



Welcome to First Hydro Company
4 June 2009

First Hydro Company overview



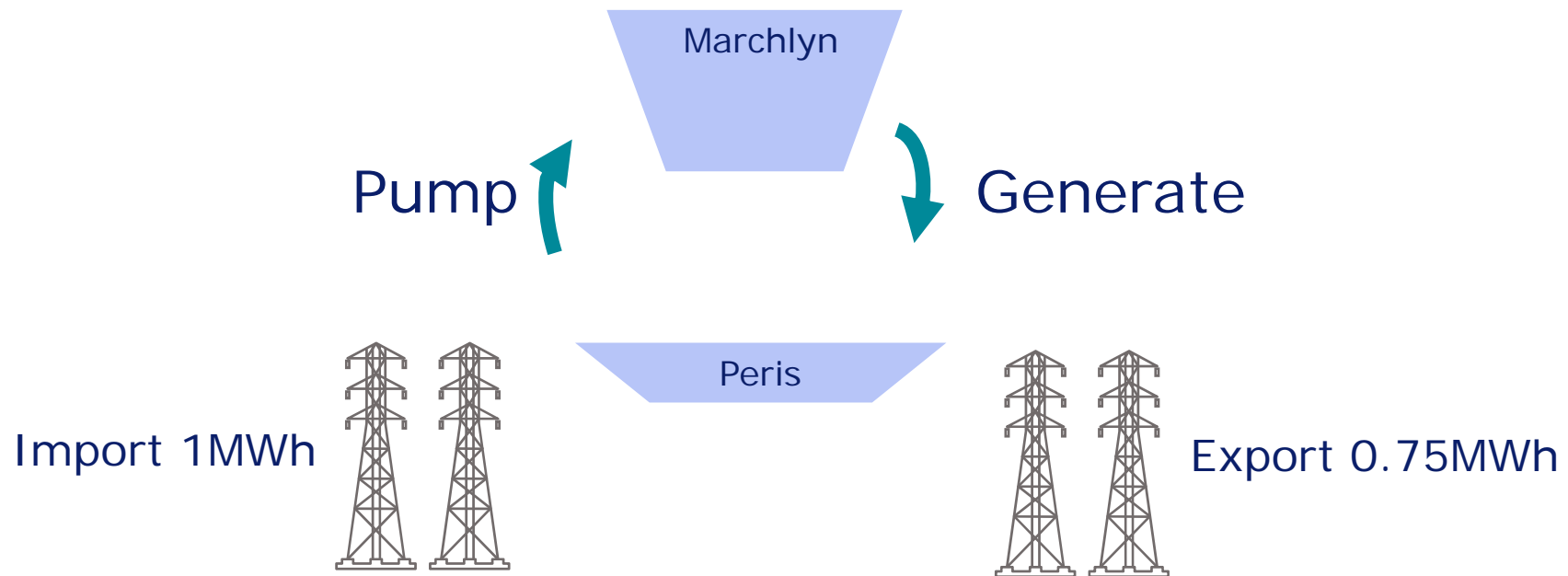
- Approximately 200 employees across four sites
- Dinorwig
 - the largest pumped storage plant in Western Europe
 - commissioned in 1983
 - total plant capacity 1,728MW, 6 reversible pump/turbines
 - reservoir capacity ~10GWh
- Ffestiniog
 - the UK's first major pumped storage station
 - commissioned in 1963
 - total plant capacity 360MW, 4 separate turbines & pumps
 - reservoir capacity ~1.3GWh
 - remotely operated from Dinorwig
- Electric Mountain visitor centre
- Bala House trading office
- Owned by International Power (75%)/
Mitsui & Co, Ltd (25%) since December 2004



The pumped storage principle



- Buy electricity overnight - pump water to top reservoir
- Release water to generate at times of peak price



