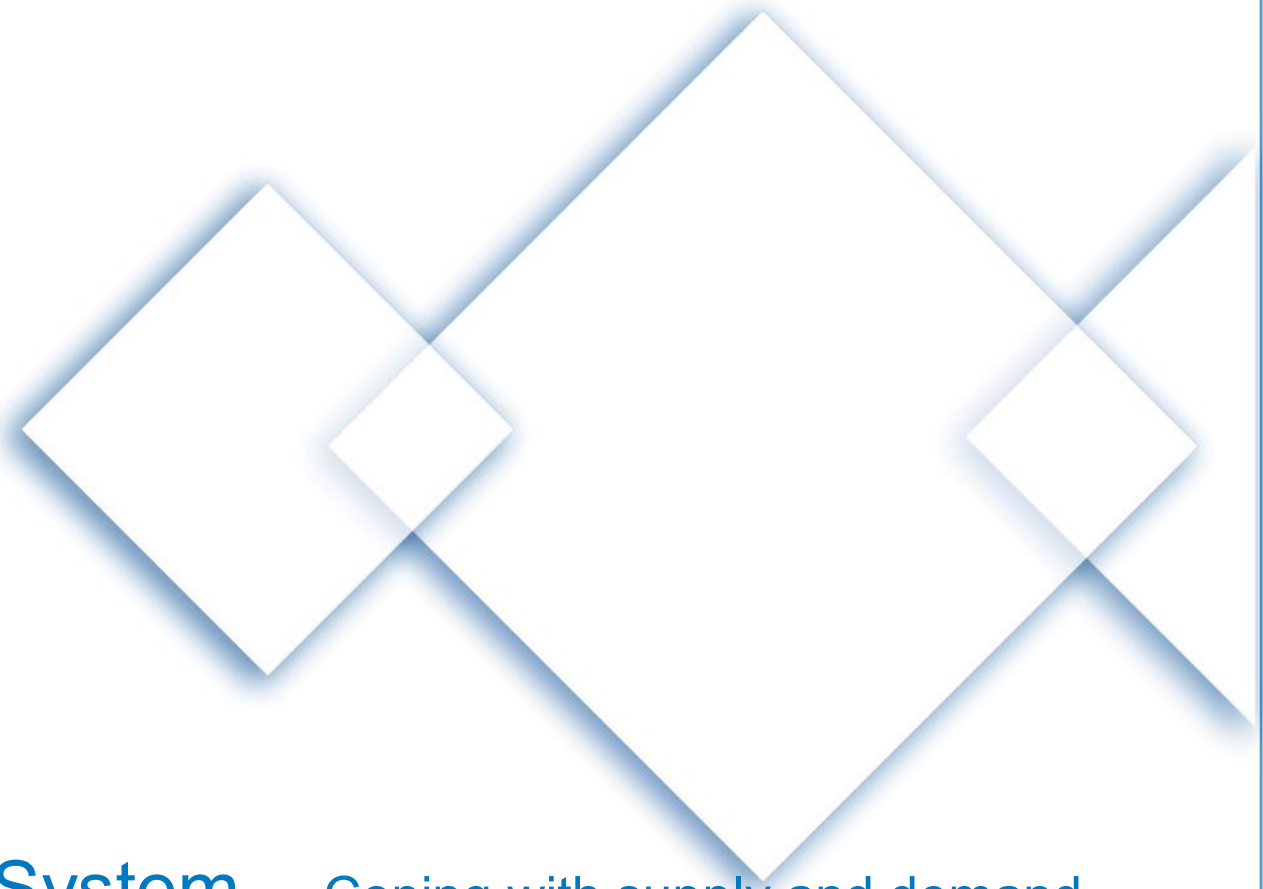


BALANCING THE SYSTEM – COPING WITH SUPPLY AND DEMAND THREATS AND HOW IT AFFECTS CUSTOMERS

Duncan Burt

Customer Services Manager

National Grid



Balancing the System — Coping with supply and demand threats and how it affects consumers

