

Balancing Services

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Overview

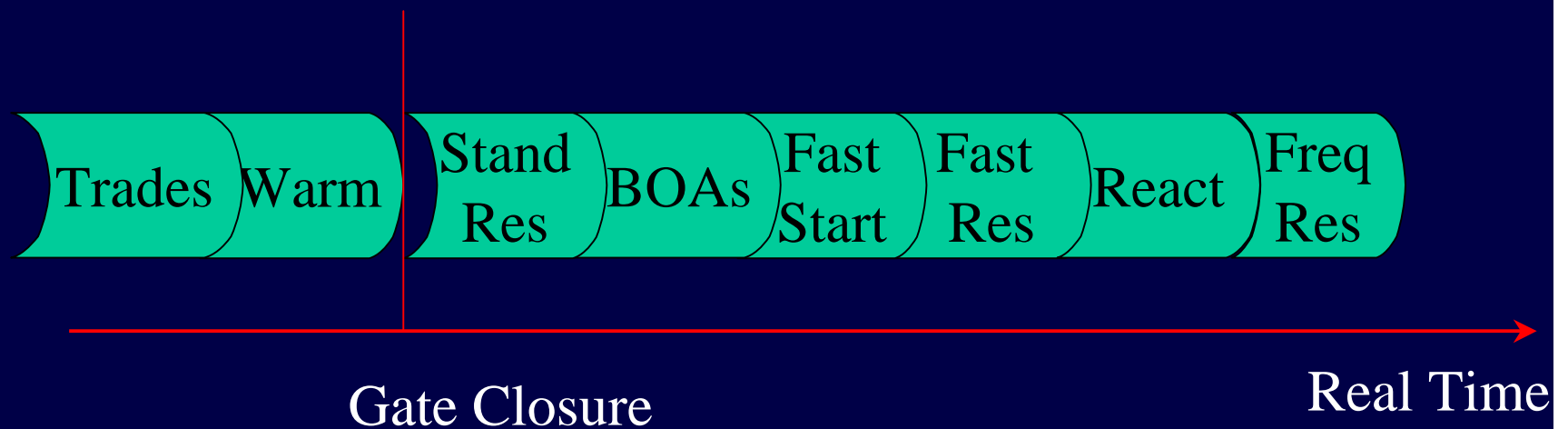
- ◆ **To outline for each Balancing Service**
 - ◆ **What it is?**
 - ◆ **Why National Grid procures it?**
 - ◆ **How it is procured?**
 - ◆ **How it is paid?**

Balancing Services

- ◆ **Frequency Response**
- ◆ **Reactive Power**
- ◆ **Fast Reserve**
- ◆ **Fast Start**
- ◆ **Standing Reserve**
- ◆ **Warming / Hot Standby**
- ◆ **Black Start**

