Will the value increase to the point that an active “demand” side enters the market as renewable penetration increases?

Or will the demand side remain a small niche player as generation CMUs/ batteries or “smart appliances” enter the markets?