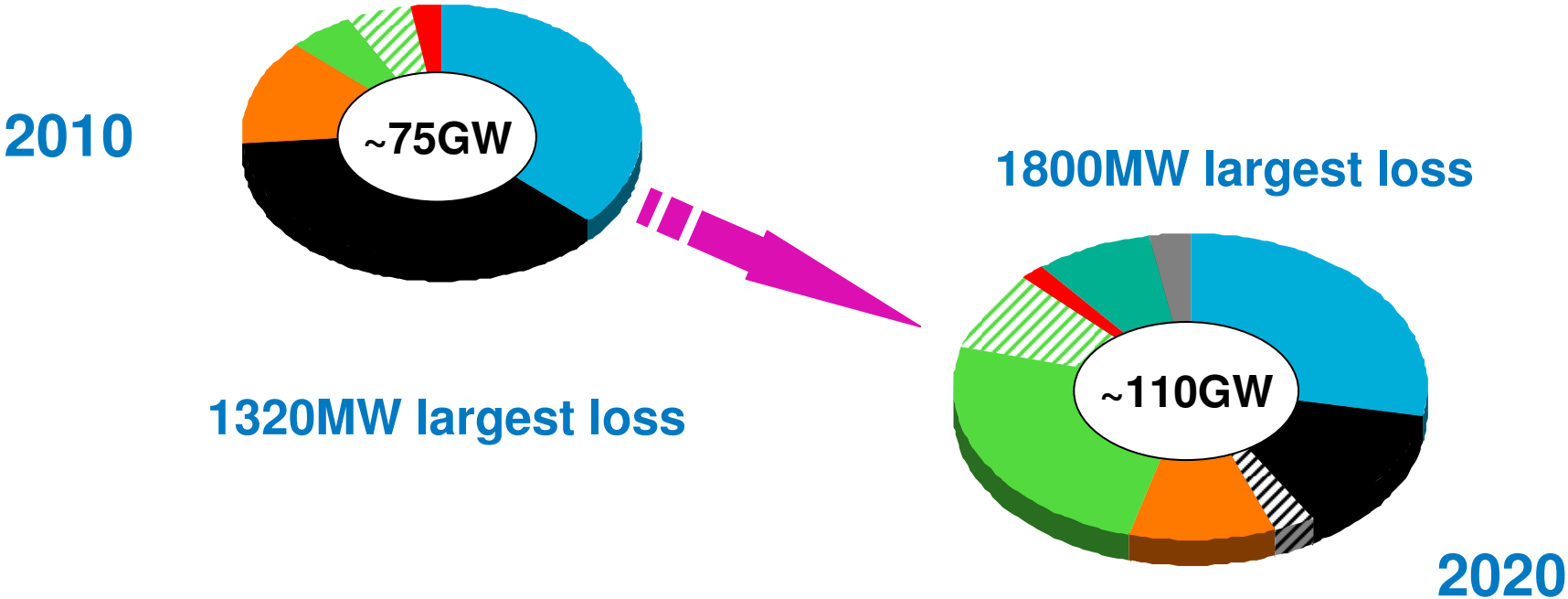


# Frequency Response – market development



Malcolm Arthur's Option

# Why do we need to change?



- Gas CCGT      ■ Coal      ▨ CCS
- Nuclear      ■ Wind      ▨ Renewable
- Interconnector      ■ CHP      ■ Other

## Why do we need to change?

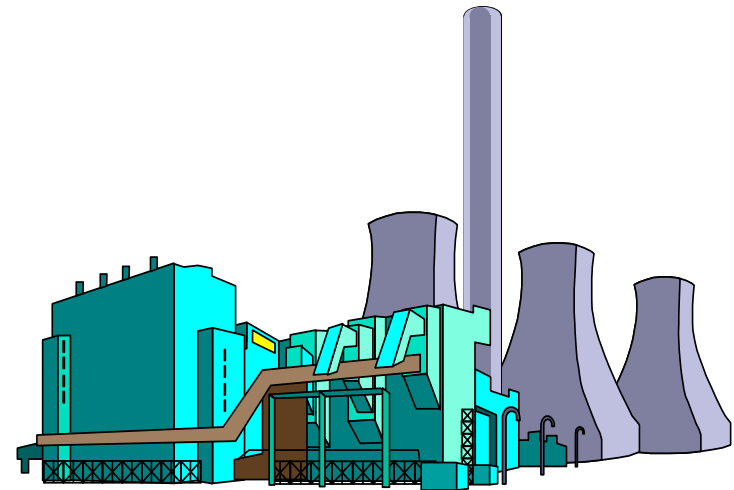
---

- Promotes alternative generation technologies that may not be able to fully comply with Grid Code
- New generation technologies will not be able to connect if obligation is too severe
- Provides an alternative to new generation