Duncan Burt

MEUC – 8th December 2008

nationalgrid

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National Grid



Electricity

- **GB System Operator**
- Operate the Electricity transmission system in Great Britain
- **Network Owner**
- Own the Electricity transmission network in England and Wales

Gas and US

- Also own and operate the Gas transmission network, some distribution networks and have similar activities in the North East US
- Now a 50:50 UK:US company

Balancing the System – GB System Operator



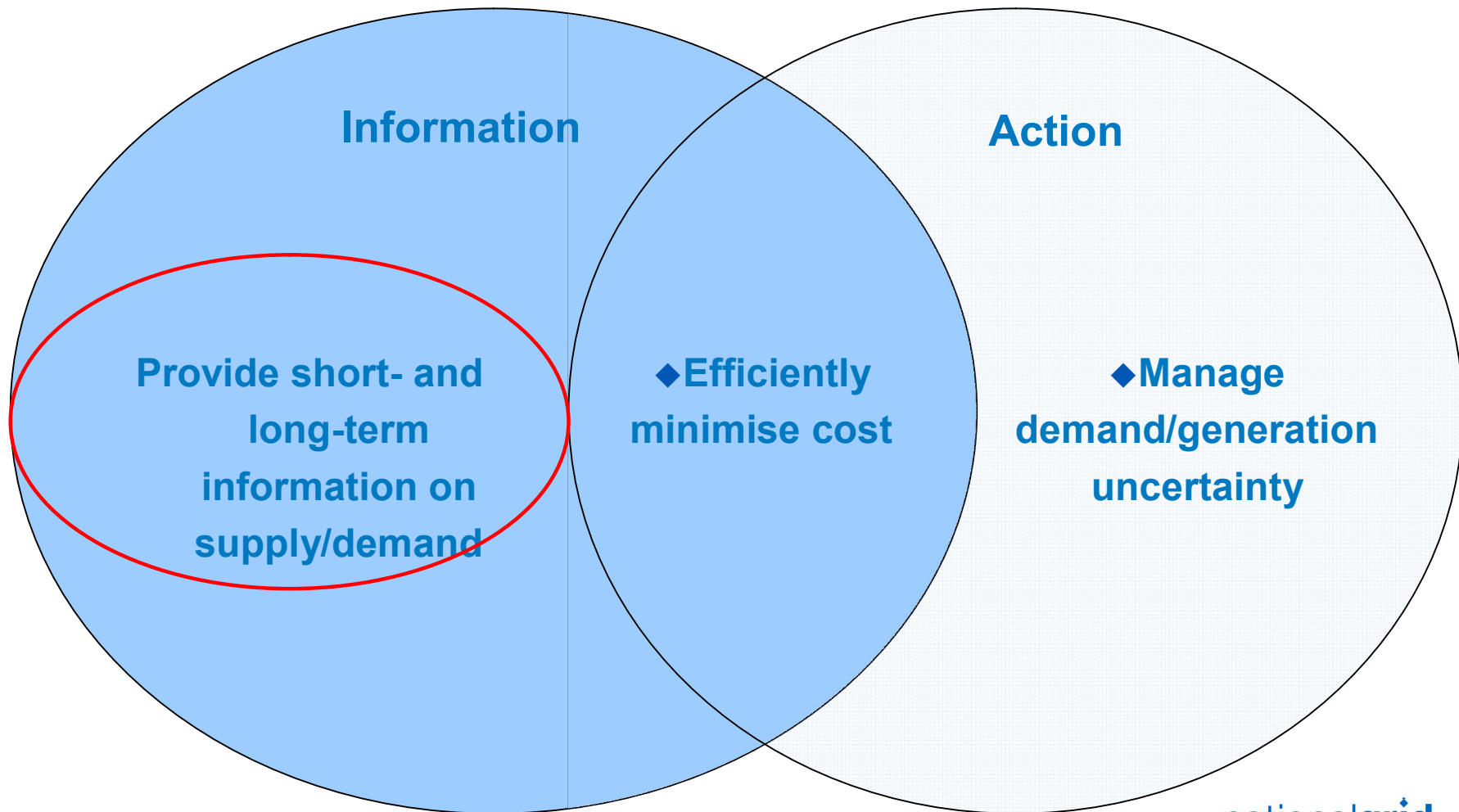
Electricity bought or sold to
'balance' the system equates
to about 2% of National
Demand

