

“ISEM” Ireland’s Wholesale power market
12th Dec 19
Stan Linehan

Overview

☐ New ISEM Wholesale Power Market

- Comparison with previous SEM market
- Balancing Market
- I/C Flows in ISEM

☐ Fuel Mix

- Global
- ISEM (Ireland)

☐ Price Drivers in ISEM

- Wind
- Gas

ISEM Market commenced Oct 2018



SEM Market

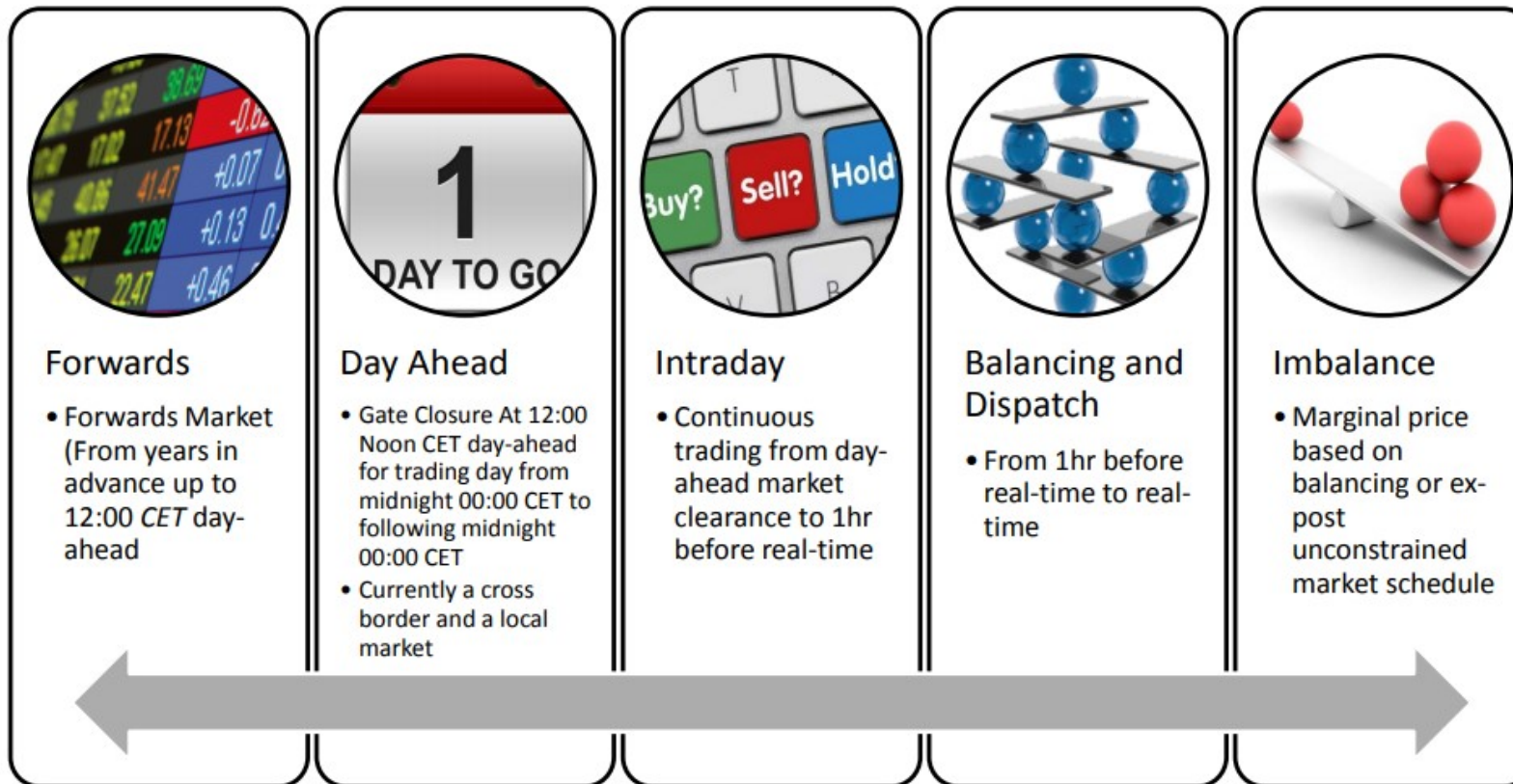
- ☐ Single Pool Market
- ☐ Bidding code of practice
- ☐ Balancing socialisation
- ☐ One Sided Market
- ☐ No Capacity Auction



