



Grange Backup Power Ltd

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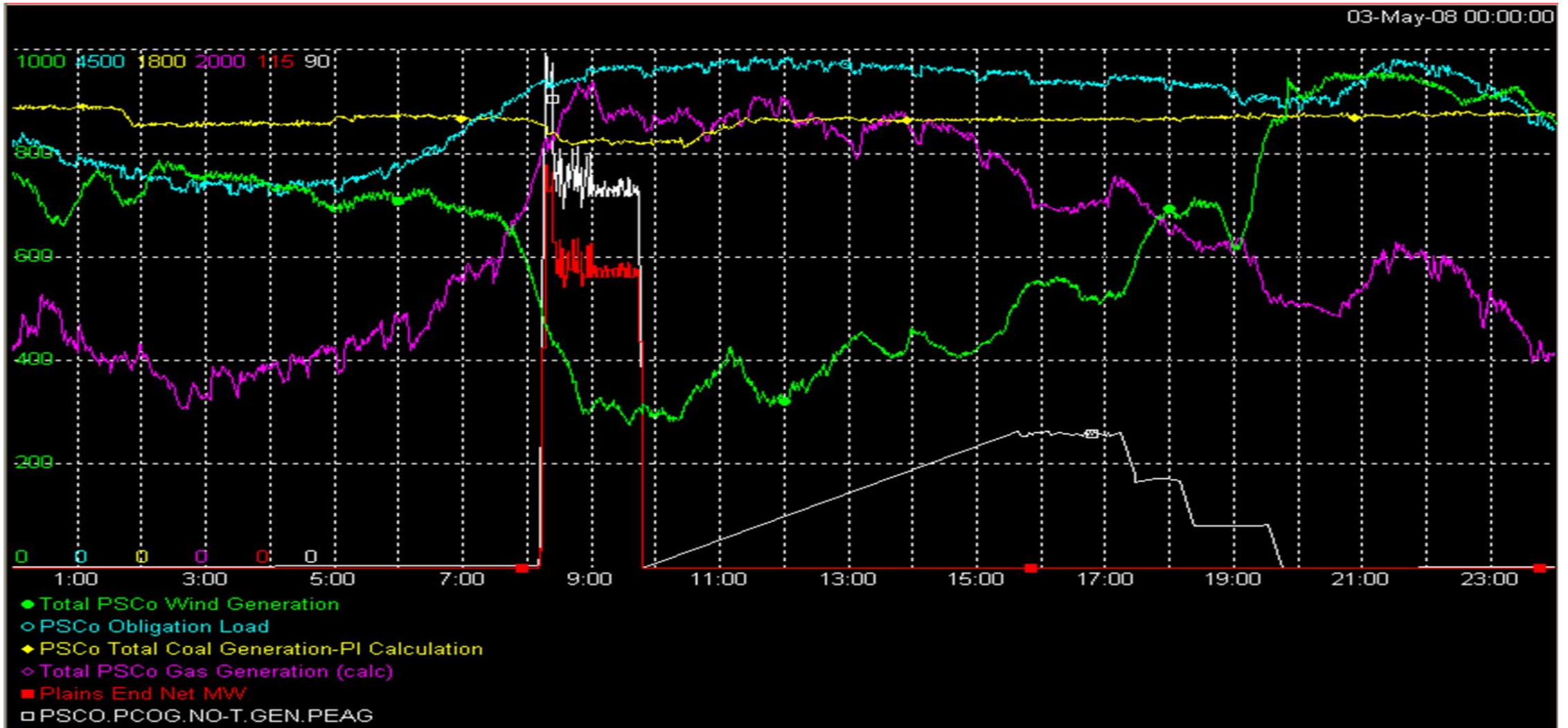
Overview of Project

- 115MW Firm Access with a live connection offer
- Located in Grange Castle Business Park beside 110kV substation
- Gas pipeline approx 1 km
- Site has been acquired and planning process is well underway
- Proposed to build multiple dual fuel 10/18 MW units based on gas engine technology

Overview of Project

- Wartsila Dual Fuel Engine:
 - Loading 120-180s from start
 - 6-10 minutes to full load from start
 - High ramping capability of 480kWe/s
 - Also can integrate synchronous condenser
 - Units can compete with mid-merit CCGTs in SEM
 - Cascading of machines enables stand by spinning reserve capacity
 - In summary multi-engine solutions offer huge possibilities for operational flexibility with high plant efficiency , units are suited to operating in a balancing market