Balancing Services

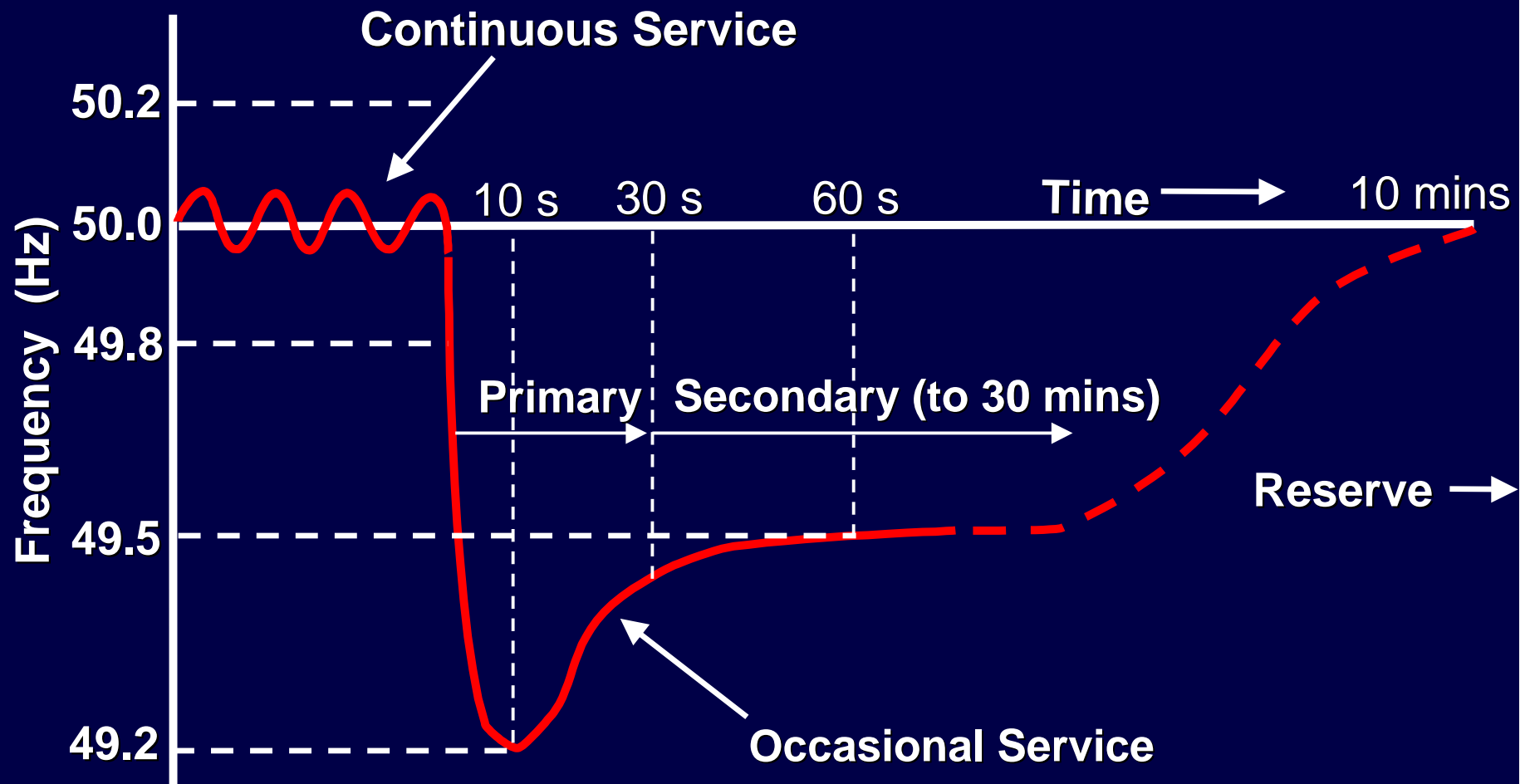
- ◆ The balancing services vary by time between instruction and delivery



Frequency Response

- ◆ **What is it?**
 - ◆ **an automatic change in active power output or demand in response to a frequency change**
- ◆ **Why we need it?**
 - ◆ **to maintain system frequency within statutory and operational limits pre and post fault**

Frequency Response - for Frequency Control



Frequency Response

- ◆ **Who can provide it?**
 - ◆ **all licensed generators in accordance with Grid Code mandatory requirements**
 - ◆ **demand tripping by low frequency relay**
 - ◆ **pump storage in “spinning-in-air” mode**

Frequency Response

- ◆ **How is it procured it?**
 - ◆ **bilaterally between National Grid and service providers**
 - **cost reflective basis for licensed generators**
 - **commercial basis for “alternative” technical response products**
 - **following CUSC, new markets may develop**