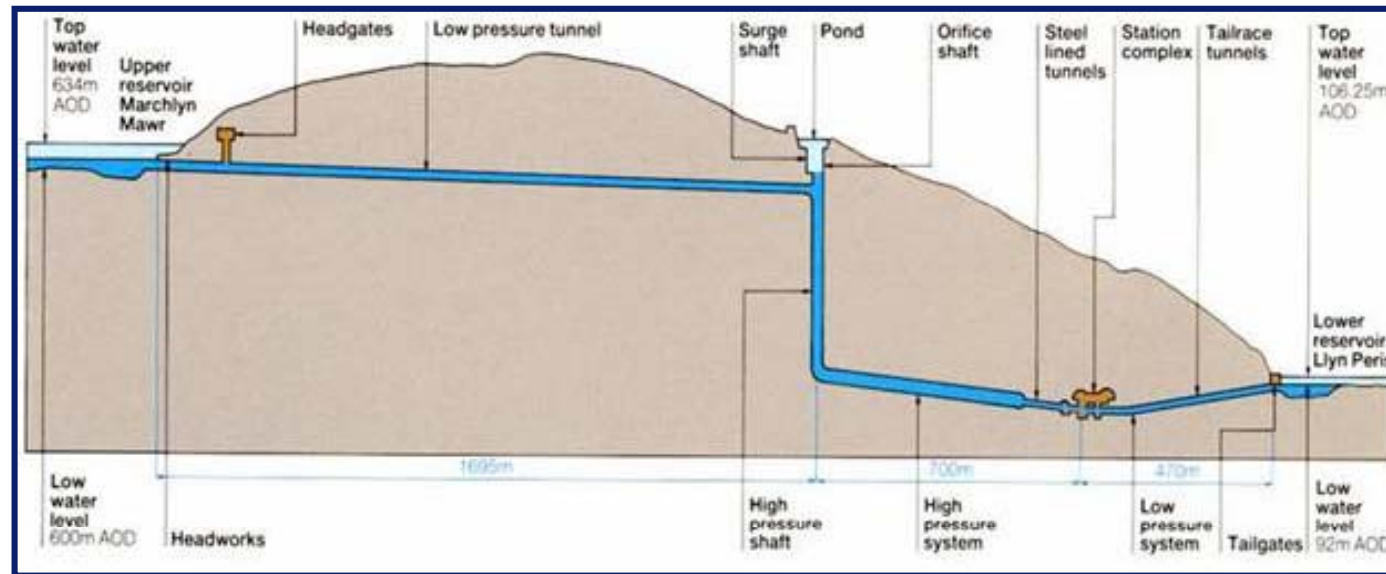
- Overall cycle efficiency ~75%
- Additional costs include transmission losses and Balancing System charges