Balance Generation and Demand

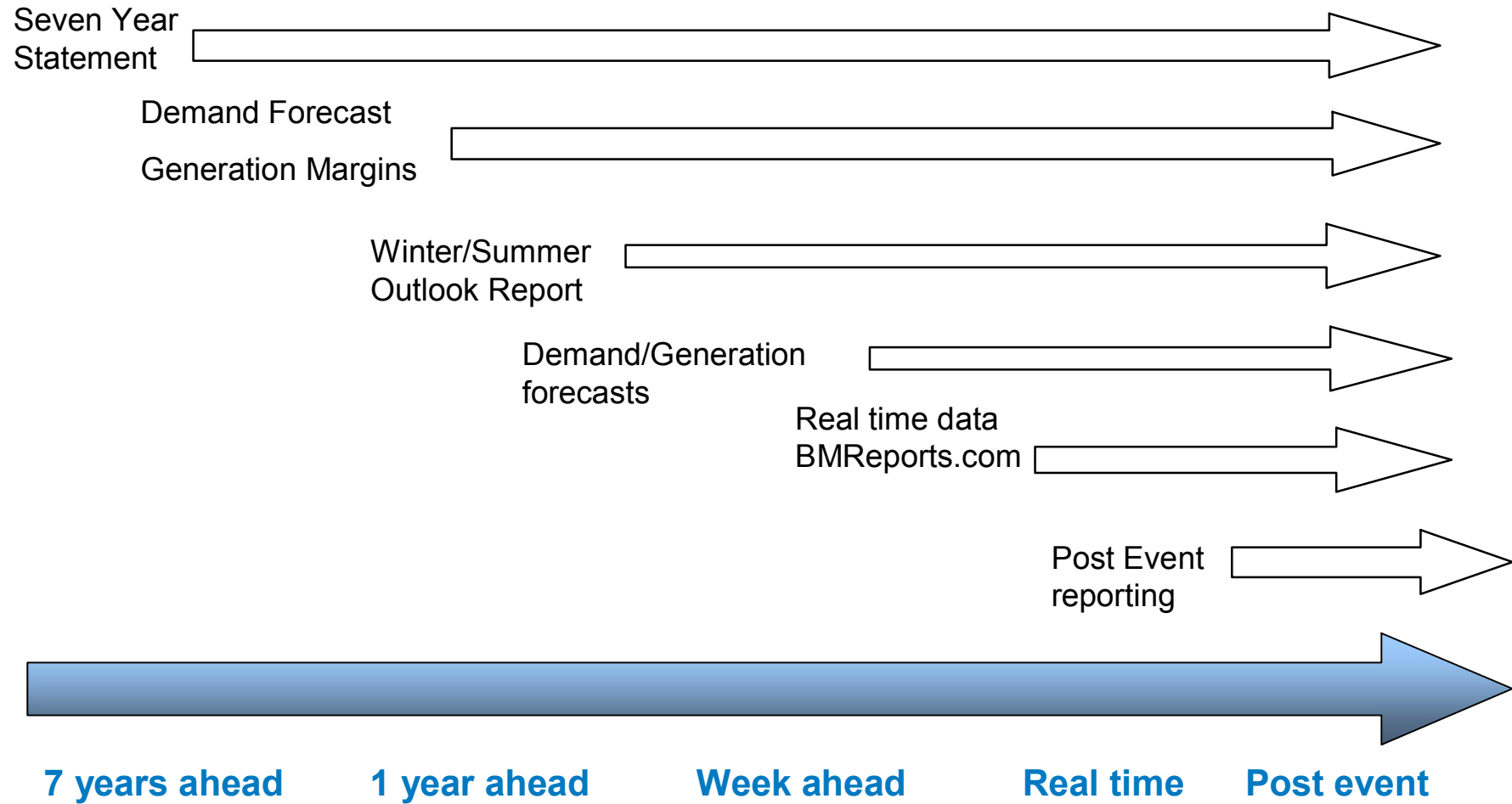
Manage flows within safe system limits

Facilitate the market

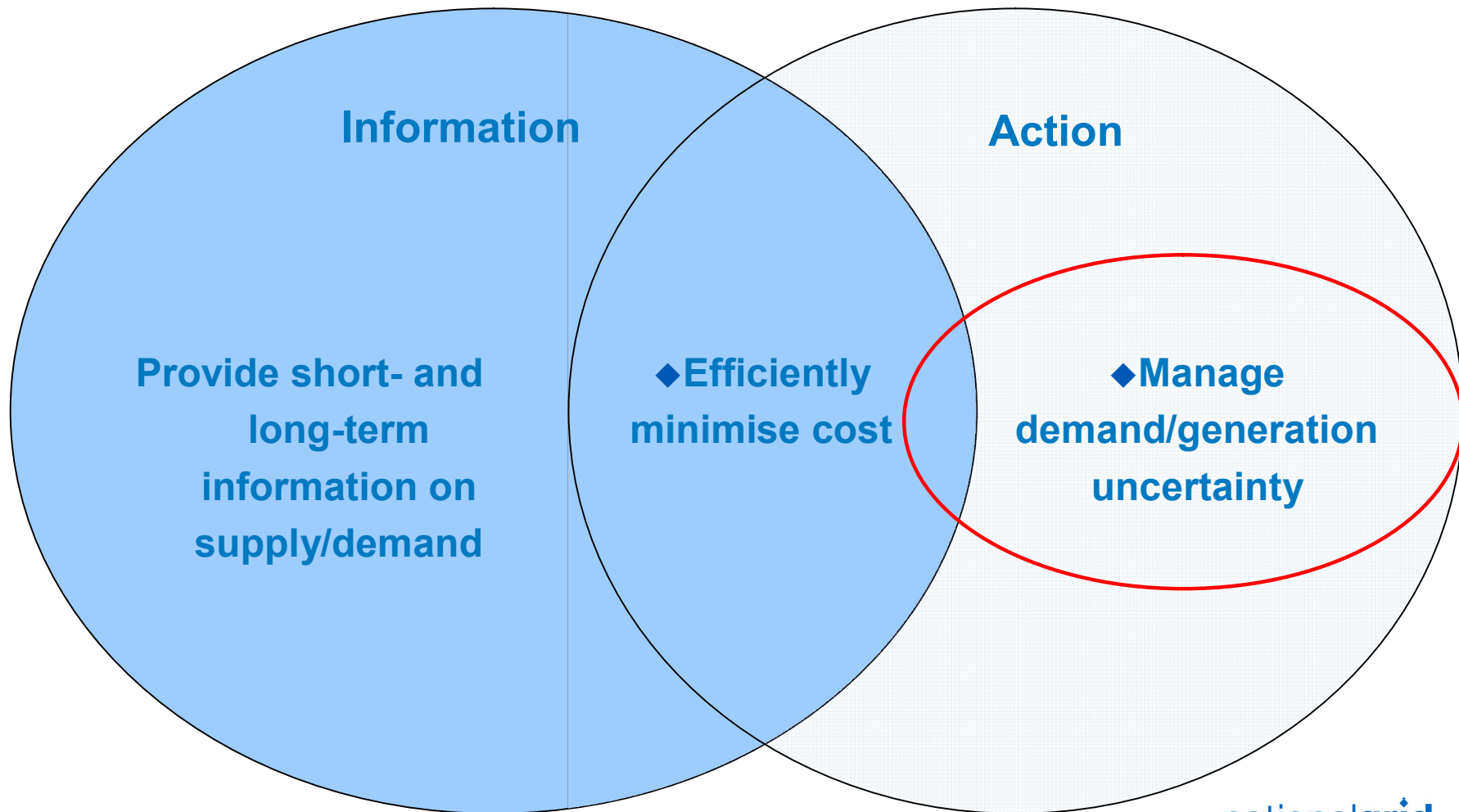
Balancing the System



Market Information



Balancing the System



Balancing Risks

Sudden generator
loss

Change in generator output

Change in weather

Equipment fault

Special Events/