ISEM Market

- ☐ Multiple Markets
- ☐ No Bidding Code of Practice (Ex Ante)
- ☐ Balance Responsibility
- ☐ 2 sided market (Demand must bid)
- ☐ Capacity Auction

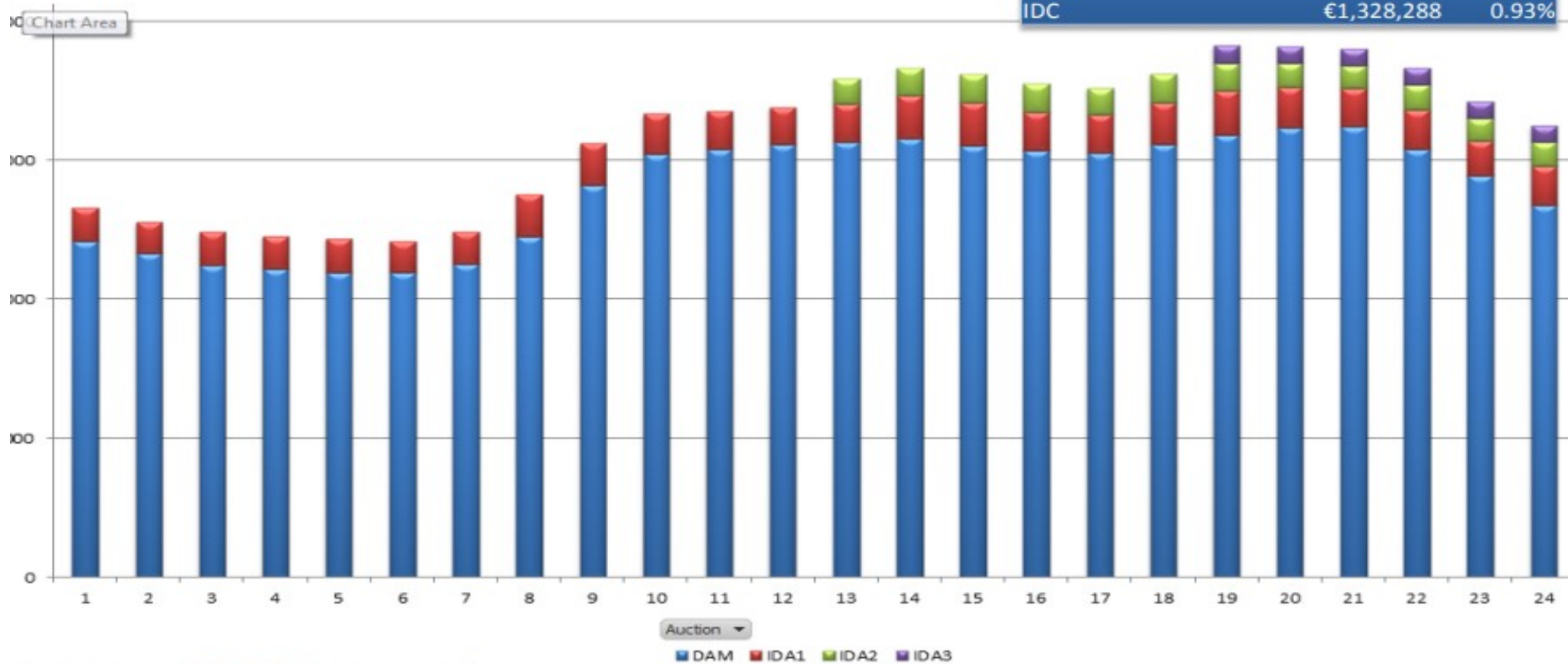
ISEM Market's Timeline



- Volumes from Ex-ante October

**Using approx. prices*

| Market | Value | % of DAM |
|--------|--------------|----------|
| DAM | €143,413,084 | |
| IDA1 | €13,541,594 | 9.44% |
| IDA2 | €5,245,769 | 3.66% |
| IDA3 | €2,020,467 | 1.41% |
| IDC | €1,328,288 | 0.93% |

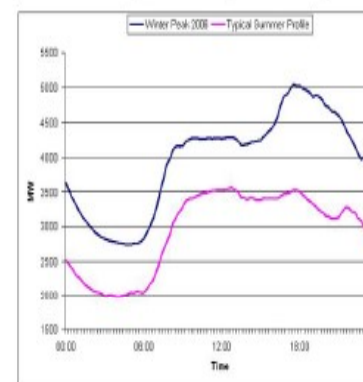


Confidential

ISEM Balancing Market

- ☐ Imbalance prices
 - Paid to units that spill excess energy into balancing market
 - Charged to units that do not meet their ex-ante market obligations
- ☐ The Imbalance Price is the bid/offer price of the marginal energy balancing action
- ☐ Bidding code of practice

Load changes through the day ...