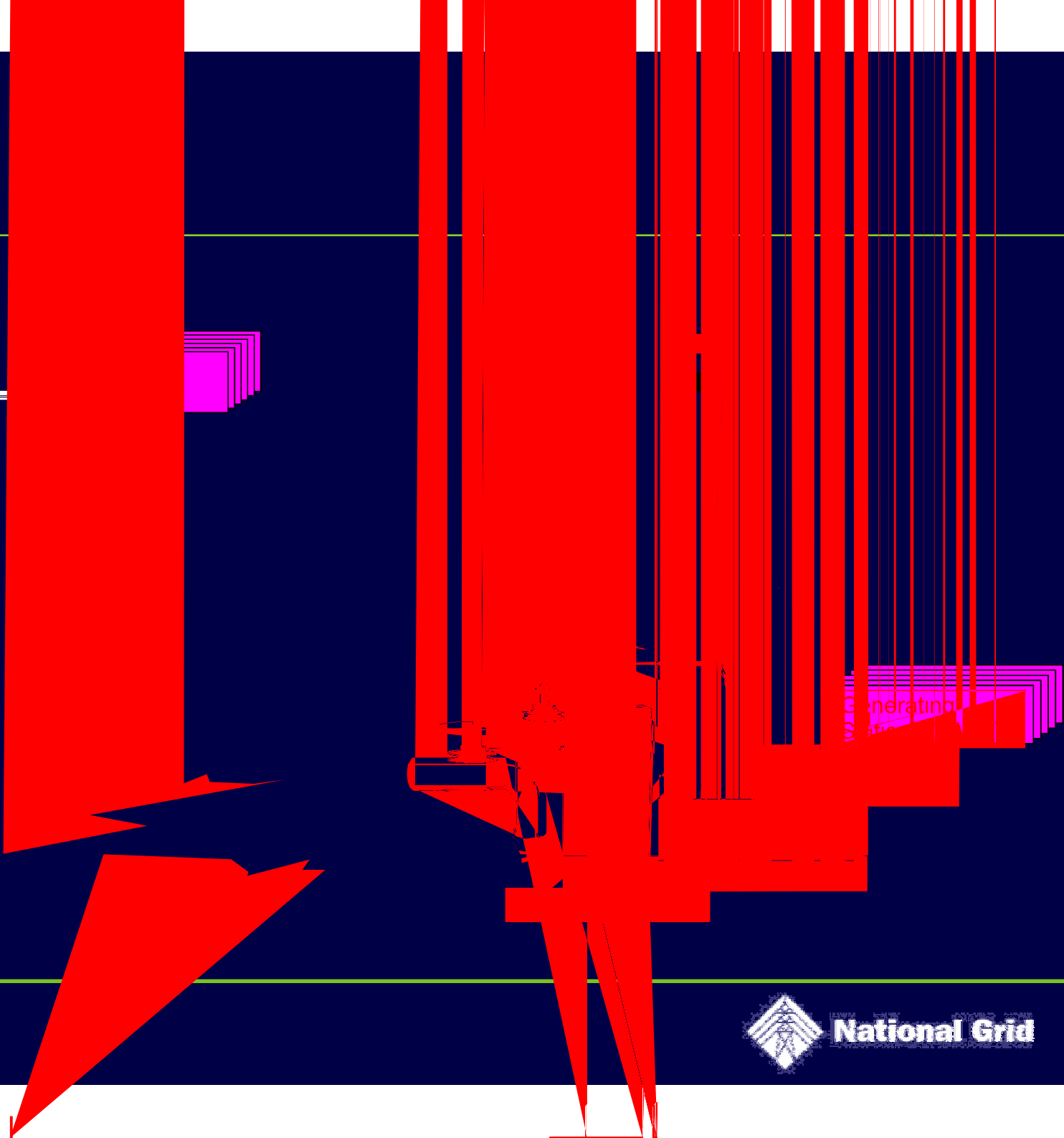
Frequency Response

- ◆ **Payment arrangements:**

- **capability fee for primary, secondary, high**
- **imbalance compensation for BM**
- **de-load costs via bids and offers**

Reactive Power

- ◆ **What is it?**
 - ◆ **the ability to automatically generate and/or absorb reactive power**
- ◆ **Why we need it?**
 - ◆ **to maintain voltage across transmission system within statutory limits**
 - ◆ **controlled on a zonal basis**



Reactive Power

- ◆ **Who can provide it?**
 - ◆ **all licensed generators**
 - ◆ **Grid Code mandatory requirements**
 - ◆ **anyone else who can provide a useable service to National Grid**