School holidays

Storms/lightening
System trips

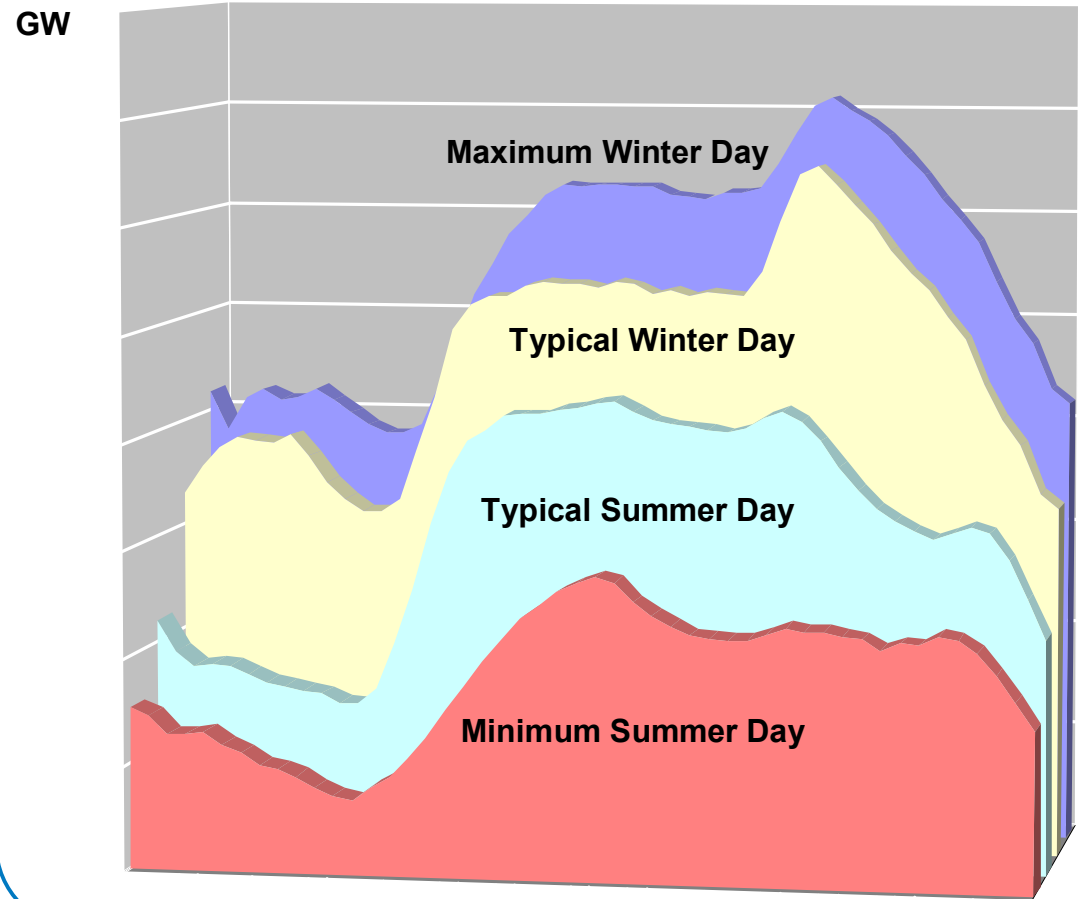


Over 1,500,000 variables per day

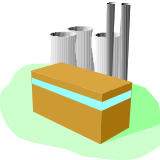
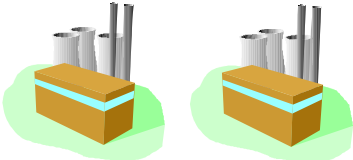
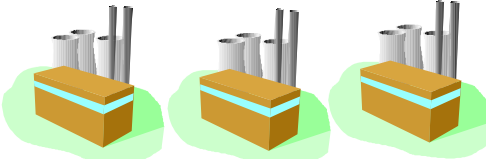
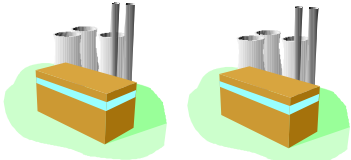
Example - Managing Demand Uncertainty

Influences on Demand

- ◆ Seasons/Weather
