Irish Wind Energy Association

DS3 Advisory Council

24th January 2018

Key Concerns for Wind Related to DS3

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- With >500MW connected last year, we are now in the “hockey stick” part of the deployment curve, as predicted.
- Curtailment is the “canary in the mine” of Irish electricity policy, an early warning that we’ve missed something.
- Energy Systems Committee has been created to model, forecast and track overall costs, and curtailment in particular as we move to 2030.
- But we need a firm foundation of 40% RES-E with minimal curtailment in 2020 before we start talking about 70%+ in 2030. Key to this:
    1. Successful and timely roll-out of DS3 System Services to get to 75% SNSP
    2. Optimizing min gen of conventional fleet during curtailment events
    3. Proactive management of interconnectors to minimise curtailment

Successful and timely roll-out of DS3 System Services #1

- Achieving 75% SNSP limit is a fundamental objective of DS3
- The aim of DS3 System Services is to put in place the correct structure, level and type of service in order to ensure that the system can operate securely at this level of SNSP
- Original go-live for System Services was October 2015
- Delays in roll-out of System Services has already contributed to 2-year delay in reaching 75% SNSP (from 2017 to 2019)
- Impact of this delay has been mitigated by REFIT 2 extension and delayed build-out of wind
- At current rates of installation (500MW per year) curtailment will ramp up rapidly, creating investment uncertainty, if SNSP can't be lifted soon.

Successful and timely roll-out of DS3 System Services #2

- Volume Uncapped Procurement now open- important milestone but will not work where significant capital investment required
- EirGrid acknowledge importance of new providers in order to meet System Service requirements post-2020
- New Providers need 2 things to deliver:
  - Volume Capped Procurement process (scheduled to kick off April 2018)
  - Access to grid for their devices (DS3 Grid Regime now unlikely to deliver offers until end 2018 earliest)
- There is a mismatch between volume capped procurement timeline and DS3 grid access timeline
- IWEA has an interest in seeing that only real projects will be awarded DS3 contracts

Successful and timely roll-out of DS3 System Services

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IWEA Recommendations

- Work on principle that some certainty over grid if pre-condition to volume capped procurement
  - 'Deemed Complete' would seem reasonable
- Also must ensure projects are for DS3 to get priority e.g. not CRM/Balancing
- It may be necessary to delay Volume Capped Procurement by 2-3 months to enable DS3 grid processing to 'deemed complete' point
  - Current deadline is May with projects awarded in September 2018, so delay must be >2-3 months since grid offers won't be made until end of 2018
  - For competitive auctions, you need more projects/MWs competing than actually required
- This delay is not ideal but better than:
  - (a) having an undersubscribed auction due to a lack of projects with grid (since grid is a pre-condition) or
  - (b) proceeding with procurement where winning projects are not ready to build causing further delays

Optimizing Min Gen of Conventional Fleet

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Quantifying the problem

- As things stand high merit order conventional units regularly run significantly above standard min gen requirements as per grid code
- Many of these units may have capability to reduce min gen further than currently stated
- At high SNSP wind is being curtailed to leave room for these units
- Mullangrid study indicates average of [200MW] cumulative above the min_gen level prescribed in the grid code, during periods when wind is being curtailed.

Key Questions

- Does this meet the EU directive on minimising curtailment of renewables?
- SIR payment may incentivise improvements, but can they make a capital investment against only 12 months SIR payment certainty?
- Should there be a programme to simply enforce the grid code?
- What does the cost benefit case for temporary derogations around min_gen look like now, given the amount of wind curtailment its causing?
- See Mullangrid table or graph on next slide

Power Plants Can Do More During Hours of Curtailment: Historically Not Going to Min Gen During Curtailment

Table Shows the Operation of Must Run Power Plants During Curtailment indicates that some of the plants (highlighted in yellow) are consistently operating at levels well above their minimum generation levels over the last 6 years