## Market aims

---

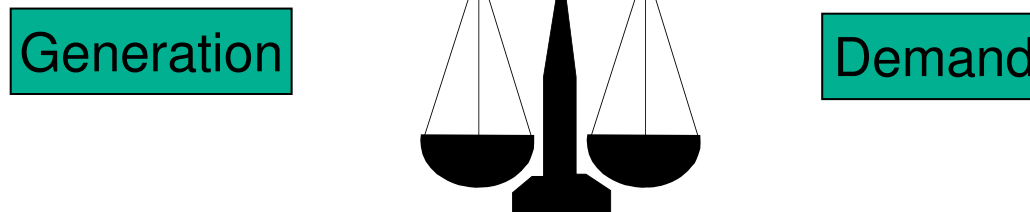
- Provide alternative options for providers
- Reduce costs to industry participants (reduce overall costs) . . . . .?
- Provide opportunity for new entrants . . . . .?
- Reduce carbon output . . . . .?



# SO Requirements

---

- Meet frequency response standards
- Reduce costs . . . . . ?
- Reduce carbon output . . . . . ?



## How would option work

---

- Grid Code obligation remains (as defined by the technical group) – any European influence?
- Generation would need to comply with the obligation either:
  - Own generation
  - Alternative technology
  - Contract for ‘top up’

## Detail to discuss

---

- Increase in operating costs
- Increased interaction with the energy market
- Additional testing and approving of alternative technologies  
e.g. governance to approve?
- Metering requirements of response volumes
- Increased optimisation complexity
- Increased monitoring and publication of response capability  
trades required
- New category of plant
- Increased system security risk
- EMR and European interaction

## Increase in operating costs

---

- What do you do about inherent capability?
- Targeted vs socialised – Benefits/Drawbacks?
  - What costs are being targeted? Response/balancing costs?
  - Cross market socialisation? Energy market/frequency market
- Consequential costs of being brought on? Additional costs from original capability?
- Compared to current operating costs
- De-loading plant to bring frequency units on
  - Additional costs for additional plant
  - Competition around bringing plant on
- Cost of de-loading and replacing vs minimum capability
- Administered bid prices during certain periods?



# Increased interaction with energy market

---

- Balancing market and movement within the generation market towards the balancing market

# Additional testing and approving of alternate technologies

---

- Demand side or technology such as batteries?
- Type test arrangements?
  - Kit that isn't on site as part of the new connection?
  - Substantive, can't be 15 technologies providing 10/10 obligation.
  - Design approval rather than type test?
- Could be wrapped up in compliance testing as part of the new connection arrangements? All on site kit would need to meet 10/10 obligation.
- Manufacture to provide a type tested piece of technology for power conversion – further assessment required at compliance testing
- Possible Grid Code change to cover testing of alternate technologies not treated as generation?
- Standard by which the characteristics can be demonstrated e.g. standard grouping of technology types
- Current compliance process should be sufficient for generators providing the obligation

# Metering requirements of response volumes

- Is it a group instruction for 10/10 or separate instructions for individual technologies?
- Off site flexibility/on site grouping
  - Meter on site/meter off site
- Provision is there for the contracted amount
- If current supplier no longer exists, requirement to mod app and show where that provision is being sourced from
- Need to prove that the response was delivered
- Be able to turn the payment off?

## Increased optimisation complexity

---

- Pricing structure based on availability and technology?
- Frequency side cost structure could be a sliding scale
  - Most flexible with full frequency response at one end, no capability at the other?
- Technology response profile?
  - Rate of delivery
- More complicated metering vs optimisation programme off of basic metering?
- Rolling real time solution for optimisation

## Increased monitoring and publication of response capability trades required

---

- Information transparency within the market?
  - Contractual information remains confidential
- A register of additional non-contracted availability?
- If generator unable to meet their requirements, apply for temporary derogation. Generators responsibility to let National Grid know they are no longer compliant.

## New category of plant

---

- Assets designed for response, not a generator
- Response unit rather than generation unit

# Increased system security risk

---

- Complexity of arrangements could impact
- More response could result in a more secure system