- ◆ Exceptional Events
- ◆ TV



Example - Managing Demand Uncertainty

Meteorological Variable	Response (MW)	Generating Unit*
Temperature (a fall of 1 Celsius in freezing conditions)	+400	
Wind (an increase of 10 knots in freezing conditions)	+700	
Cloud cover (from clear sky to thick cloud)	+1500	
Precipitation (from no rain to heavy rain)	+800	

Balancing Approach

Planning

- ◆ Extensive long-, medium- and short-term planning
- ◆ Wide range of information and analysis tools

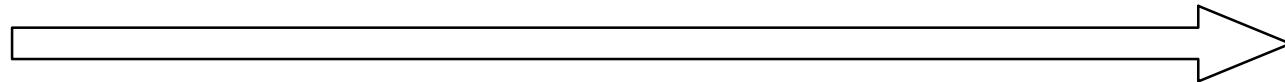
Risk Management

- ◆ Detailed risk management approach to system and assets
- ◆ Efficiently manage risks

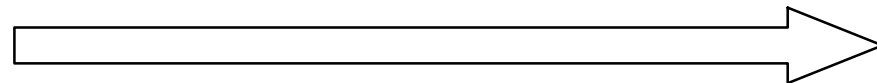
Most important asset: **Our engineers and analysts**

