

Overview of National Grid's Balancing Services



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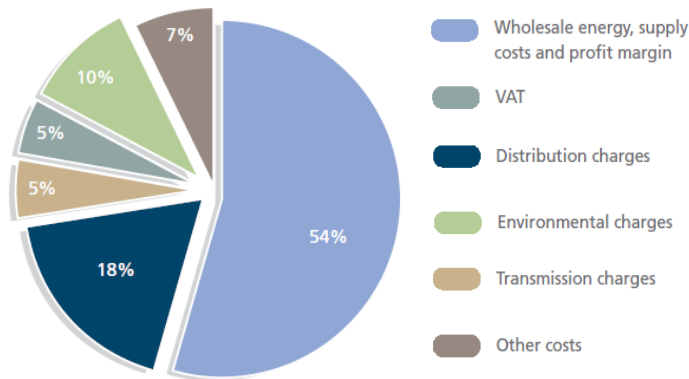
Agenda

Demand Side Response Workshop – 20 November 2012

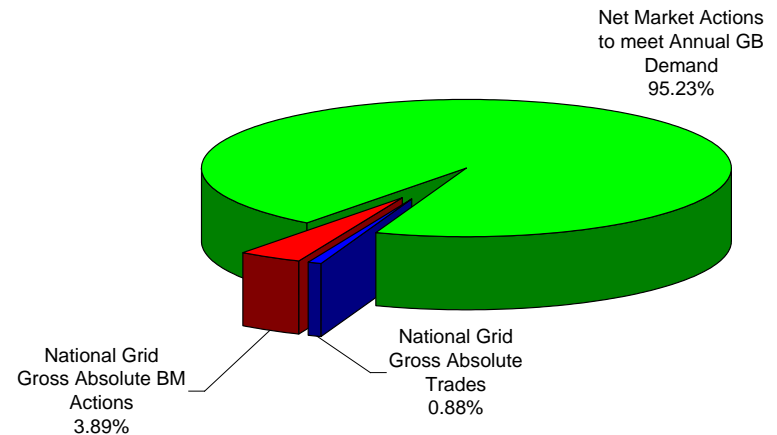
- **National Grid's energy balancing role in the GB Electricity Market**
- **Balancing Services**
- **Demand Side Response's current role in balancing**
- **Future Challenges and the role of Demand Side Response**

National Grid's Energy Balancing role in the GB electricity market

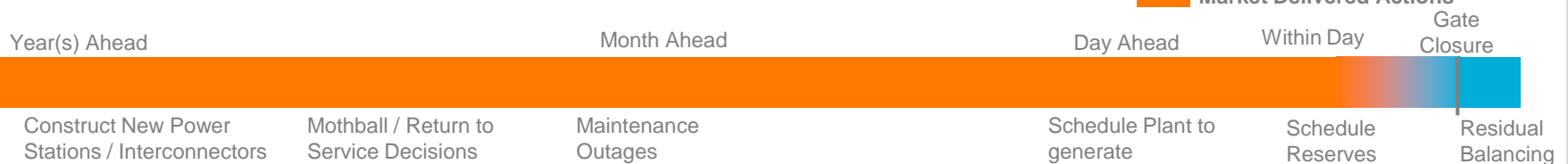
Ofgem Analysis of Domestic Electricity Bills – May 2012



Comparison of National Grid Action Volumes with Annual Demand (2010/11)



Electricity Energy Market



Demand Response little used (currently) by wholesale electricity market except perhaps at times of winter peak demand – TRIAD Avoidance

Significant potential for its use is there however

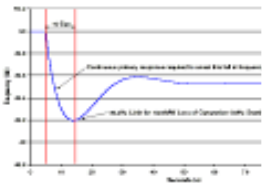
National Grid's use of Demand Response is well developed but National Grid's role is small in volume terms compared with remainder of the market

National Grid is very much the "Residual Balancer"

