System Operator for Northern Ireland

Wind Workshop

Ramada Hotel

Wednesday 28 November 2007

System Operator for Northern Ireland

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Northern Ireland Wind Penetration

Developer	Wind Farm	Pre-Grid Code (MW)	2005	2006	2007
	Corkey	5			
	Rigged Hill	5			
	Elliott's Hill	5			
	Bessy Bell	5			
	Slieve Rushen Ph1	5			
	Owenreagh	5			
	Lendrum's Bridge	5.94			
	Lendrum's Bridge Ph2	7.26			
	Altahullion	26			
	Snugborough	13.5			
	Slievenahanaghan	1			
	Total wind at end 2004	**83.7**			
Airtricity	Tappaghan		19.5		
RES	Callagheen			16.9	
RES	Lough Hill				7.8
Airtricity	Bin Mountain				9
RES	Wolf Bog				10
QG	Sl Rushen Ph2				6
RES	Altahullion Ext				11.7
			83.7	16.9	44.5
Installed	Total		103.2	120.1	164.6

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Northern Ireland Wind Penetration

Committed Connections

Wind Farm	Installed Capacity (MW)	
	2008	2009
Sl Rushen Ph2	48	
Bessy Bell 2	9	
Owenreagh Ext	5.1	
Garves	15	
Crockagarron	18	
Sl Divena Ph1	30	
Glenbuck	3	
Sl Divena Ph2	20	
Gruig		25
Crighshane		35
Church Hill		20
	148.1	**80**

Adding this to the existing 212.6MW gives a total of **392.7MW**
And there's a further 1000MW (approx) on land plus the off-shore sites.

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NI Wind Penetration – History

- The island has operated with spinning reserve equal to 75% of the largest infeed (historically approx 400MW).
- With 400MW of wind (majority in the NW) the loss of 275kV circuits to Coolkeeragh auto-disconnects 240MW at Coolkeeragh and wind SPS auto-disconnects a further 60MW (approx). Auto-disconnection of further wind may result in low frequency load shedding.
- It has been established by observation that wind can reduce to zero over a period of 30 minutes – high wind speed shutdown. In the absence of foresight, this is equivalent to losing a single 400MW generator.
- SONI participated in the development of the ANEMOS wind forecasting tool. It was intended that the ANEMOS outputs would be integrated into the NI unit commitment process. This significant development was imminent when the directive to introduce SEM was given. So the rules changed!

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- To date the experience with wind has been positive and it has provided additional generation
- For the large part we as SO's have been able to ignore variability and have not had to consider curtailment
- Only once has the wind variability concerned SONI
- SONI had been working toward integrating wind variability management into unit commitment but a change of plan is required with the SEM
- However, even if we were able to deal with the commitment variabilty issue, how much wind should we commit?

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Technical issues relating to wind operation with increasing wind generation

- Voltage control
- System inertia
- 3 machine rule / minimum plant generation/ plant mix
- Moyle imports / exports
- Ramping issues
- Reserve requirements

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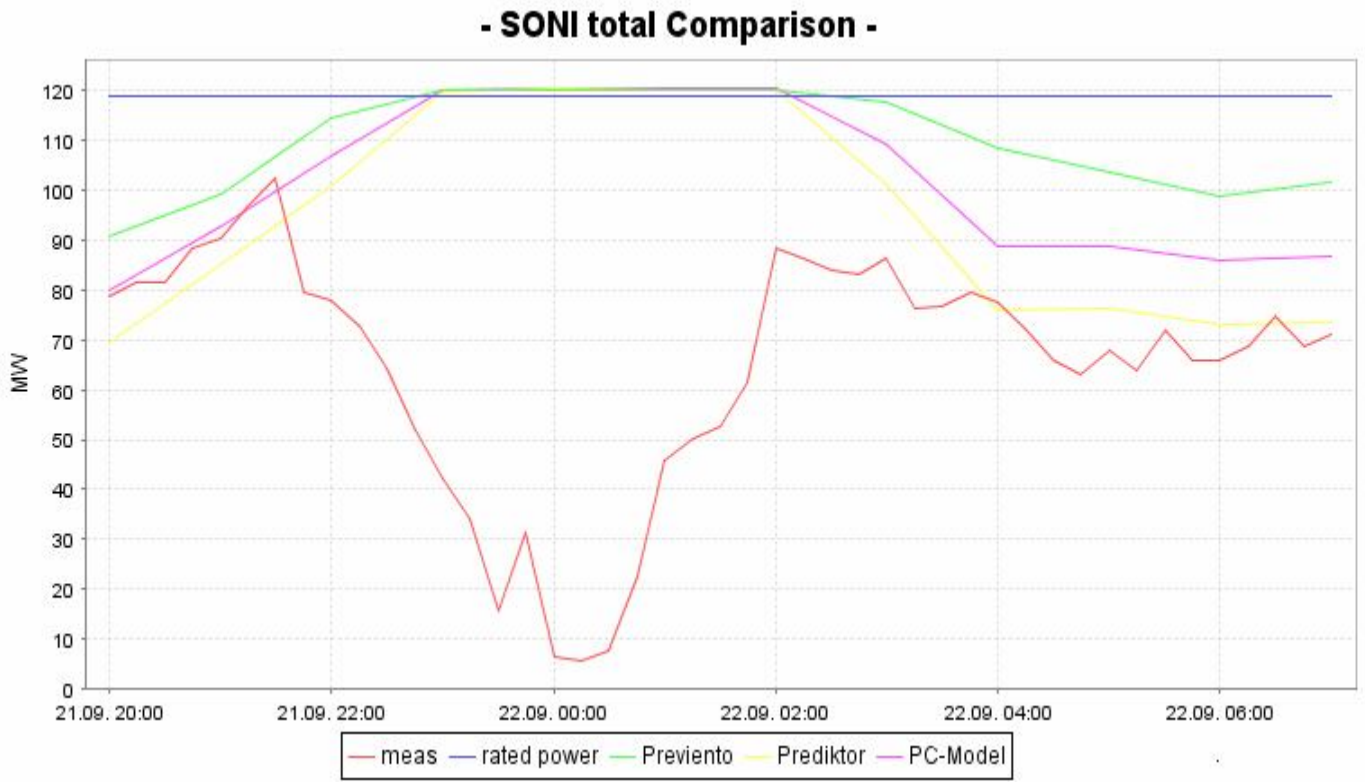

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Technical issues relating to wind operation with increasing wind generation

- Future impact of NI - ROI increased interconnection
- Future impact of ROI - GB interconnection

- Wind forecast / integration into unit commitment tools
- Curtailment mechanisms

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Market issues relating to wind operation with increasing wind generation

- The new SEM requires both SO's to take an island view of generation and this must also include wind issues
- The co-operation required for this is within the remit of the SO's and will take place via the newly constituted System Operations Committee
- A scoping exercise followed by a series of studies will be necessary to understand the foregoing technical issues on an island basis – this will not be simple!

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Market issues relating to wind operation with increasing wind generation

- There are also issues around how the actual market rules accommodate wind
- At present all wind is ‘must run’ and as such if the SO’s were to curtail wind this will appear as a constraint cost to the SO’s
- There is also the issue of plant mix – issues around wind & CCGT’s & a need for more OCGT’s
- Hence the SO’s believe that new market rules are needed for large wind penetration (or the cost will become prohibitive) and this requires regulatory input