

Future System Requirements

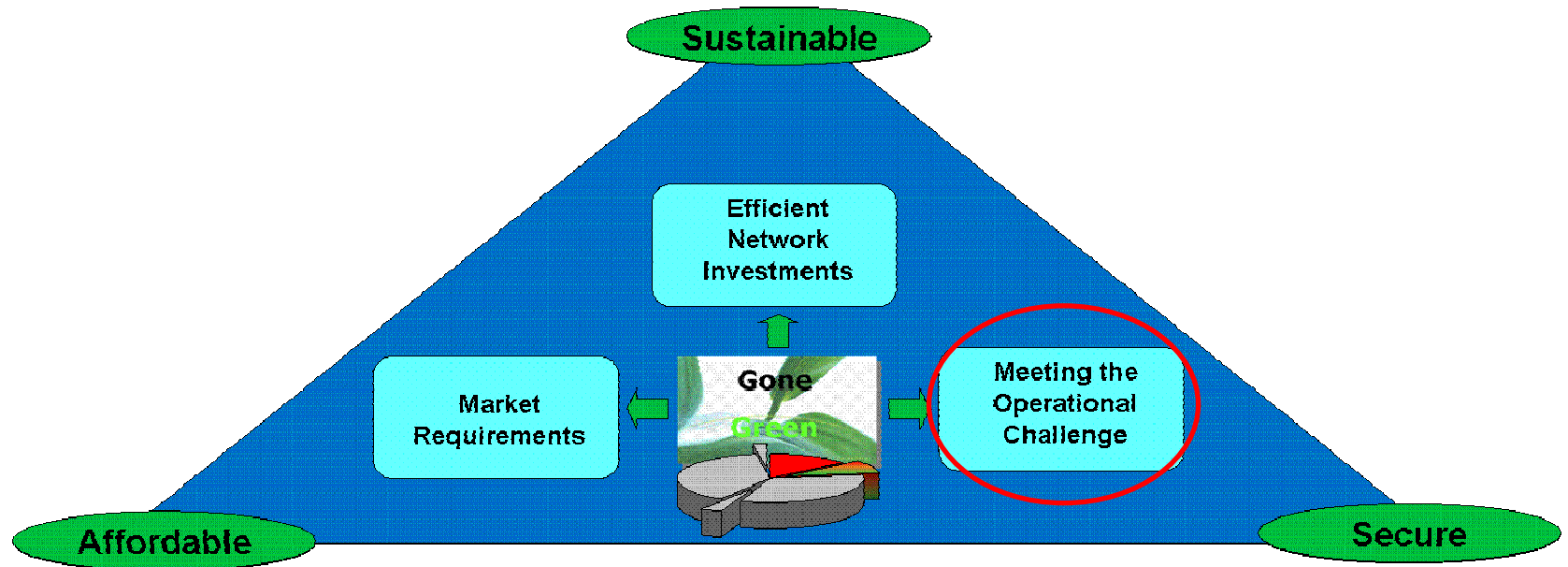
David Wildash

nationalgrid

The power of action.™

Introduction

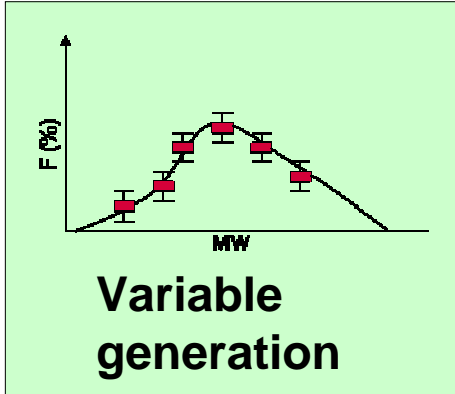
- ◆ The 'Operating the Electricity Transmission Networks in 2020' consultation was published last month
 - ◆ Designed to complement network investment work (ENSG)
 - ◆ And to feed into wider debates on energy markets and security of supply



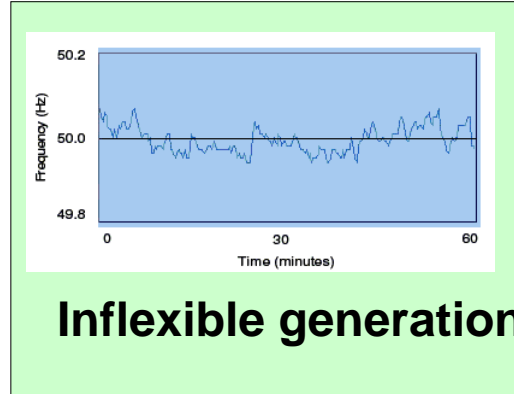
What is it?