Asset features

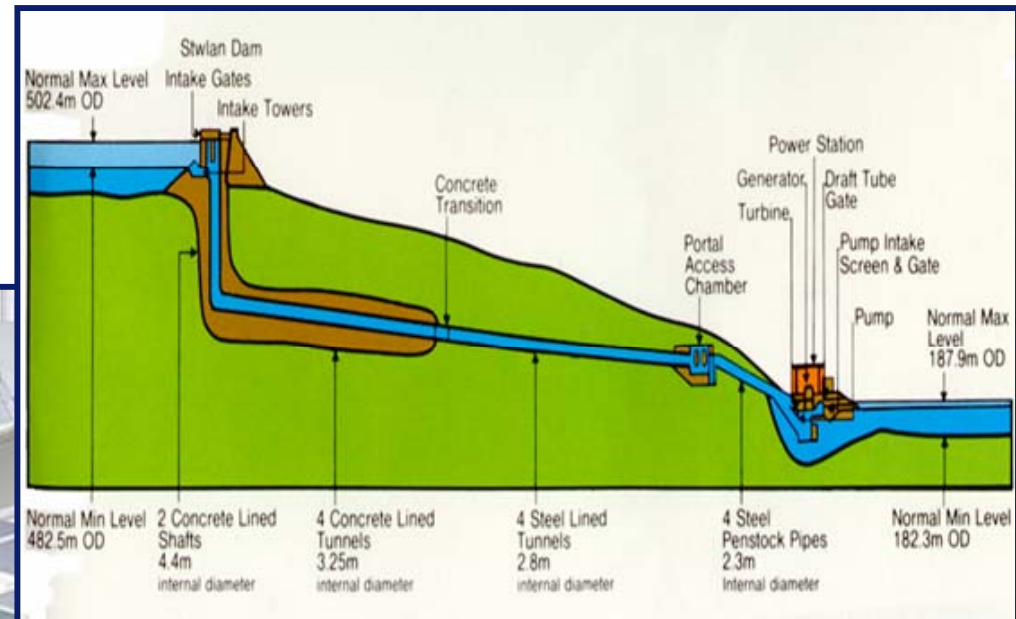
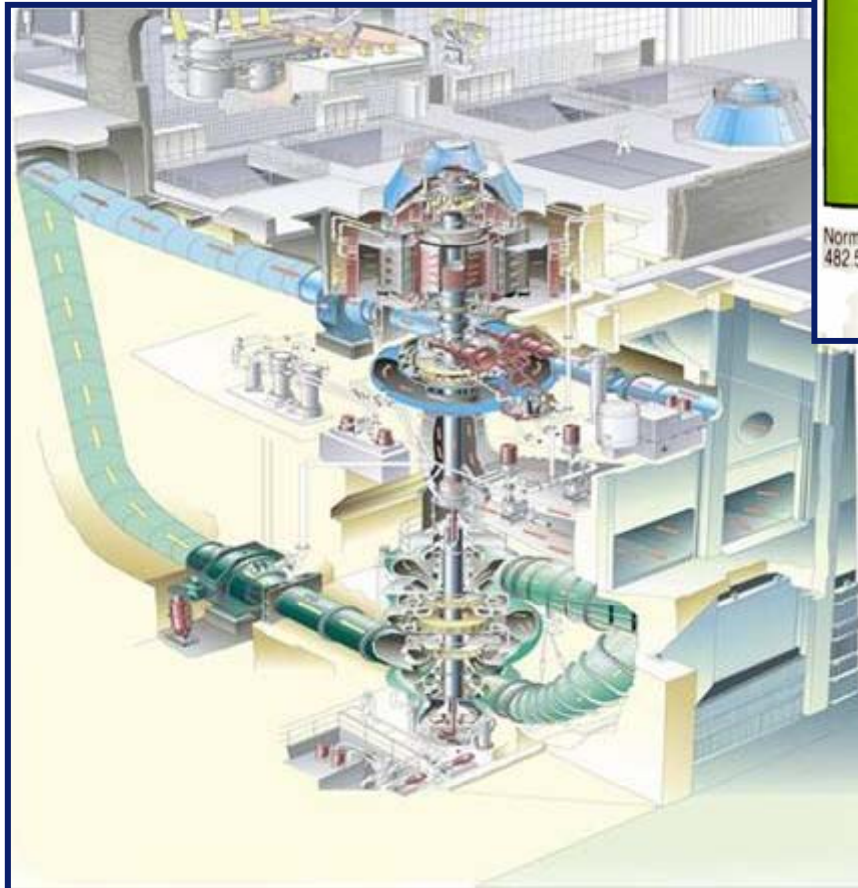


- Speed of response
 - Dinorwig full output in ~16 seconds
 - Ffestiniog full output ~60 seconds
- ~40,000 mode changes per year
- Extremely high reliability and availability
- Uniquely flexible assets
- Originally designed and built to support grid system management
- Asset capabilities provide for a diverse range of trading and marketing opportunities under NETA/BETTA
- Business is geared around maximising short term opportunity
 - highly flexible outage management
 - proprietary systems to support trading and despatch