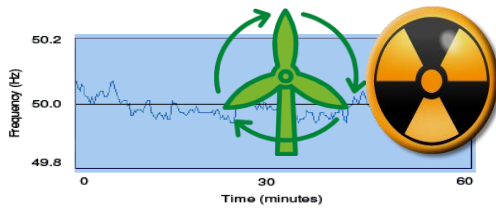
Balancing Services

Energy Balancing

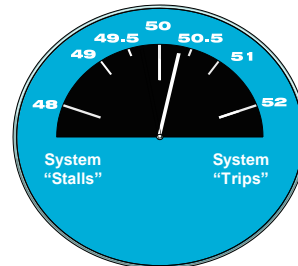
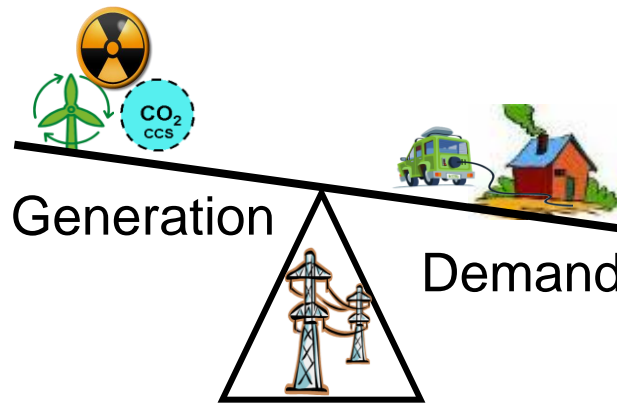
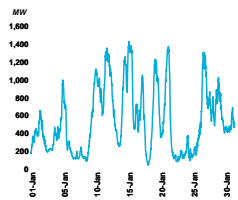
Large generation



Inflexible generation



Variable generation



Passive Demand



Industrial



Domestic

Active demand



Industrial



Domestic

Distributed generation



Balancing Services

Current Demand Side Services

Frequency Response

3MW 10-30 sec 15-30 min

£50-55/kW/annum

Max Req't: 1200MW approx
Demand Side contribution:
~8%

Fast Reserve

50MW 2 min 15min

£40-50/kW/annum

Max Req't: 800MW approx
Demand Side contribution:
0% day, 38% night

STOR

(Short Term Operating Reserve)

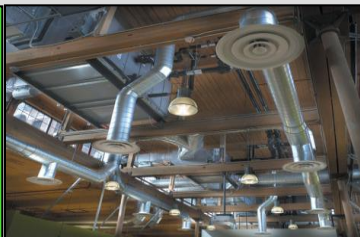
3MW 20min (4hr) 2hr

£25-35/kW/annum

Max Req't: 2800MW approx
Demand Side contribution:
45%

STOR in particular has seen strong recent volume growth on the demand side. However significant volumes of those STOR Services are in fact delivered by back-up generators depressing demand, rather than "true" load reduction.