- ◆ **An informal consultation, intended to**
 - ◆ Set out National Grid's broad view of short term operating issues in electricity in the future
 - ◆ Seek views of interested parties
- ◆ **Focussed on**
 - ◆ A 10 year horizon (2020)
 - ◆ Operational issues in the period mainly 4 hours ahead to real-time
- ◆ **Based on the 'Gone Green' generation and demand scenario**
 - ◆ Used by the ENSG in developing the proposals outlined in the report "Our Electricity Transmission Network: A Vision For 2020"

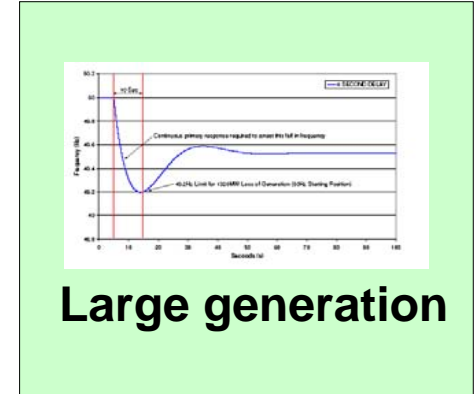
The Gone Green Generation Challenges



What operating reserve to hold in a world of variable renewable generation?



Can the new generation fleet of nuclear, wind and supercritical coal provide the full range of services?



How do we cope with larger plant >1320 MW when it 'falls off' the system?

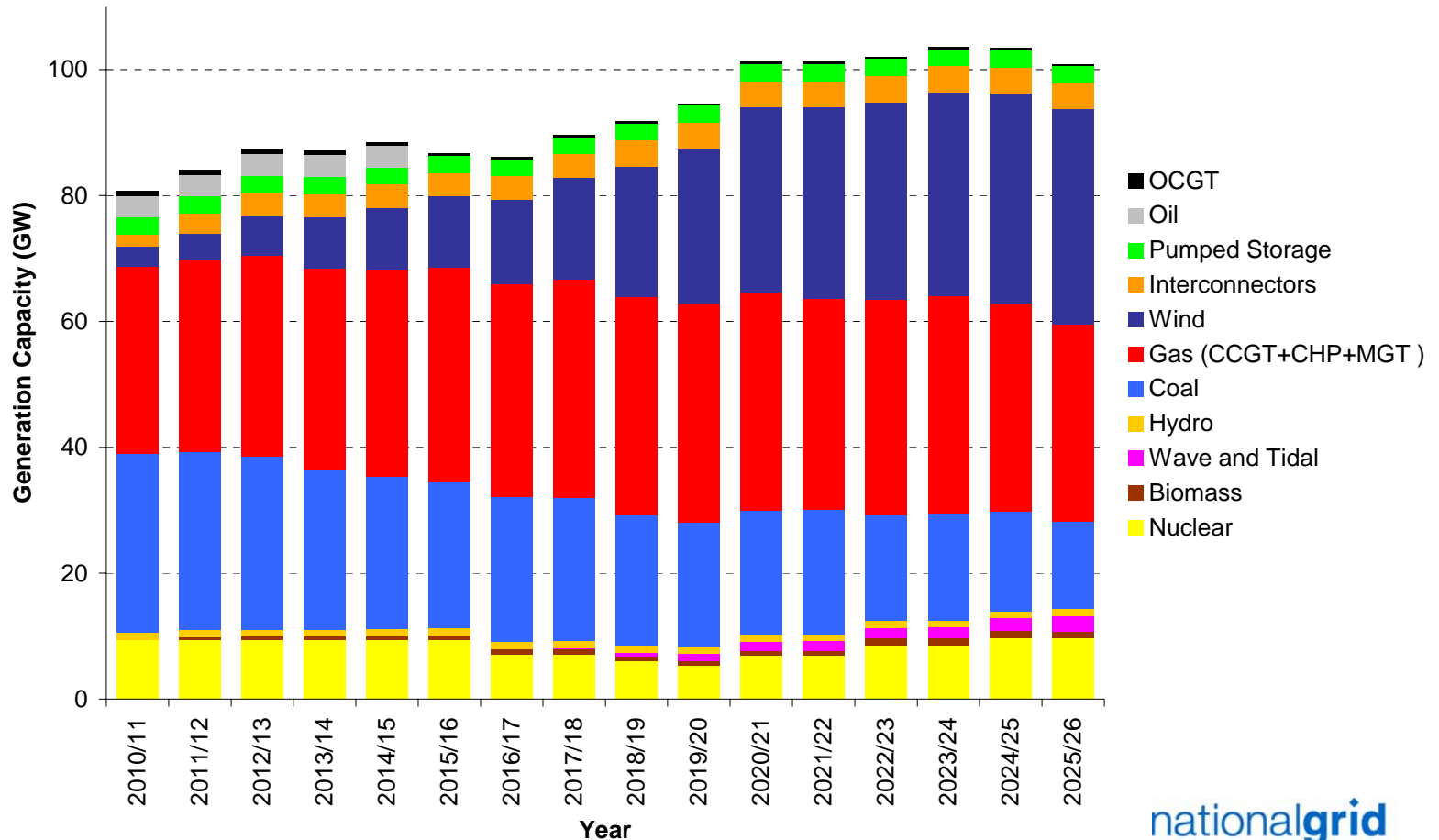
How to meet these challenges in the most economic and sustainable way whilst maintaining security?