Dinorwig



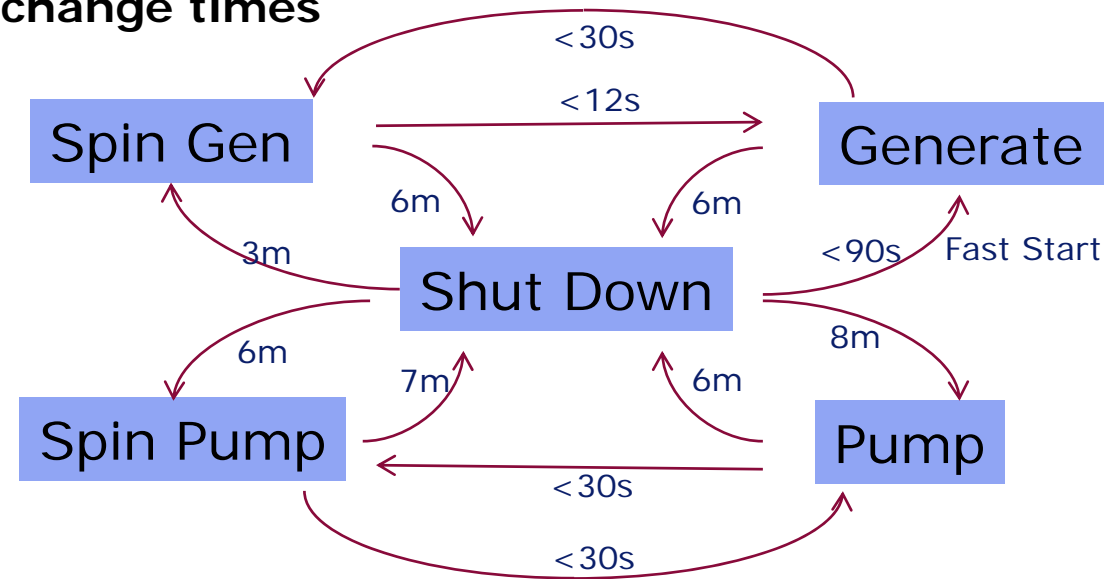
Ffestiniog



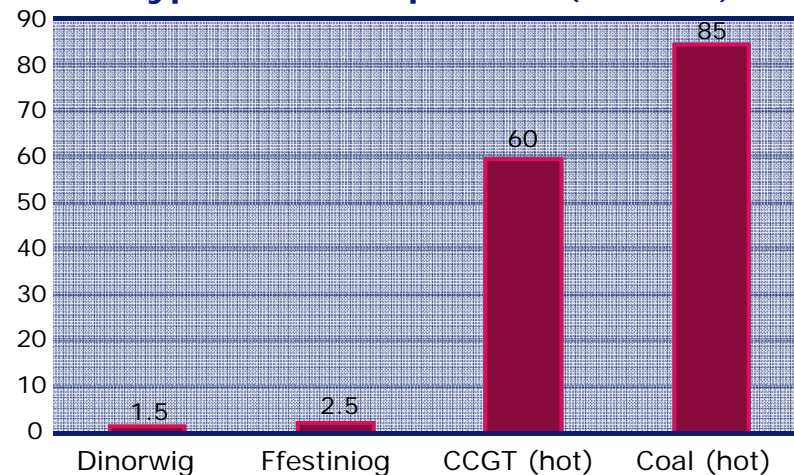
Plant dynamics



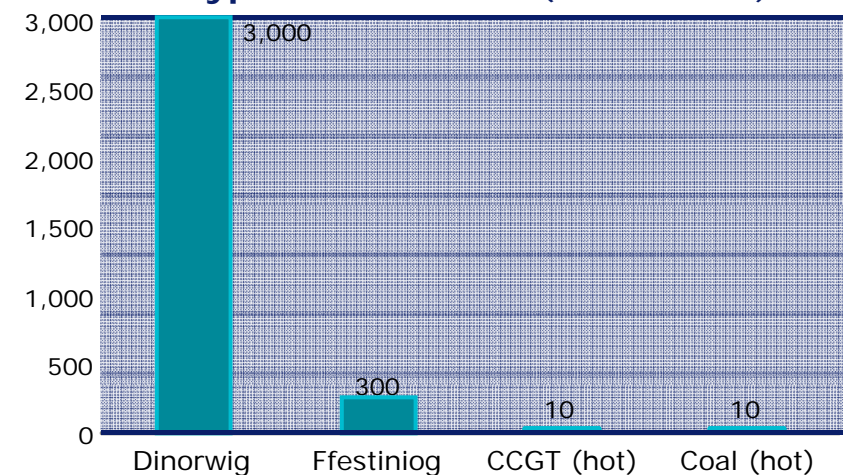
Dinorwig mode change times



Typical start-up times (minutes)



Typical load rates (MW/minute)



Plant investment strategy



- Preserve competitive advantage
 - maintain current levels of performance
 - focus on quality of core maintenance
 - replace or refurbish aging/obsolescent equipment
 - retain expertise within business
- Enhance competitive advantage
 - improve reliability/availability
 - increase quality or range of products
- Case study: Dinorwig Additional Stored Energy
 - increased storage by 700MWh (~8%)
 - commenced January 2007 and completed October 2007
 - major civil engineering project within Snowdonia National Park