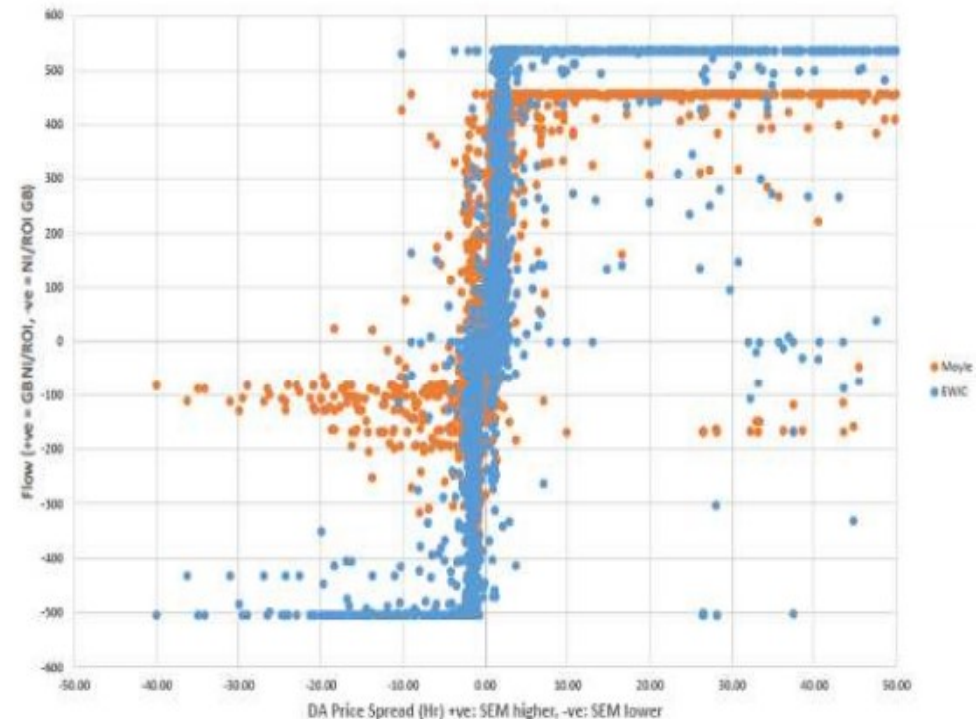
...Generation output must match this



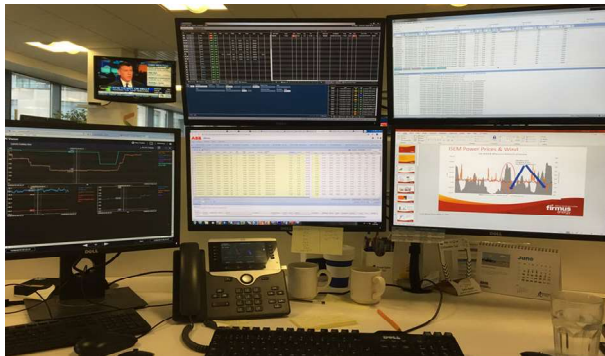
Interconnector Efficiency improved in ISEM

- ❑ Efficient Flows on the I/Cs are a key objective of the ISEM market design
- ❑ I/Cs flows are overwhelmingly in the correct direction in ISEM.
- ❑ Correct arbitrage will show flows in upper right and lower left quadrants.