Developments in Electricity Generation and Demand

- ◆ **Our discussion and analysis is based on the ‘Gone Green’ demand and generation scenario**
 - ◆ ‘Gone Green’ is useful in setting out issues in a plausible timeline which meets emissions and renewables targets
 - ◆ Other scenarios could be equally valid
- ◆ **‘Gone Green’ generation in 2020**
 - ◆ Wind Capacity at 29.5GW
 - ◆ Gas Fired Generation at 34.3GW
 - ◆ Coal Fired Generation at 19.8GW
 - ◆ Nuclear Generation capacity at 6.9GW
 - ◆ Some 15GW of embedded generation (including on-site CHP)
- ◆ **‘Gone Green’ demand in 2020**
 - ◆ Trend for peak demands is flat
 - Economic growth, transport and new applications drive demand up
 - Energy efficiency and embedded generation have the effect of reducing peak demand

Developments in Electricity Generation and Demand

◆ Generation under 'Gone Green'



Developments in Electricity Generation and Demand

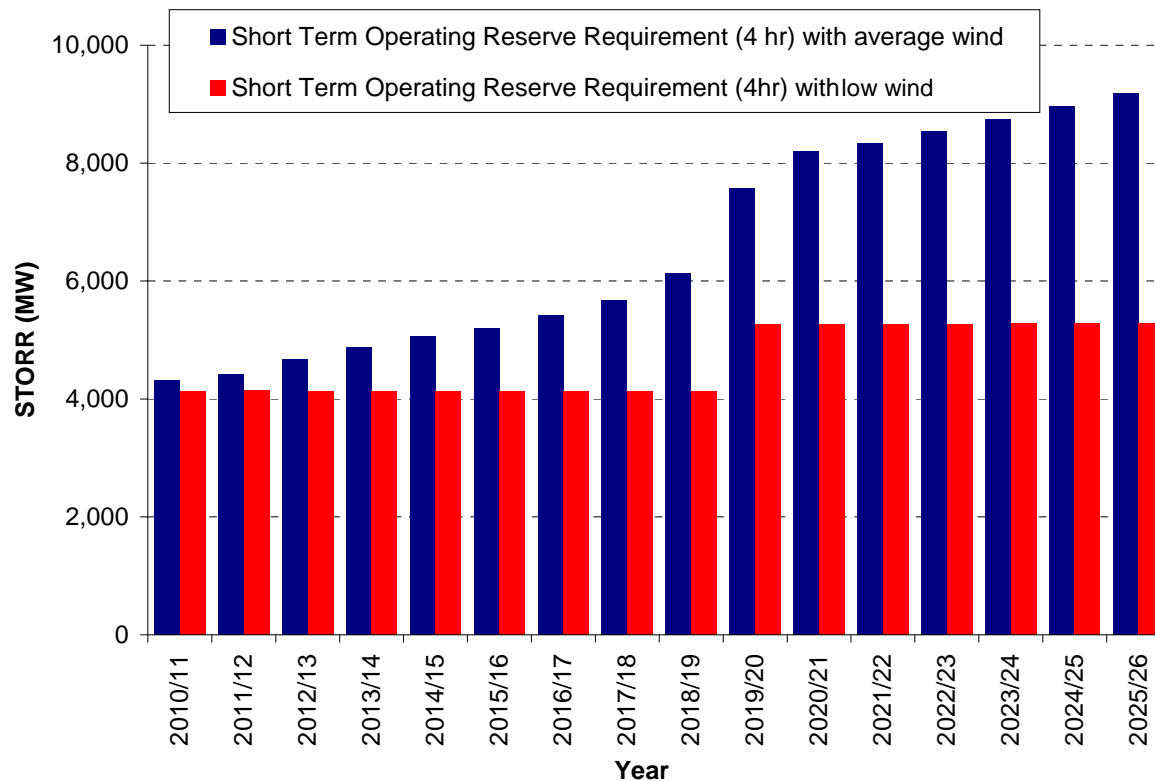
◆ Discussion of 'new' demand side technologies

- ◆ Overall trend
 - 'Gone Green' trend is essentially flat for net peak demand
- ◆ 'SMART'
 - the smart meter
 - active demand management
 - Smart Grid
- ◆ Electric Vehicles
 - charging period

Reserve and Operating Margin

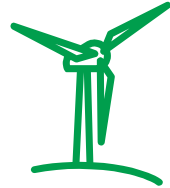
◆ Reserve requirement under 'Gone Green'

- Short Term Operating Reserve Requirement for average wind and low wind conditions