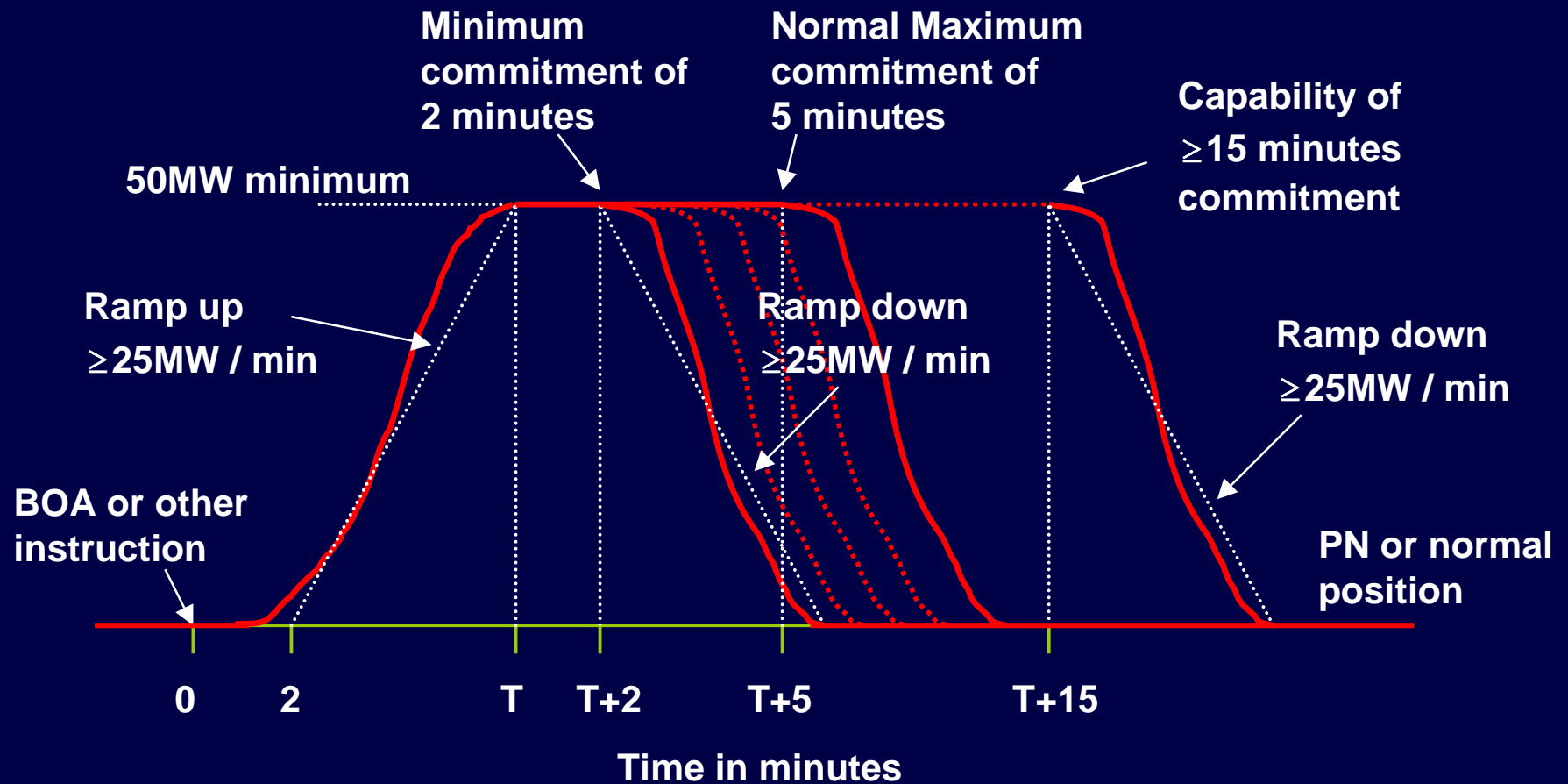
Reactive Power

- ◆ **How is it procured?**
 - ◆ **competitive biannual tender process - reactive market**
 - ◆ **default service otherwise**
- ◆ **Payment arrangements:**
 - ◆ **codified in CUSC Schedule 3**
 - ◆ **utilisation and capability for market process**
 - ◆ **utilisation only for default service**