Interconnectors are flowing efficiently, reflecting the price differentials between markets



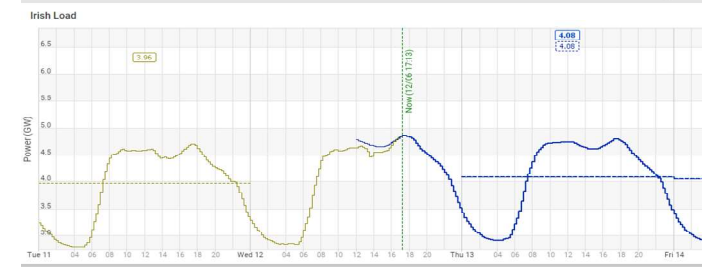
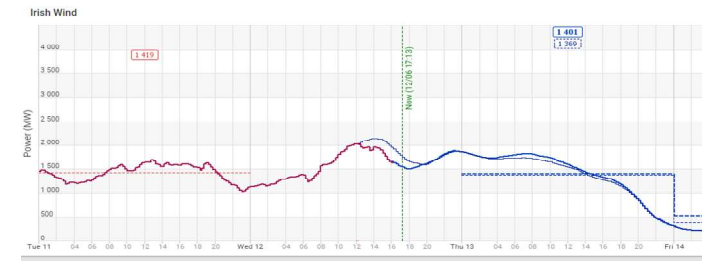
Daily Activity of BGE Front Office Power



Plant Outages

| All Island Outage Plan | | | | | | | | | | |
|------------------------|-----|----|----|----|----|----|----|----|----|----|
| Energy Trading | ET1 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET1 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET2 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET3 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET4 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET5 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET6 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET7 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET8 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET9 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET12 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET13 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET14 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET15 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET16 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET17 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET18 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET19 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET20 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET21 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET22 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET23 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET24 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET25 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET26 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET27 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET28 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET29 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET30 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET31 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET32 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
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| ET79 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET80 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET81 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
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| ET96 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET97 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET98 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET99 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| ET100 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |

Wind and Demand

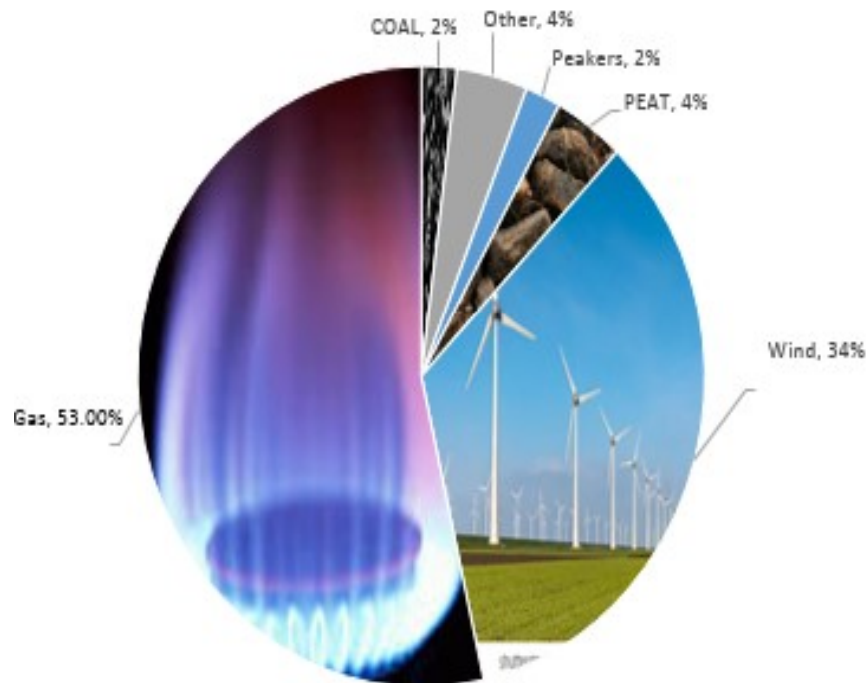


Gas & Carbon Prices

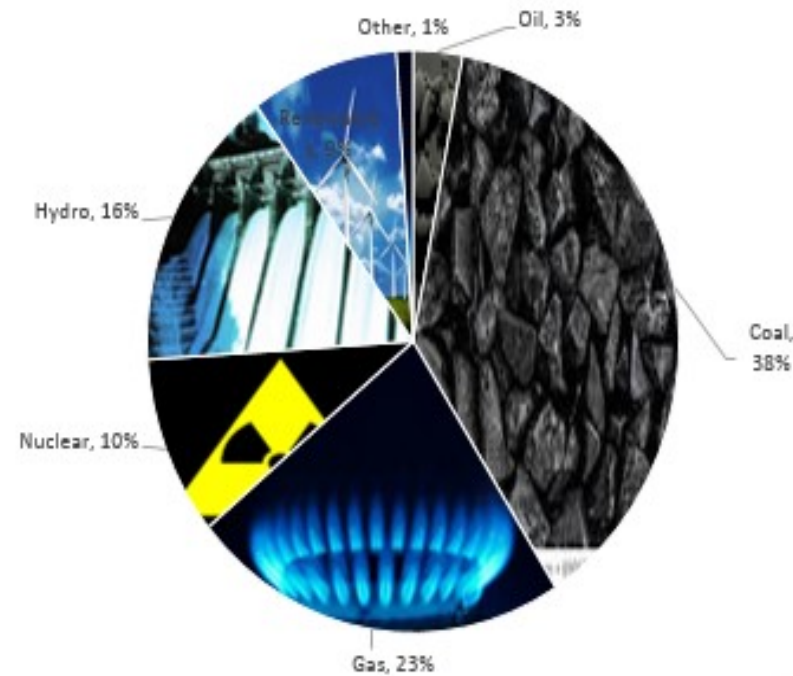
| ICAP | Qty | Bid | NBP Ask | Qty | Last | Qty |
|------------------------|-----|-----|---------|-----|-------|-----|
| Within Day | | | | | 28.90 | ⇄ |
| Day Ahead | | | | | 29.60 | ⇄ |
| Bal of Week | | | | | 28.75 | ⇄ |
| Weekend | | | | | | |
| Saturday | | | | | | |
| Sunday | | | | | | |
| WK/DY NW | | | | | 28.00 | ⇄ |
| Bal of Month | | | | | 28.00 | ⇄ |
| 26 22/06-23/06 | | | | | | |
| 26 24/06-28/06 | | | | | | |
| 26 29/06-30/06 | | | | | | |
| 26 27 01/07-05/07 | | | | | | |
| 26 Jun-19 (17-30) | | | | | | |
| 26 Jul-19 (01-15) | | | | | | |
| 26 Jul-19 (17-31) | | | | | | |
| 26 Aug-19 (01-16) | | | | | | |
| 26 Jun-19 x FR -Jul-19 | | | | | | |
| 26 Jul-19 x FR -Aug-19 | | | | | | |
| 26 Aug-19 x FR -Sep-19 | | | | | | |
| 26 Sep-19 x FR -Nov-19 | | | | | | |
| Jul-19 | | | | | | |
| Aug-19 | | | | | 27.92 | ↓ |
| Sep-19 | | | | | 28.75 | ↓ |
| Oct-19 | | | | | | |
| Nov-19 | | | | | | |
| Dec-19 | | | | | | |
| Jan-20 | | | | | | |
| Q4-19 | | | | | | |
| Q4-19 | | | | | | |
| Q4-20 | | | | | | |
| Q4-20 | | | | | 55.65 | ↑ |