Reserve & Operating Margin – Future Requirement

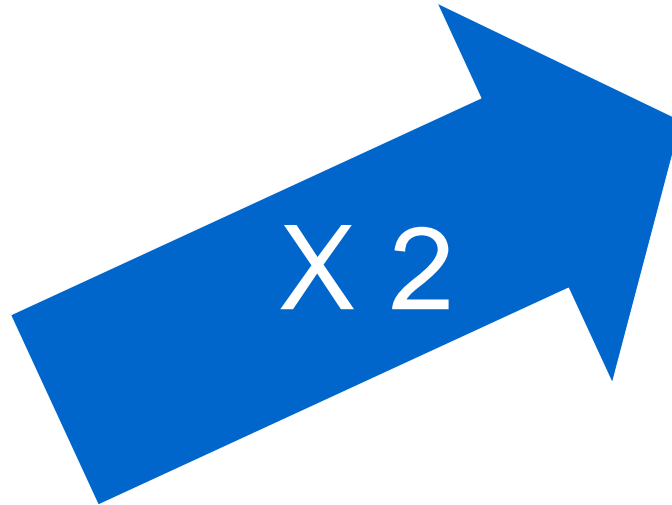
2009



2020

4 hour ahead uncertainty
in wind forecasting

>£550m

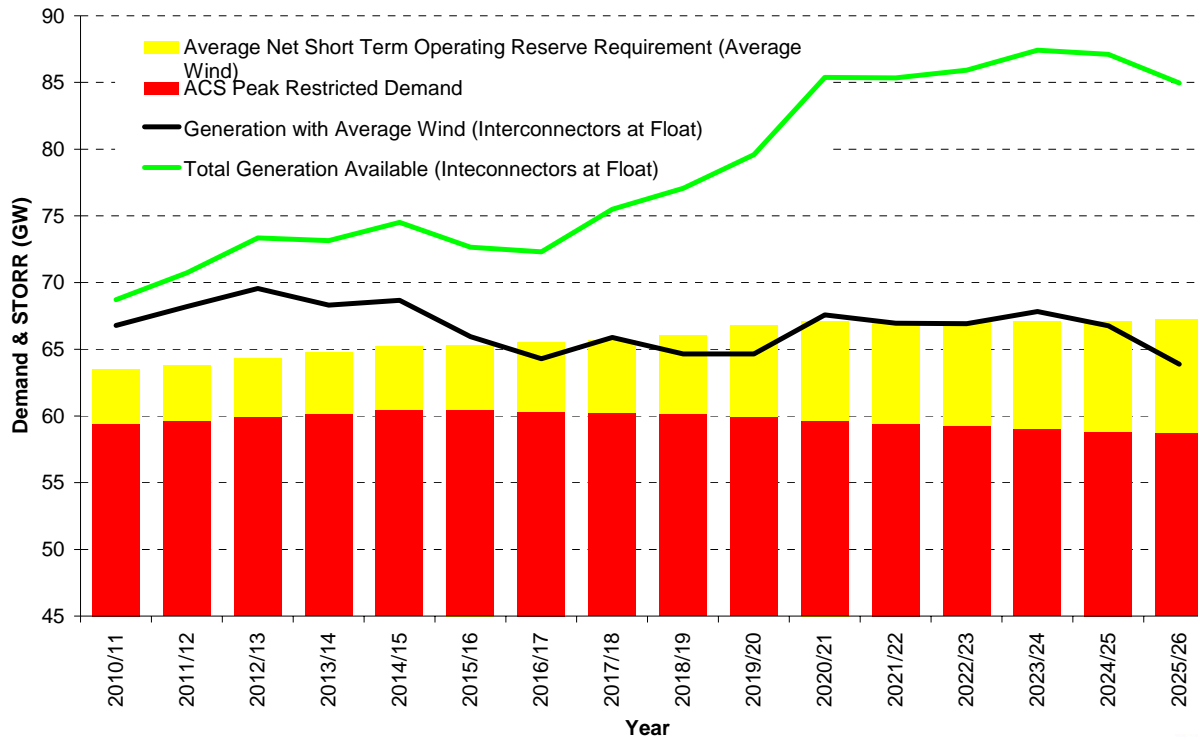


~£260m

Significantly greater
future requirement