Procuring Balancing Services

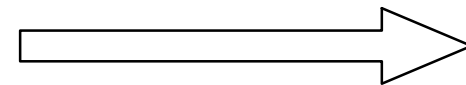
Long term tenders
for Reserve



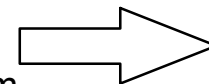
Bilateral contracts
Trading



Trading



Balancing
Mechanism



Year ahead

Month Ahead

Week ahead

Day ahead

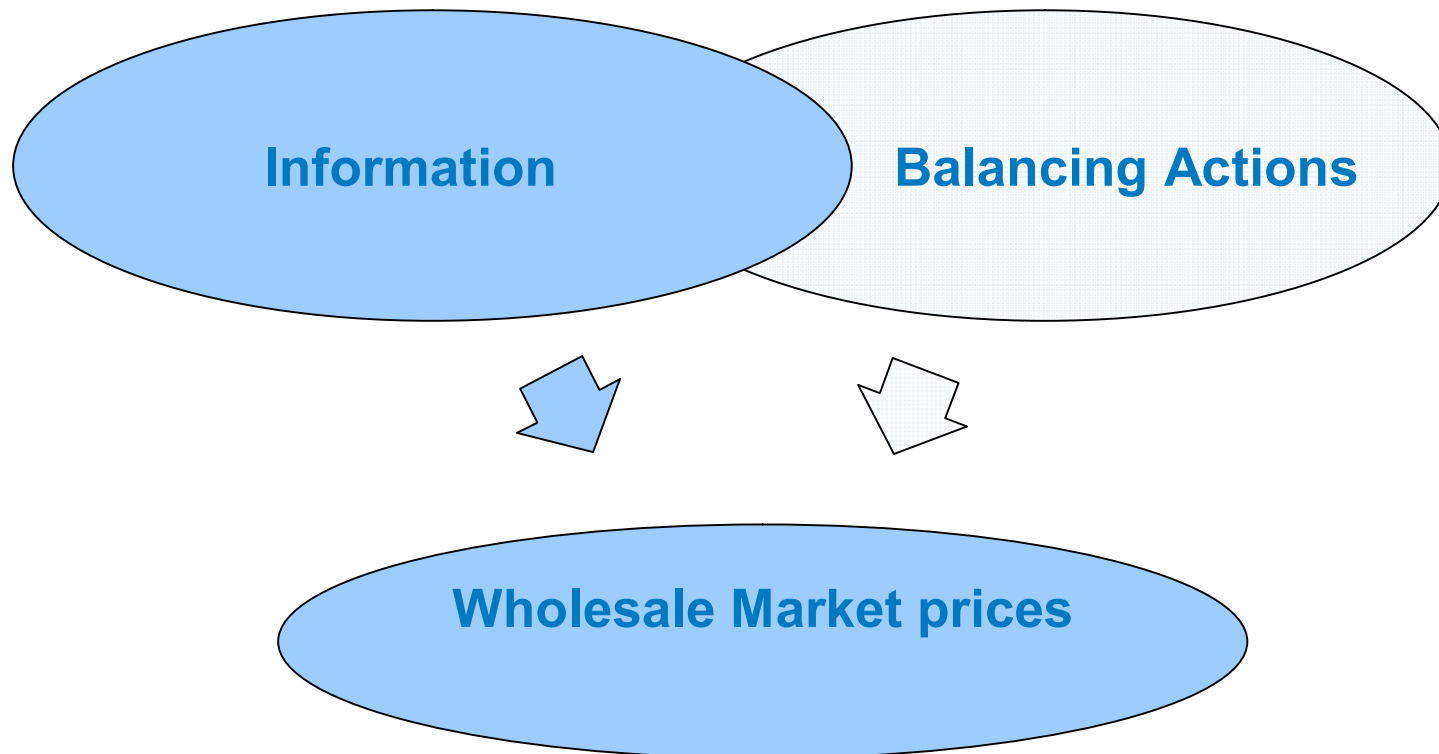
Real time

Approximately 30% of long term contracts with Large Industrial and/or Demand Side participants

Impact of System Balancing

Direct cost of System Balancing averages at £1/MWh to £2/MWh

Indirect impact is at least as significant:



Balancing the networks – The Future

Electricity

2008

- ◆ Second by second balancing achieved by flexing generation
- ◆ Demand not dispatchable