Dinorwig additional stored energy





Commercial Focus



The role of pumped storage in the GB market



1. Energy arbitrage - peak/off-peak

- valuable peaking capacity
- enables efficient running of steam plant overnight

2. Reserve provision

- range of timescales (focus on fast)
- but, limited storage

3. Frequency control

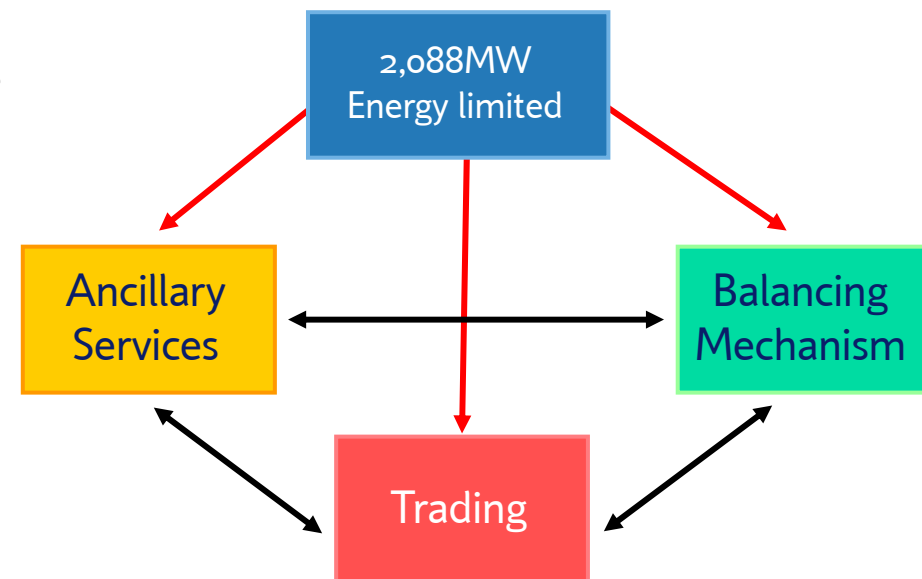
- fast response to plant trips, TV pickups etc.

- Roles underpinned by plant reliability and dynamic capabilities
- Buying fuel and selling product via the same market

Market challenges for pumped storage



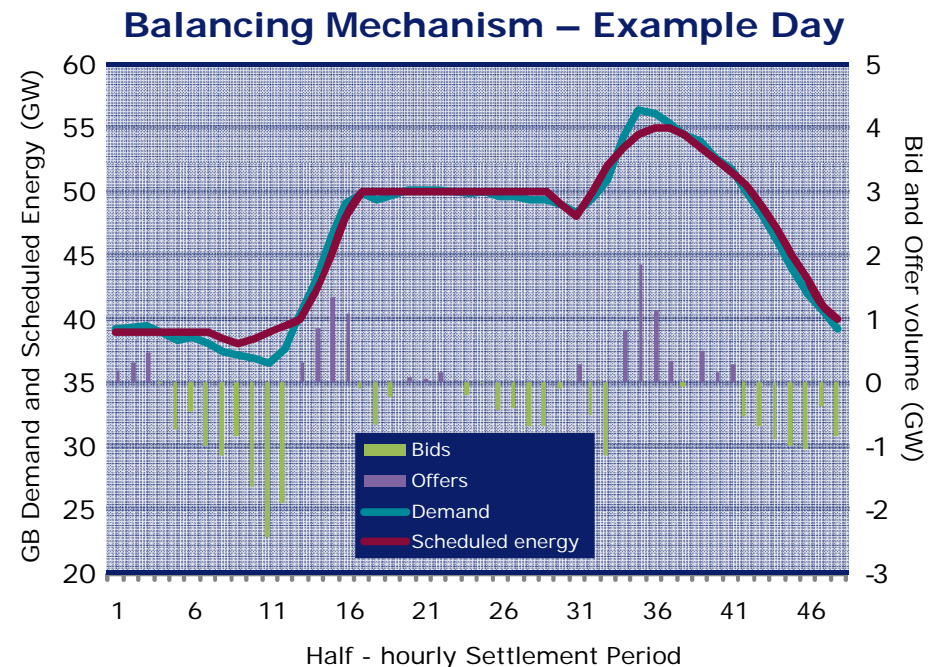
- Products sold through the three BETTA markets:
 - Trading, Balancing Mechanism, Ancillary Services
- Energy-only market, no Renewable Obligation Certificates, no capacity payments
- Reliance on volatile, short term markets
 - poor forward liquidity in shaped products
- Complex business
 - maximising option value of assets
 - managing water constraint