ISEM & Global Fuel Mix

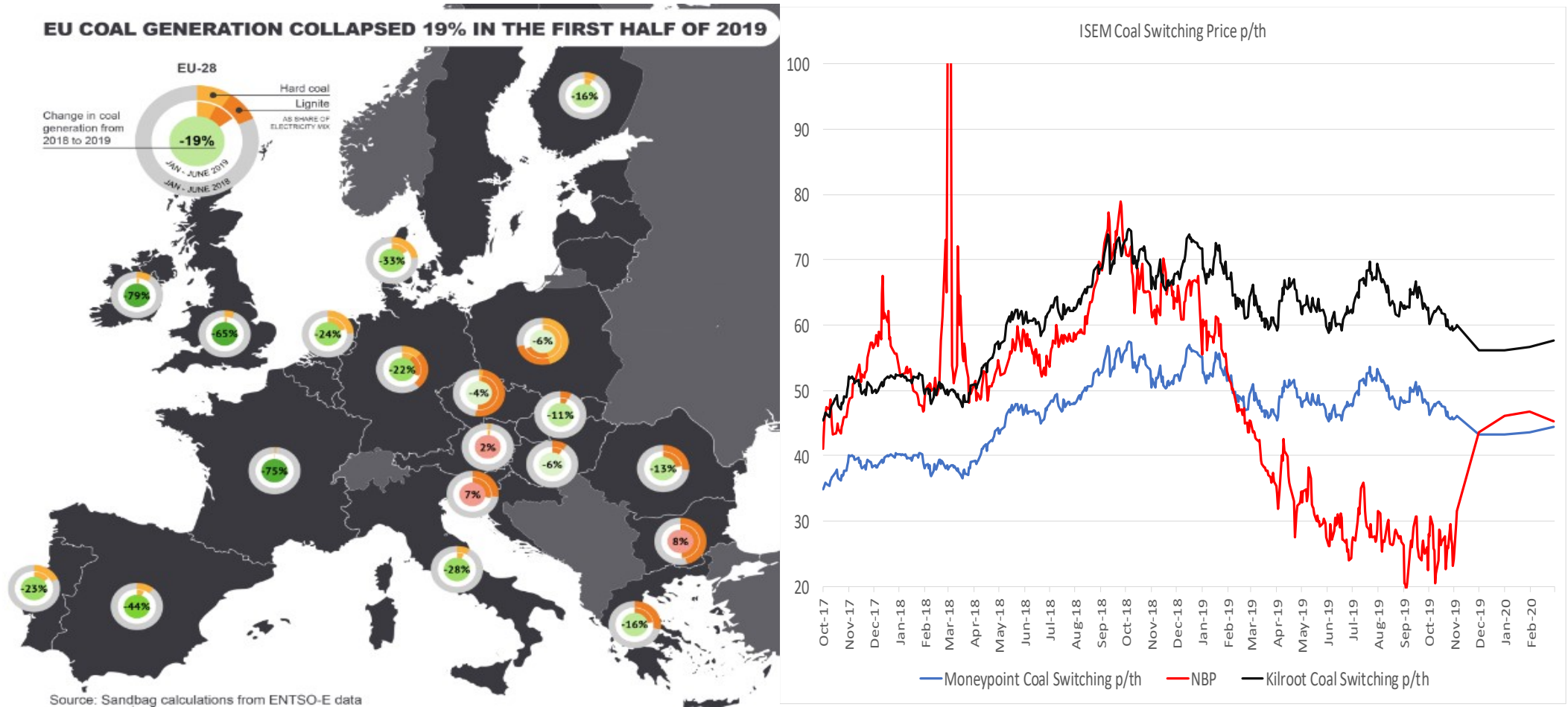
ISEM Fuel Mix



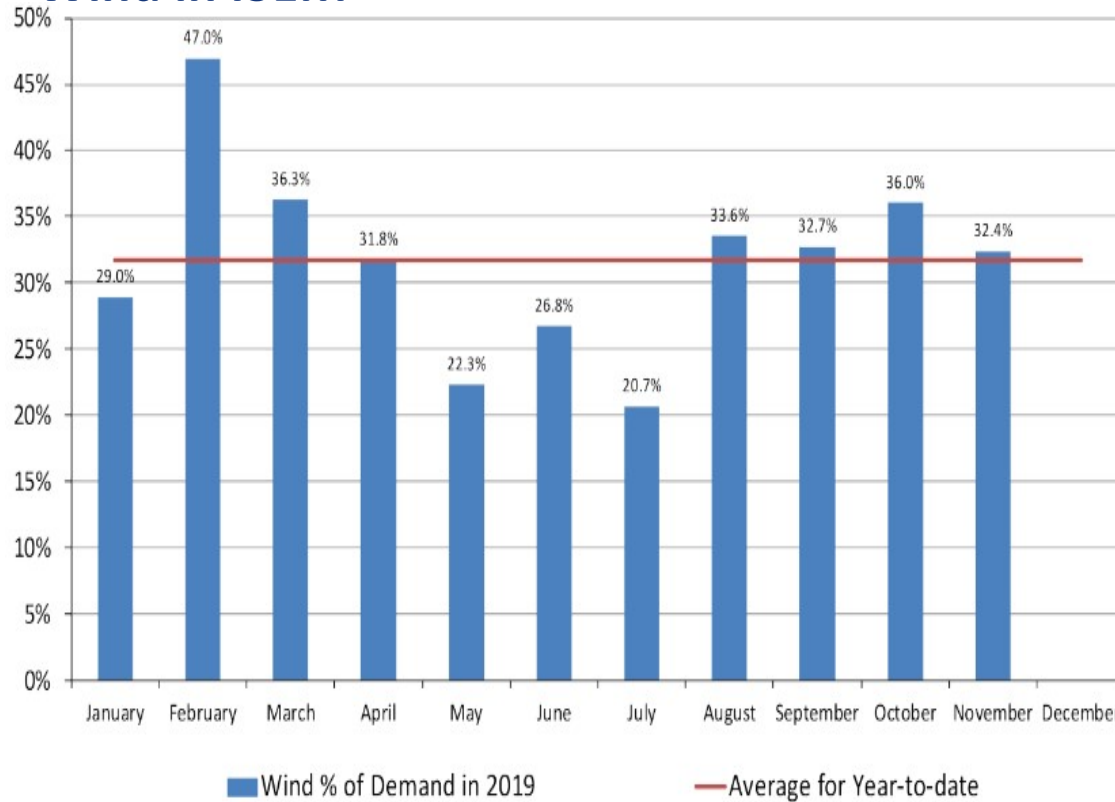
Global Fuel Mix



Coal Generation decreasing



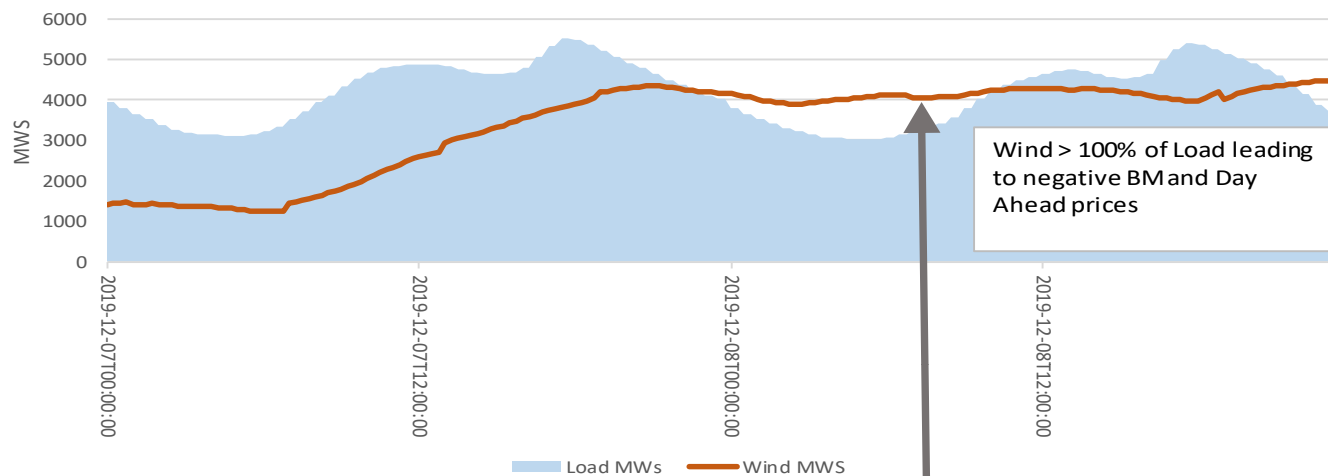