Fast Reserve

- ◆ **What is it?**
 - ◆ **manually instructed, rapid & flexible**
 - ◆ **delivery within 2 minutes**
 - ◆ **25MW/min or more**
- ◆ **Why we need it?**
 - ◆ **to maintain system frequency during large demand changes**
 - ◆ **to manage the unpredictable, eg television “pick-ups”**

Fast Reserve Definition



Fast Reserve

- ◆ **Who can provide it?**
 - ◆ **generation or demand meeting with technical requirements**
 - ◆ **minimum instructable volume of 50MW**
 - can comprise of smaller aggregated volumes

Fast Reserve

- ◆ **How is it procured?**
 - ◆ **monthly tender process**
 - ◆ **bilateral agreement also possible**
- ◆ **Payment arrangements:**
 - ◆ **optional service**
 - ◆ **firm service**

Fast Start

- ◆ **What is it?**
 - ◆ **fast acting power from non-synchronised generation**
 - ◆ **LF/manual initiation**
 - ◆ **capable to start and deliver within 5/7 minutes**
- ◆ **Why we need it?**
 - ◆ **manage short term changes**
 - ◆ **post-incident to arrest frequency drops**

Fast Start

- ◆ **Who can provide it?**
 - ◆ **licensed OCGTs in accordance with Grid Code**
 - ◆ **currently no requirement to procure further services over existing provision**