Balancing mechanism



- Generators sell energy, and then schedule generation to meet half-hourly contract position
- 'Gate closure' 1 hour ahead of each half-hour period
- System operator then matches generation to actual demand by adjusting generation via offers or bids, minute-by-minute.
- First Hydro offers premium dynamics
 - managing TV pickups
 - cover for generator trips
 - meeting demand fluctuations



Ancillary services



- Physical services to facilitate system security and power quality
 - procured by National Grid
 - enable system balancing in real time
 - mostly undertaken via competitive tender or real time call-off

Reserve:

- Short Term Operating reserve (20 minutes)
- Fast Reserve (2 minutes)
- Longer notice contingency reserve (BM Startup)

Frequency Response:

- Dynamic Response
- Static Response

Other:

- Black Start
- Reactive Power
- Intertrips

Trading in the wholesale market



Trading considerations

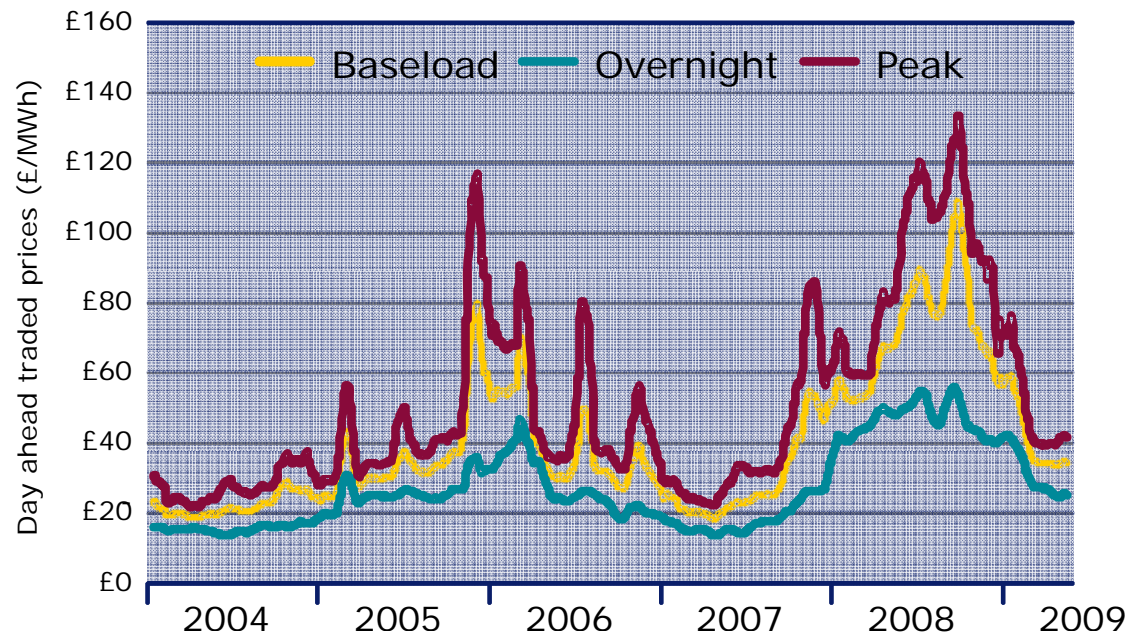
- Value of capacity/energy in traded markets (net of pumping)
- Capacity 'sterilised' for ancillary services
- Probability of being used in balancing mechanism
- Water balancing requirements

Key skills

- Physical ability to deliver any half-hourly shape
- Experienced traders in APX/short term markets
- Proprietary live market information and decision support tools
- Systems able to notify contracts right up to gate closure



Wholesale price trends



- Highlights volatility in prices and spreads
- Impact of Phase 2 of EU ETS can be seen from Jan 08
- Tight system conditions in Winter 05/06 and through 2008

Market outlook



- GB plant mix to change radically in next 10 years
 - driven by tightening environmental regulation and the EU's 2020 targets
- System to face more challenging system security and balancing issues
 - wind intermittency, opted out coal plant, nuclear inflexibility
- First Hydro is well positioned and planning for the future
 - investing in its assets to ensure engineering integrity and extend plant life
 - addressing recruitment needs, expanding apprentice schemes
 - developing its understanding of the impact of change in its target markets
 - seeking to enhance its assets to meet the demands of the market