Wind in ISEM



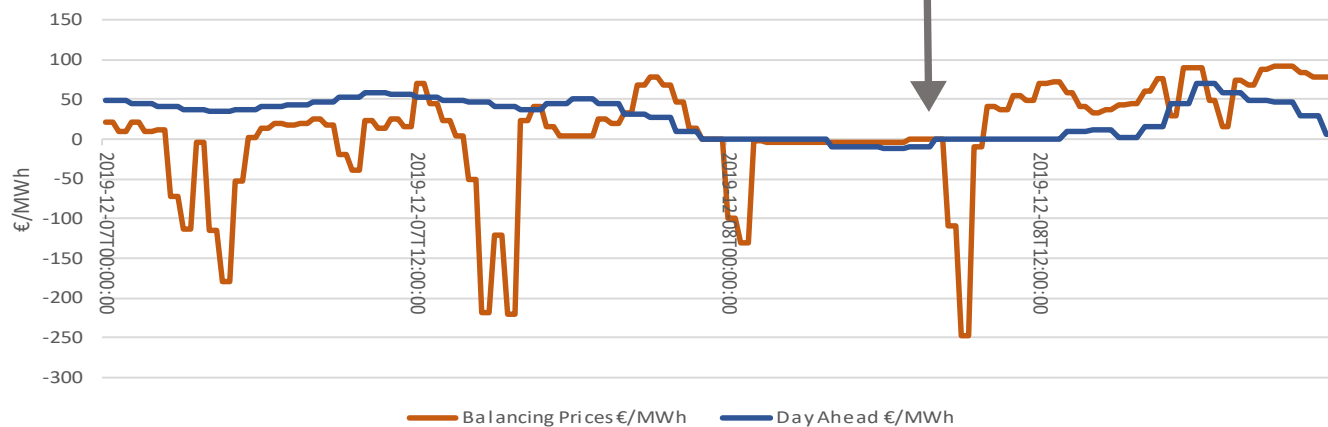
- ☐ Ireland had over 70% of its Power Demand met by Wind on the 8th Dec 2019
- ☐ All Island Wind generation Record reached on 8th Dec 2019 (4481 MWs)