Reserve and Operating Margin

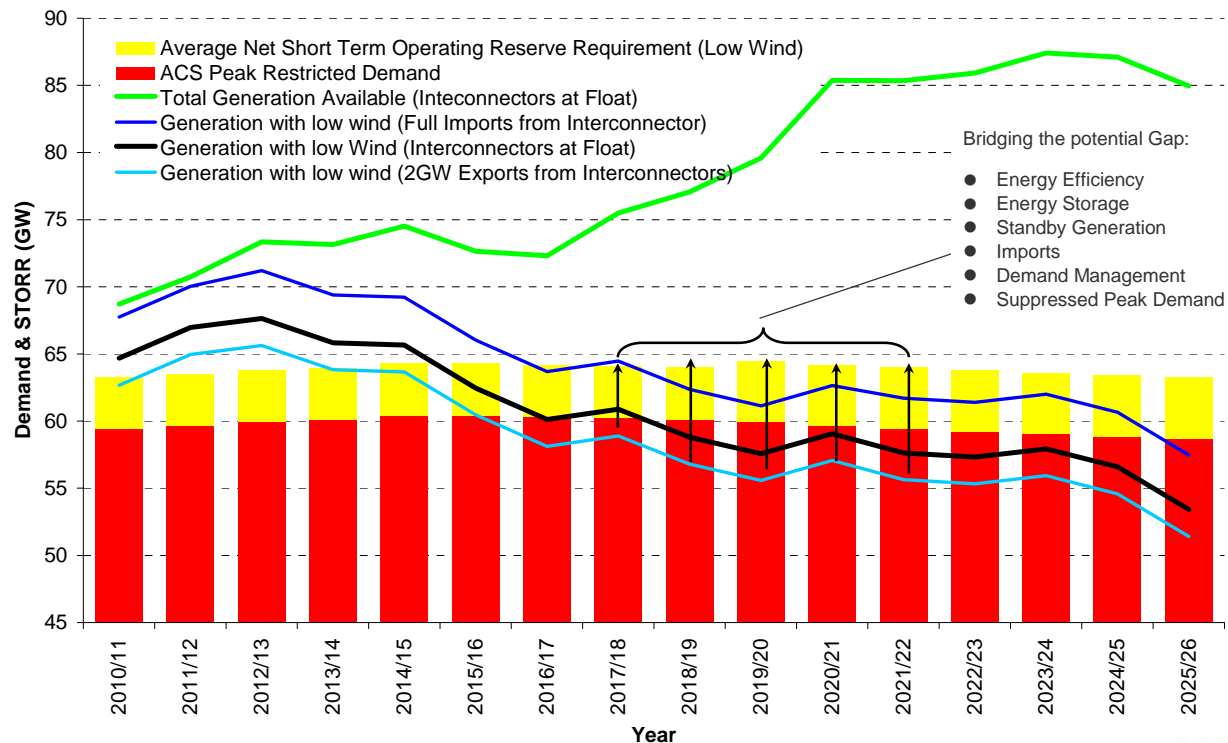
- ◆ Operating Margins under 'Gone Green'
 - ◆ Presented in a 'Winter Outlook' style
 - ◆ Firstly, looking at average wind conditions



Reserve and Operating Margin