Future

- ◆ Dynamic demand
- ◆ Smart meters
- ◆ Storage
- ◆ Flexing generation

Gas

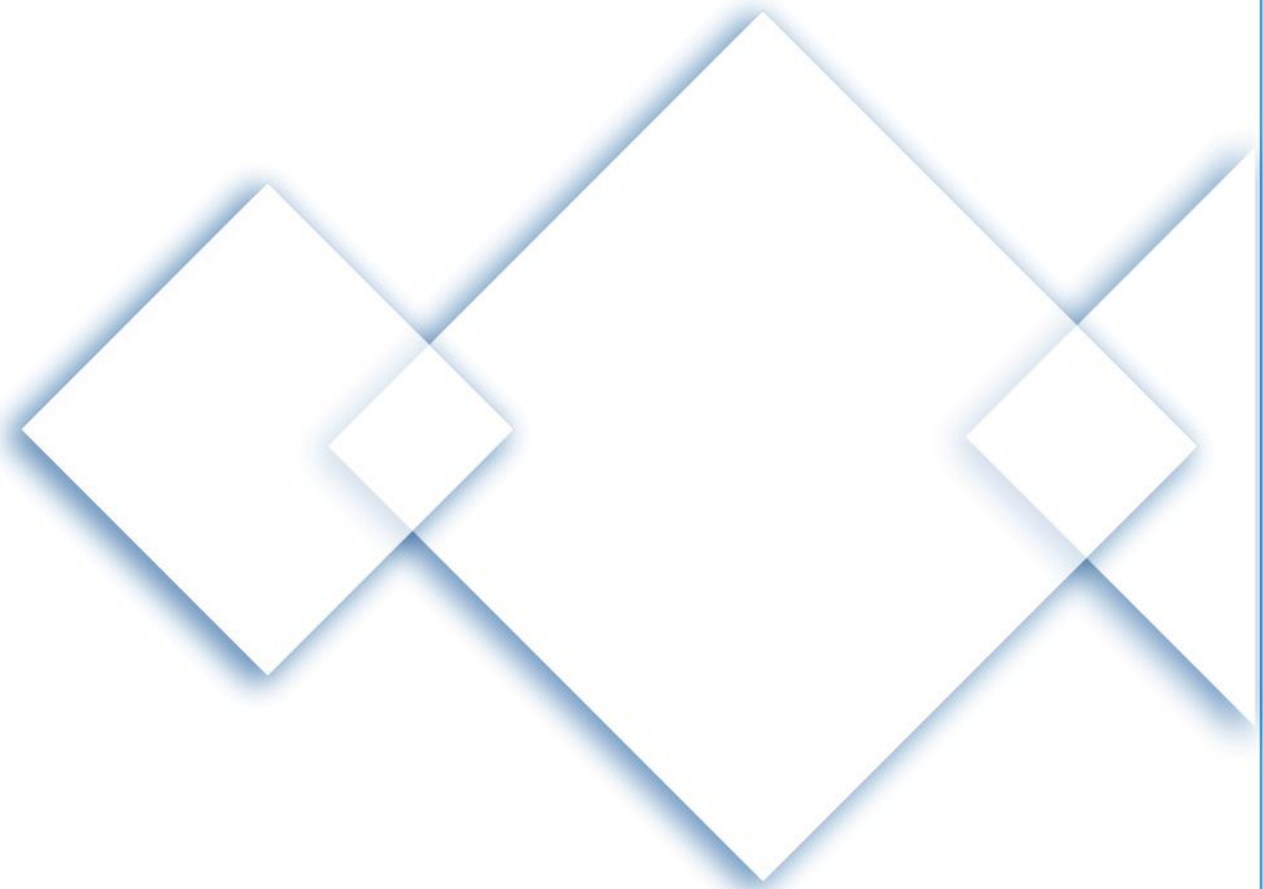
2008

- ◆ Major Flows from UKCS & Norway
- ◆ Storage and Interconnector provide key balancing role

Future

- ◆ Less UKCS
- ◆ Variable flows from Norway, European interconnectors & LNG, make balancing more challenging





Thankyou

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Further Information Resources

Seven Year Statement

- ◆ <http://www.nationalgrid.com/uk/Electricity/SYS/>

Winter/Summer Outlook

- ◆ <http://www.nationalgrid.com/uk/Gas/TYS/outlook/>
- ◆ <http://www.nationalgrid.com/uk/Electricity/SYS/sumOutlook/>

Generation/Demand Margins and Real Time data

- ◆ <http://www.nationalgrid.com/uk/Electricity/Data/>
- ◆ http://www.bmreports.com/bsp/bsp_home.htm
- ◆ <http://www.bmreports.com>

Balancing Services Opportunities

- ◆ <http://www.nationalgrid.com/uk/Electricity/Balancing/demandside/>