Dynamic Frequency Response delivery by load management

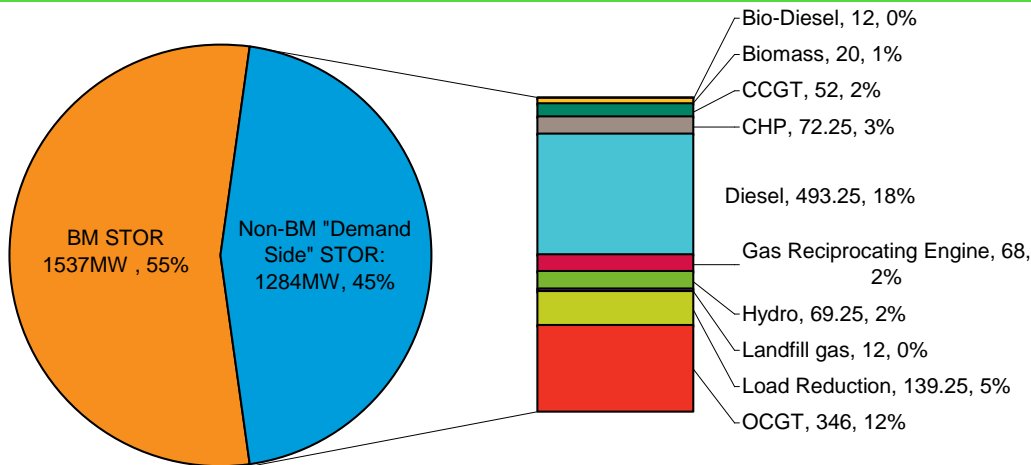


Static Frequency Response delivery by interruption of smelting



DSR's current role in Balancing STOR – breakdown

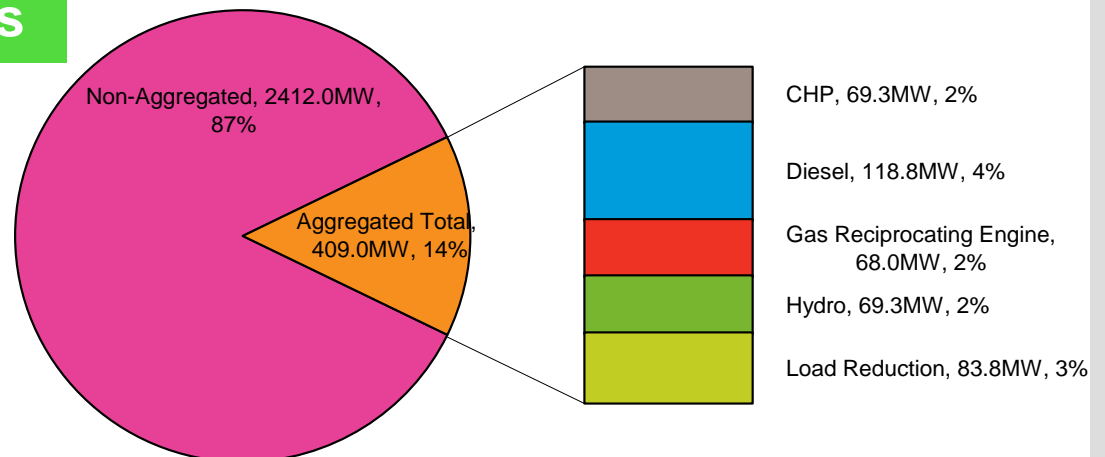
Focus on Non-BM "Demand Side" Services



- It appears that the majority of services are ultimately provided by generation resources
- Diesel and open-cycle gas turbine dominate

Aggregated STOR Services

- Aggregators are another key aspect of the STOR market, gathering smaller loads together for National Grid to instruct
- Diesel and other generation technologies predominate but biggest contributor of "true" demand side resources



Future Challenges & the role of DSR

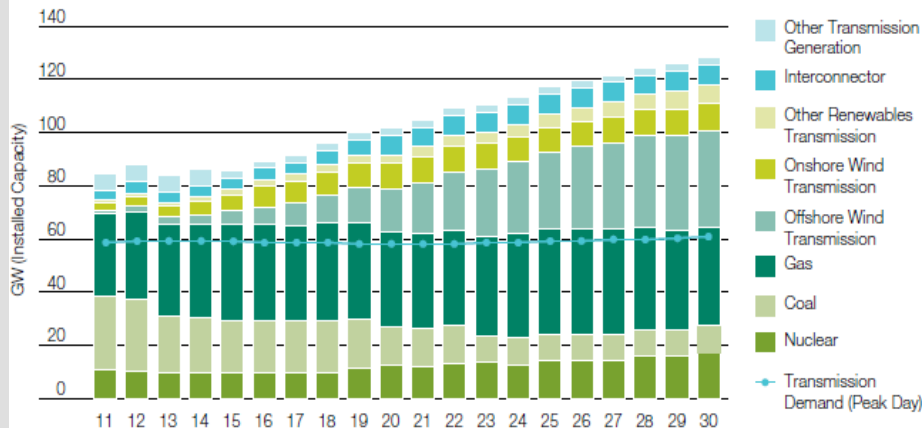
nationalgrid
THE POWER OF ACTION

The 2020 Challenge

Key driver: the expected large changes to the Generation mix

- Major changes to the composition and location of generation sources

Electricity Generation
Total UK energy requirement



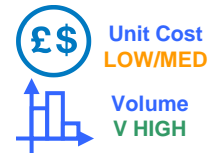
- This is likely to increase the uncertainty around balancing the electricity system

- Might this all lead to increasing opportunities for the demand side?

National Grid no longer the only interested party in Demand Side Response

Suppliers

Increased Use of DSR in wholesale markets to balance variable renewables output? Uses larger volumes of cheapest DSR



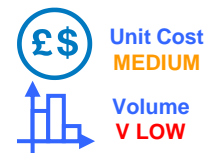
National Grid

Uses premium priced sources of DSR for residual balancing activity. Volumes low but perhaps higher than seen now



DNOs

Uses DSR as means of deferring network reinforcement. Perhaps unable to compete with other parties – shared use of DSR?



The 2020 Challenge

Balancing the GB Network

What are the Industry and National Grid doing?

Low Carbon Network Fund

- National Grid partnering with DNOs and others on a number of LCNF projects
- Investigating how network companies may share knowledge and operational tools utilising demand side response
- Working out where actions may come into conflict, looking to develop hierarchies etc

Significant Code Review

- How big an incentive will imbalance prices provide to the market to self-balance?
 - Key driver for wholesale market use of DSR
- Will other market mechanisms be introduced that impact upon DSR procurement
 - Day Ahead Reserve Markets etc?

Electricity Market Reform

- Capacity Mechanism will be key to the availability of low load factor plant
 - This type of plant effectively sets the Short Run Marginal Cost of reserve so may impact future DSR procurement

Develop New Services

- Consideration being actively given to how services may need to adapt to future challenges
- More dynamic, weekly, daily services as volatile requirements appear at much shorter notice
- EMR and SCR make firm long term decisions at this time highly difficult

Conclusions

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- **There is a significant and different balancing challenge for the wholesale electricity market and national grid to respond to in the coming years.**
- **Opportunities for the demand side are growing**
 - **SMART Metering & Time of Use tariffs**
 - **Building Management Systems Technology**
- **However growth opportunities lie across the electricity sector, with Suppliers and DNOs, not solely with National Grid**
- **Historically “demand side” services have been delivered by back-up generation**
 - **Is there greater scope for “true” demand side response to play a greater role in the future?**