	Must Run Plant	MEC (MW)	Min Gen Level (MW)	Avg Generation Level During Curtailment Events (MW)			
				Q1 to Q3 2017	2016	2015	2012-14
Republic of Ireland	Dublin Bay	415	203	259	257	248	271
	Huntstown 2*	412	121	159	158	176	181
	Huntstown 1*	344	120	138	191	195	181
	Poolbeg A	230	120	123	129	236	242
	Poolbeg B	230	120	108	121		
	Tynagh**	384	220	195	224	199	198
	Moneypoint 1	285	99	118	121	117	121
	Moneypoint 2	285	99	120	121	118	120
	Moneypoint 3	285	99	122	127	120	115
	Aghada 1	258	112	0	0	0	0
	Aghada 2 (Longpoint)	431	216	213	207	218	206
	Tarbert 3	241	35	0	0	35	0
	Tarbert 4	243	35	0	0	0	0
	Whitegate (Glanagow)	442	180	205	225	187	188
	Great Island***	464	203	205	255	257	0
	Edenderry	118	41	67	74	75	85
	Lough Ree	91	71	75	76	79	75
	West Offaly****	137	77	92	96	101	101
	Sealrock 1	80	40	73	76	74	76
	Sealrock 2	81	40	75	78	75	76
	Average		**113**	**138**	**149**	**148**	**149**
	Average Total ROI Min Gen During Curtailment Events (MW)			**1361**	**1403**	**1280**	**1329**
Northern Ireland	Ballylumford B4	170	54	0	56	0	0
	Ballylumford B5	170	54	32	57	0	0
	Ballylumford B6	170	54	0	0	54	54
	Ballylumford B10	101	63	62	62	64	65
	Ballylumford B31	247	113	123	106	121	110
	Ballylumford B32	247	113	126	127	0	83
	Kilroot K1	238	93	108	107	117	122
	Kilroot K2	238	93	105	108	119	118
	Coolkeeragh	412	260	290	283	271	264
	Average		**100**	**121**	**113**	**124**	**117**
	Average Total NI Min Gen During Curtailment Events (MW)			**479**	**488**	**470**	**411**

* = Min gen of Huntstown plants were previously 170MW but reduced in 2017.

** = Min gen of Tynagh plant was previously 194MW but increased in 2017

*** = Min gen of Great Island plant was previously 232MW but reduced in 2017.

**** = Min gen of West Offaly plant was previously 48MW but increased in 2015

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Proactive management of interconnectors to minimise curtailment

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- SO-SO counter-trading was initiated to mitigate curtailment of wind and has delivered reasonable results but still see instances where I'C flows work against wind
- No clarity on how this will be managed in i-SEM
- Last trade closes 17:30 but EirGrid currently not set up for night-time counter-trading

Key Questions

- What is the cost benefit case around moving to 24hr counter-trading arrangements?
- How does counter-trading requirement change under I-SEM?
- What can be done to minimise the negative impact of intra-day trading platform limitations day one?
- What metrics can be published to show efficacy of countertrading?
- Should these be broken out in curtailment reports?

Update on Interconnector Activity During Curtailment Events

		2014	Q1 & Q2 2015	Q3 & Q4 2015	2015	Q1 & Q2 2016	Q3 & Q4 2016	2016	Q1 & Q2 2017	Q3 2017	Q1 to Q3 2017	2014 to Q3 2017
Curtailment Events	Curtailment Events(nr.)	137	57	62	119	53	34	87	49	21	70	413
	EWIC Avg Net (MW)	190	74	-76	-1	-114	-14	-64	-160	-411	-244	-15
	EWIC Avg Net (%)	36%	14%	-14%	0%	-22%	-3%	-12%	-30%	-78%	-46%	-3%
	Moyle Avg Net (MW)	99	5	-96	-46	-116	-139	-127	-210	-236	-219	-63
	Moyle Avg Net (%)	40%	2%	-38%	-18%	-39%	-46%	-42%	-70%	-79%	-73%	-21%
All Periods	EWIC Absolute Avg (Day) (MW)	376	267	160	213	31	-3	14	-15	-66	-32	154
	EWIC Absolute Avg (Night) (MW)	78	51	-100	-24	-19	-10	-15	-119	-296	-178	-25
	Moyle Absolute Avg (Day) (MW)	154	111	11	61	34	-56	-11	26	-39	4	55
	Moyle Absolute Avg (Night) (MW)	50	-53	-132	-92	-56	-61	-59	-86	-159	-111	-49