ISEM Power Prices & Wind 7-8th Dec 2019 "Storm Atiyah"

Load and Wind 7-8th December 2019 "Storm Atiyah"



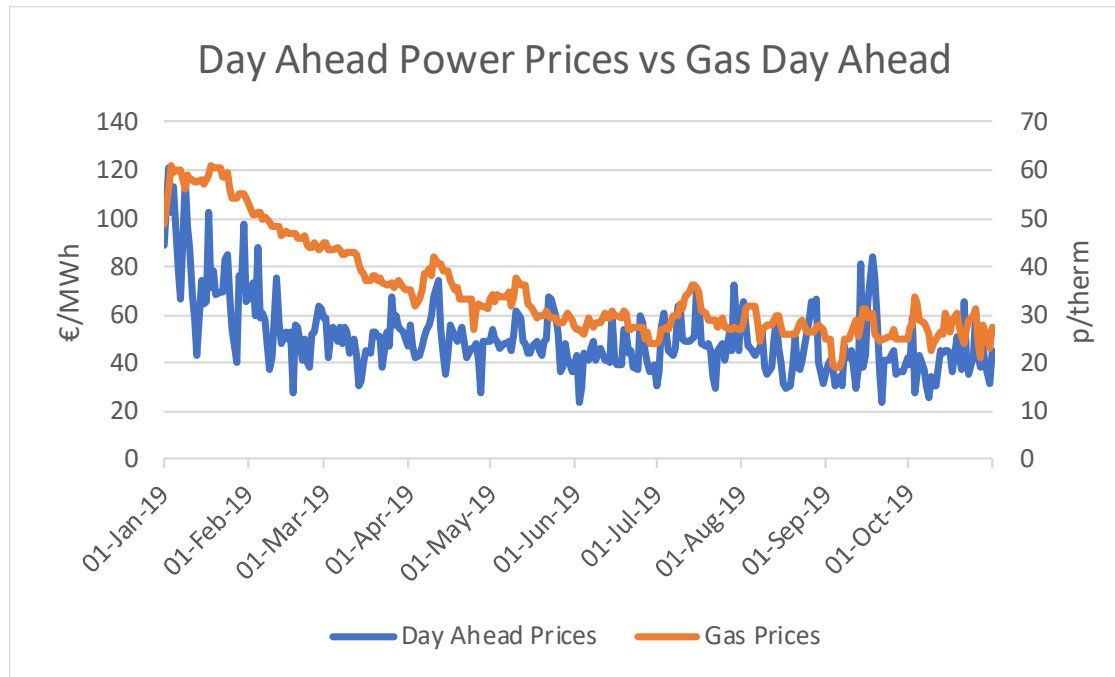
Day Ahead & Balancing Prices 7-8th December 2019 "Storm Atiyah"



| Date & Time | Wind MWs | Load MWs | BM €/MWh | DA €/MWh |
|--------------|----------|----------|----------|----------|
| 8 Dec 8:00am | 4123 | 3798 | -247 | -0.3 |
| 8 Dec 6:30am | 4137 | 3144 | -4.2 | -11.9 |

- High Wind during times of low demand leads to negative Day Ahead & Balancing Prices
- Balancing Market more volatile than Day Ahead

ISEM Day Ahead Power Price vs Gas Day Ahead



- ❑ ISEM prompt Power Prices have a correlation with day ahead Gas
- ❑ Correlation breaks down
 - Periods of high wind
 - Power Plant outages
 - Gas going out of merit “Beast from East”

Summary

- ☐ Wholesale power market changed to ISEM in October 2018
- ☐ Gas market share is staying constant, but coal generation is rapidly falling off
- ☐ Prompt ISEM prices fluctuate according to wind , demand and gas prices.
- ☐ Balancing ISEM prices proving to be volatile
- ☐ Less value in capacity market for generators in ISEM compared to SEM.