◆ Operating Margins under 'Gone Green'

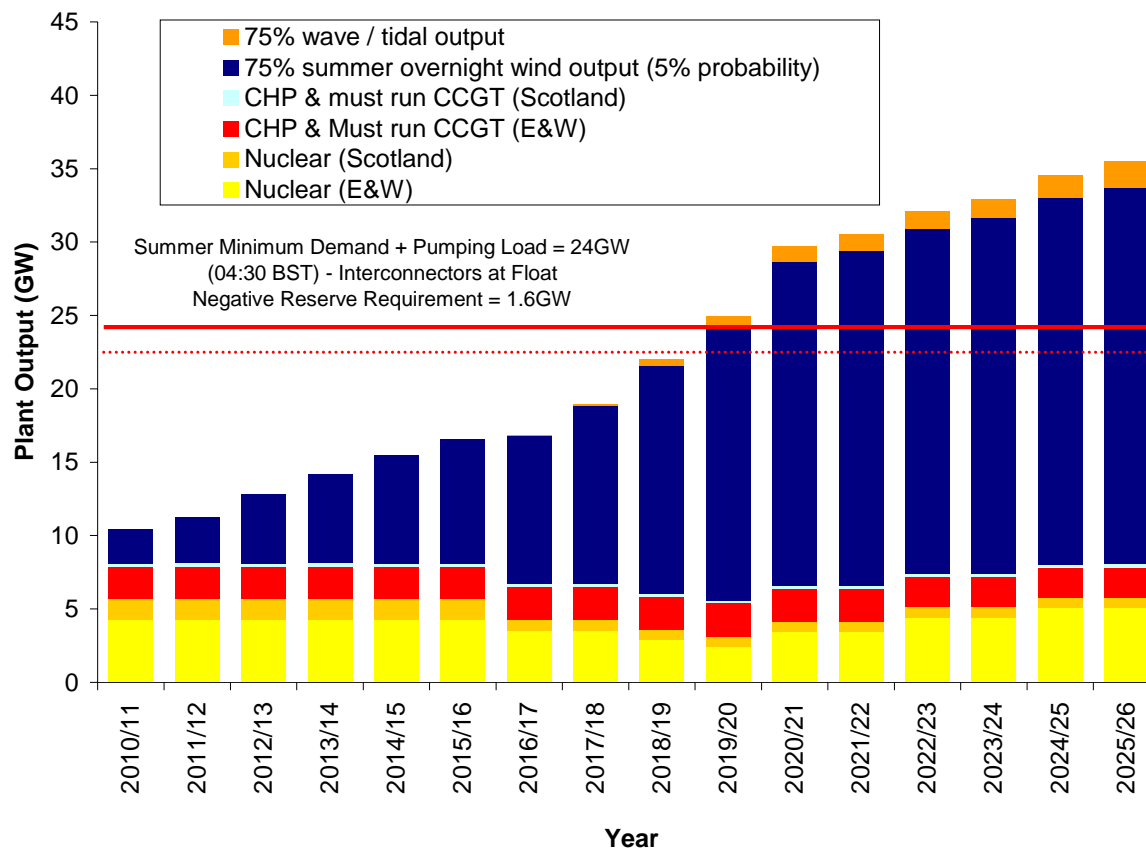
- ◆ However, average conditions become less meaningful as wind capacity grows
- ◆ Experience suggests that the System Operator needs to plan for low wind conditions