Notes:

Positive figures represents imports, negative figures represent exports

EWIC Out of Service: 21st to 22nd Feb 2014, 2nd to 3rd May 2014, 26th to 28th Aug 2014, 9th to 14th Sep 2014, 30th Sep 2014 to 1st Nov 2014, 7th Jan 2015, 10th to 13th Mar 2015, 20th to 21st Jun 2015, 22nd Jun 2015, 8th to 11th Sep 2015, 28th to 29th Sep 2015, 6th Sep 2016 to 23rd Dec 2016, 17th Mar 2017 to 23rd Mar 2017, 18th Apr 2017 to 31st May 2017

Moyle Out of Service: 31st Mar 2014 to 7th Apr 2014, 5th July 2014 to 29th Aug 2014, 3rd to 4th Nov 2014, 12th to 13th Dec 2015, 13th to 15th Apr 2016, 26th to 28th Apr 2016, 6th Jun to 16th Sep 2016

Inter-connector Activity 2014-2017

- Review of interconnector activity during curtailment events over the last 4 years indicates that imports have steadily reduced over time through increased exports due to market activity and SO countertrading, with both interconnectors now operating on a net exporting basis during curtailment events.
- Summary of interconnectors over past 4 years:
  - EWIC on average exporting 15MW during curtailment events which is 3% of its 530MW export capacity. During all periods EWIC on average importing 154MW per day and exporting 25MW per night. However EWIC is predominantly exporting over the last 2 years.
  - Moyle on average exporting 63MW during curtailment events which was 21% of its 300MW export capacity at the time. During all periods Moyle on average importing 55MW per day and exporting 49MW per night. Again, Moyle is predominantly exporting over the last 2 years. Noted that the firm export capacity of Moyle reduced from 300MW to 80MW in Nov 2017 due to the connection of a number of large wind farms in Scotland. However it is noted that exports on Moyle have exceeded the 80MW firm capacity on occasions since Nov 2017.

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Volume Risk on Temporal Scalar

- Every factor that affects curtailment also affects SNSP volumes. DSM, storage and conventional plant need to know how many hours SNSP will be above 50%, 60% and 70%, specifically:
  - Wind is stochastic, but appears to cause a range of
  - Variations in interconnector trading (including countertrading) could cause a range of
  - Variations in min_gen
  - Vartiations in min number of units could cause
  - Other factors beyond EirGrid such as the level of demand (particularly datacentres) and installed capacity of wind (depending on success of REFIT + timing / volumes to be supported under RESS)

- Cumulatively if all the variability goes the “right” or “wrong” way, then the average scalar could be very different
  - This is going to attract a very large risk premium from investors
  - The risks are impossible to model
  - There are no ways to reconfigure your plant or service to mitigate these risks

Optimised Dispatch and Transmission Constraints

Key Questions

- How quickly can EirGrid move the minimum number of units lower (from 8 to as low as 4)?
- If the N-S interconnector is further delayed, is there a contingency plan for lowering min_units?
- Can inertia/RoCoF constraints be applied more flexibly?
- When will either EirGrid or industry be able to paint a dispatch picture of 2030?
  - We have high level quantities from Low Carbon Living Scenario
  - But we need accompanying likely transmission constraints volumes of DS3 likely to be required, changes to largest infeed, likely SNSP level, likely minimum inertia level, operational philosophy.
  - This vision can help estimate costs, predict curtailment, predict SNSP volume scalars.