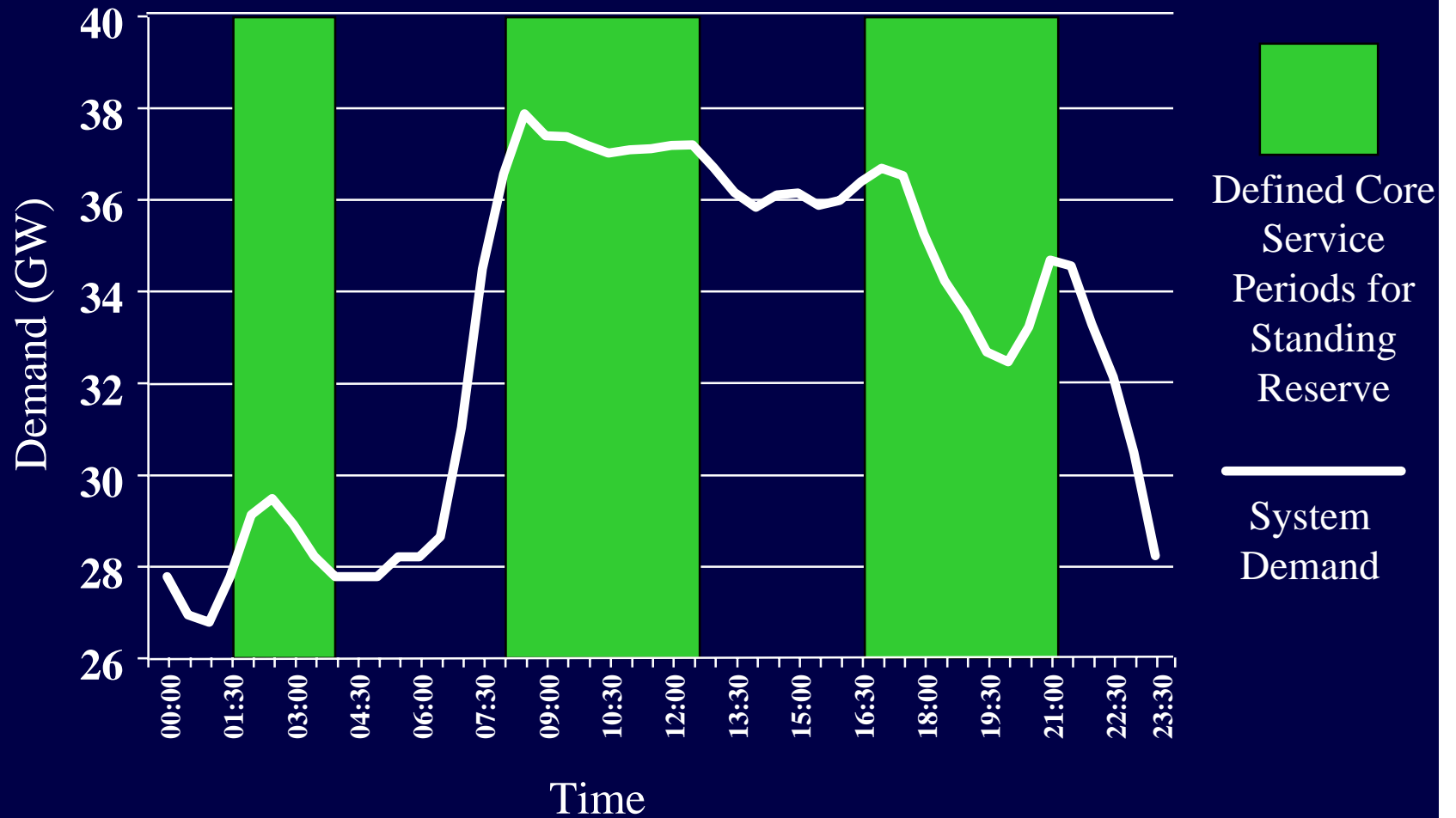
Fast Start

- ◆ **How is it procured?**
 - ◆ **bilateral agreement**
 - ◆ **cost reflective basis**
- ◆ **Payment arrangements:**
 - ◆ **availability fee**
 - ◆ **start-up fee**
 - ◆ **automatic delivery fee (for LF initiation only)**
 - ◆ **energy via BOAs in BM**

Standing Reserve

- ◆ **What is it?**
 - ◆ **manually instructed**
 - ◆ **delivery of active power > 3 MW**
 - ◆ **fully available in 20 minutes**
 - ◆ **sustainable for 2 hours**
- ◆ **Why we need it?**
 - ◆ **manage mismatch between generation and demand**
 - ◆ **assists recovery of frequency response capability**

Standing Reserve Requirement



Standing Reserve

- ◆ **Who can provide it?**
 - ◆ **non-synchronised generation**
 - OCGTs
 - pumped storage
 - industrial generation
 - ◆ **demand reduction**
 - ◆ **minimum instructable volume of 3MW - can comprise of smaller aggregated volumes**

Standing Reserve

- ◆ **How is it procured?**
 - ◆ **annual tender process**
- ◆ **Payment arrangements:**
 - ◆ **availability fee in contract**
 - ◆ **utilisation**
 - via BOAs for BM providers
 - via contract for Non BM providers

Warming and Hot Standby

- ◆ **What is it?**
 - ◆ **contingency reserve**
 - ◆ **ensure sufficient availability in BM**
 - ◆ **hold in state of readiness**
- ◆ **Why we need it?**
 - ◆ **ensure sufficient operating margin is available**
 - ◆ **contingency to cover shortfall in generation availability or lateness in notified delivery**

Warming and Hot Standby

- ◆ **Who provides it?**
 - ◆ **licensed generators with NDZ outside Balancing Mechanism timescales (> 3.5 hours)**
 - ◆ **typically comprise low load factor coal and oil plant**