Smart Wind Chasing Real Life Example, Colorado, US



Key I-SEM HLD Characteristics for Grange

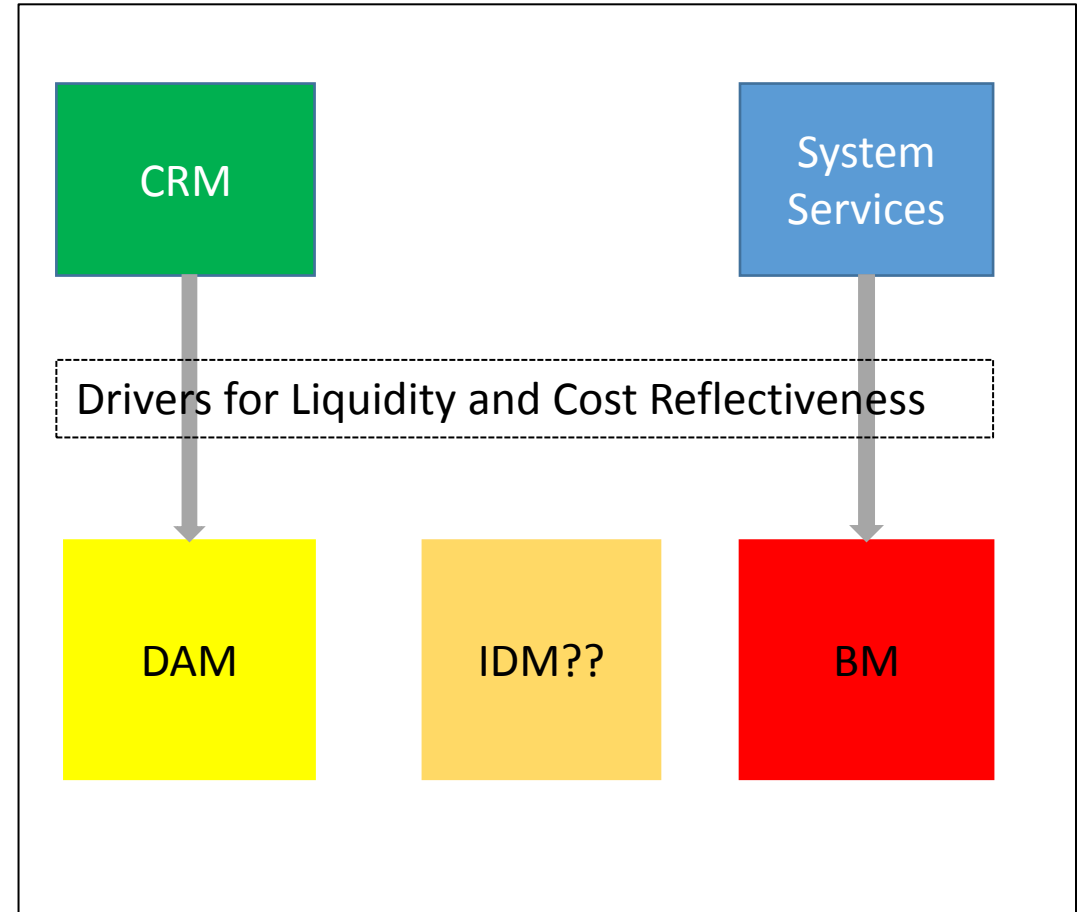
From the HLD decision paper

The design of the I-SEM is characterised by:

- Access to all I-SEM market places for participants of all sizes and technologies
- Liquid and transparent centralised short term physical markets that are coupled with European trading mechanisms, and are exclusive routes to physical scheduling
- Balance responsibility for all participants to ensure that their notifications of generation or demand best reflect their actual expectations
- An explicit capacity remuneration mechanism to help deliver secure supplies for consumers in the all-island market, particularly with increasing variable generation

Feedback on RLG Workshops

- New entrant business case difficult to make unless revenue streams available from CRM, System Services and Energy markets
- CRM and System Services auctions encourage liquidity and cost reflectiveness in DAM and Balancing markets
- IDM is exclusive/Balancing market mandatory– imbalance price key driver in I-SEM for liquidity and market based scheduling of wind and interconnectors in IDM



Feedback on RLG Workshops

- As a flexible generating plant reflecting the value of flexibility in the imbalance price is important. This may also be true of other technologies, such as demand response and storage technologies
- A unit that could respond to wind and demand energy deviations may do this in less than 15 minutes. Flagging of these bids and offers in the balancing mechanism may prevent the true value of flexibility from being reflected in the marginal imbalance price
- Sharper/volatile imbalance prices encourage liquidity in IDM and provide signals for investment in flexibility and demand response
 - Follow on from above is that energy balancing should be market based as much as possible?
 - TSO Balancing Principles will be important to facilitate above as much as possible
- Will there be a market cap and floor in the IDM and balancing market?

Feedback on RLG Workshops

- Fully delinked notifications move generators away from having to produce technically feasible solutions in Day Ahead and Intraday markets
- Objective of balancing market is to minimise the cost of deviations from the physical notifications. If the notifications are more likely to be technically feasible does this not make the process for reaching a feasible dispatch more cost effective?
- More transparent approach for notifications to be linked to contracted quantities which are revised as necessary before IDM gate closure. This may also mitigate market power issues
- Assuming Day Ahead price is used as the reference price for CRM and there is a penalty for physical non-delivery participants should already be incentivised to bid into DAM according to technical feasibility
- A market participant operating in the IDM would consider aggregate contract quantities versus market demand and wind forecasts important for formulating intraday bids and offers and assessing the imbalance pricing trend then physical notifications

Summary

- Key objective for Grange is to have level playing field and transparency in market rules to make market entry assessment
- 3 markets provide additional trading flexibility but also complexity. With increased complexity comes increased potential for market manipulation
- As market power issues are assessed it would be useful to reassess the balancing market and dispatch and scheduling issues again
- Balancing market is an opportunity for participants to respond to flexibility signals. There is a trade off between the complexity of bids and offers and the need the to revise bids and offers.