Reserve and Operating Margin

◆ Summer Minimum Demands under ‘Gone Green’

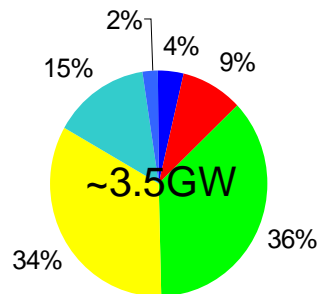
- ◆ Analysis based on occasions of ‘High’ renewable output (75% - 6 nights per year)
- ◆ Network reinforcements assumed to be in place
- ◆ Potential balancing costs of ~£1.6m (in today’s prices) per occasion in 2020



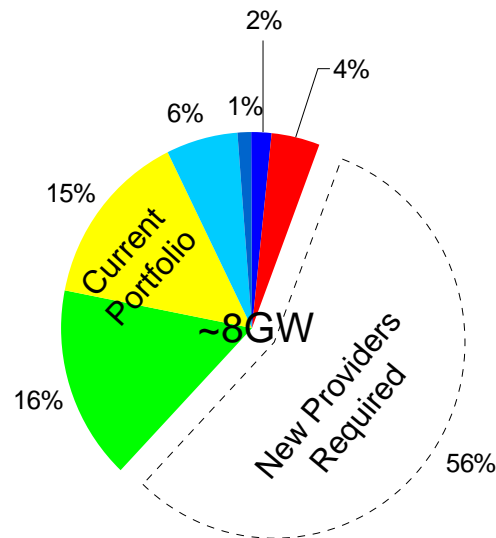
Balancing Services Development

- ◆ **There are clear opportunities to provide Balancing Services**
 - ◆ The consultation document discusses and seeks views on the provision of services from demand side, storage and interconnectors amongst others

Typical Current Winter Reserve Provider Breakdown



Potential Opportunity for New Reserve Providers in 2020



- Small Demand sites
- Large Demand sites
- BM STOR
- Non-BM STOR
- Pumped Storage
- Interconnectors

Key Messages

- ◆ **The generation mix is changing in response to the climate change challenge**
- ◆ **This will bring significant challenges to the System Operator in dealing with the characteristics of the new generation plant.**
- ◆ **Demand Side Management & Onsite Generation can help in providing National Grid with the services it requires.**

What's next?

- ◆ **Follow up report issued in the Autumn**
 - ◆ Incorporating responses and feedback
 - ◆ Any necessary updates

- ◆ **Intended to inform**
 - ◆ National Grid's development of processes and systems
 - ◆ Energy Market Developments
 - ◆ Future thinking on Security of Supply assessment

Responding

- ◆ **Formal or informal responses can be sent to**
 - ◆ Operating.2020@uk.ngrid.com
- ◆ **Responses can also be made online**
- ◆ **Please respond by**
 - ◆ 14th August 2009