Warming and Hot Standby

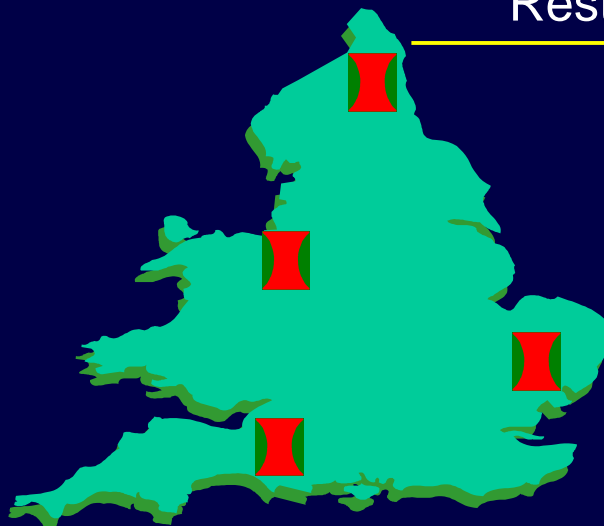
- ◆ **How is it procured?**
 - ◆ **bilateral agreements**
 - ◆ **option based contracts**
- ◆ **Payment arrangements:**
 - ◆ **warming fee (£/hr)**
 - not payable in the event unit synchronises via BOA
 - ◆ **Hot Standby fee (£/hr)**

Black Start

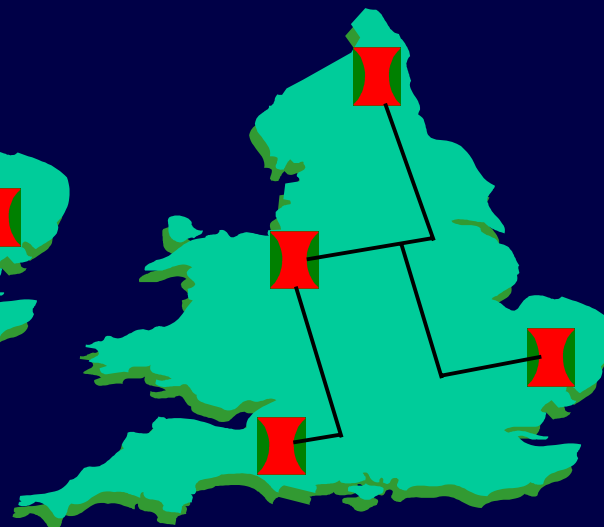
- ◆ **What is it?**
 - ◆ **ability of a generating unit to synchronise independent of external suppliers**
- ◆ **Why we need it ?**
 - ◆ **to facilitate re-energisation in the event of total or partial system shutdown**
 - ◆ **restore customer demand**

Black Start Restoration

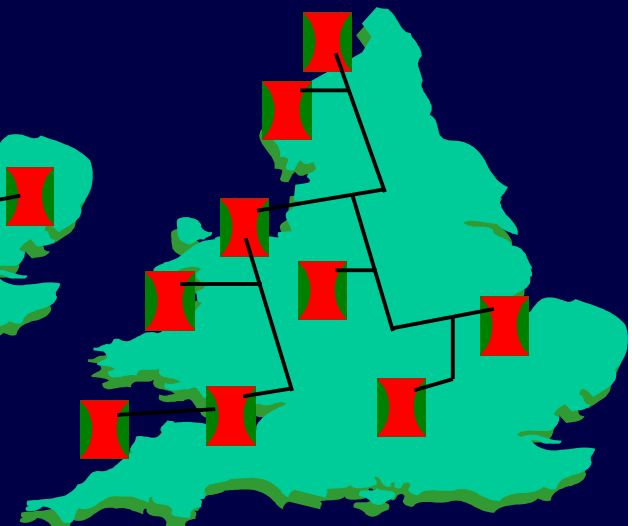
Restoration of electrical supplies



'Power Islands' are formed using Black Start stations and the corresponding local demands



'Power Islands' are synchronised to form electrical sub-systems



Electrical Supplies completely restored

Black Start

- ◆ **Who can provide it?**
 - ◆ **licensed generators in accordance with Grid Code requirements on an “as needs” basis**

Black Start

- ◆ **How is it procured?**
 - ◆ **bilateral agreement**
 - ◆ **based on cost reflective charging principles**
 - ◆ **normally long term contract**
- ◆ **Payment arrangements:**
 - ◆ **capability fee (£/hr)**
 - ◆ **utilisation remunerated via BSC arrangements**

Further Information

- ◆ **Web site link -**
<http://www.nationalgrid.com/uk/indinfo/balancing/index.html>
- ◆ **Account Managers**