



**Single Electricity Market
Performance**

01 October 2020 – 31 December 2020

SEM-21-013

SEM Monitoring Report

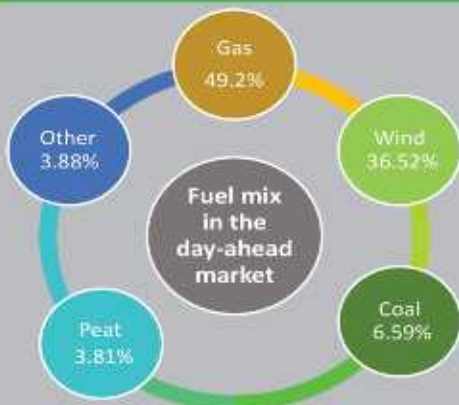
1 October 2020 - 31 December 2020

SEM
committee

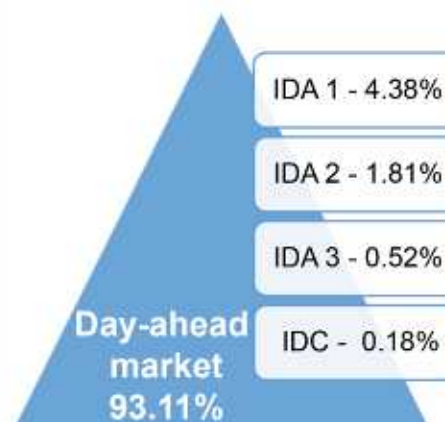
Key Highlights

- ✓ Prices in the day-ahead market were 10.54% higher than in the equivalent period last year. Prices also increased from the previous quarter by 38%. Higher gas prices contributed significantly to the price increases.
- ✓ High liquidity concentrated in the day-ahead market with over 93% of ex-ante volumes traded with an overall value of over €560m.
- ✓ Interconnectors continued to flow efficiently between the SEM and GB. This is the last period through which interconnectors are traded in the DAM. From 1 January 2021, market coupling across the interconnectors will take place in the intraday auctions 1 and 2 only.

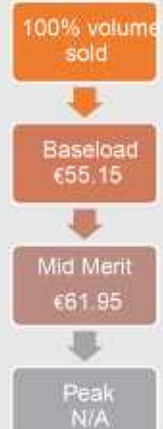
Fuel Mix



Market share by volume



DC contracts



Prices and impact of wind

- ✓ In periods of high wind, the day ahead price dropped significantly
- ✓ The highest prices are associated with a low wind forecast
- ✓ Increase in average day-ahead price from €37.02 in previous quarter to €50.97

Average daily price in DAM €50.97
Lowest price in hourly period -€31.25
Highest price in hourly period €378.12



Highest prices during evening peak demand

Lowest prices overnight

1 INTRODUCTION

The Single Electricity Market (SEM) is the wholesale electricity market for the island of Ireland. This report is compiled by the SEM Market Monitoring Unit (MMU), which closely monitors the market, in particular with relation to bidding controls in place and to the requirements of REMIT. The report provides an overview of the performance of the market and of the trading arrangements that exist in a number of different timeframes. These arrangements are shown graphically in Figure 1 below:



Figure 1 - SEM Energy Markets

Trading in the forward market is financial only and does not entail physical delivery of power. It does however provide market participants with the opportunity to hedge their positions in the Day Ahead Market (DAM) through forward contracts.

Participation in the DAM is through coupling with the EU Internal Energy Market and is not mandatory. Following the DAM, the Intraday Auctions (IDA) provides market participants with the opportunity to refine their market position and minimise their exposure in the Balancing Market (BM). Through the BM the Transmission System Operators (TSOs) buy and sell power from market participants to ensure that the demand and supply of power is exactly matched.

This report covers the fourth quarter of 2020 from 01 October to 31 December.

2 MARKET PERFORMANCE

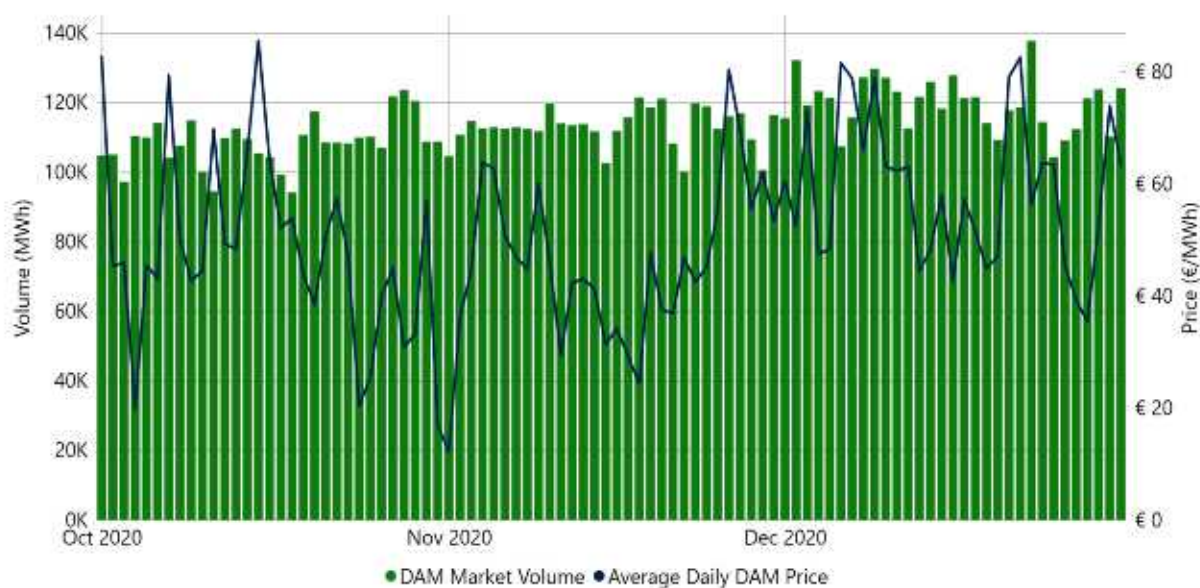
The SEM is designed to allow the efficient coupling of the wholesale market on the island of Ireland with the wholesale electricity market across Europe through a single marketplace and common rules. The trading arrangements are designed to achieve this through a liquid DAM on the island coupled with the DAM across Europe and the effective linking of the two through efficient use of the two interconnectors that link Ireland and Northern Ireland with Wales and Scotland respectively.

Further coupling has been effected in the intraday market timeframe and currently two auctions during this time link the SEM to the wholesale market in Great Britain. The design of the SEM allows a market solution to the balancing of the demand and supply of electricity through a balancing market which takes place in real time.

This will be the final quarterly report in which trading will be carried out under the above arrangements. From 01 January 2021 new trading arrangements have been put in place that will see market coupling across the two interconnectors take place through the Intraday auctions (1 & 2) only.

2.1 DAY AHEAD MARKET

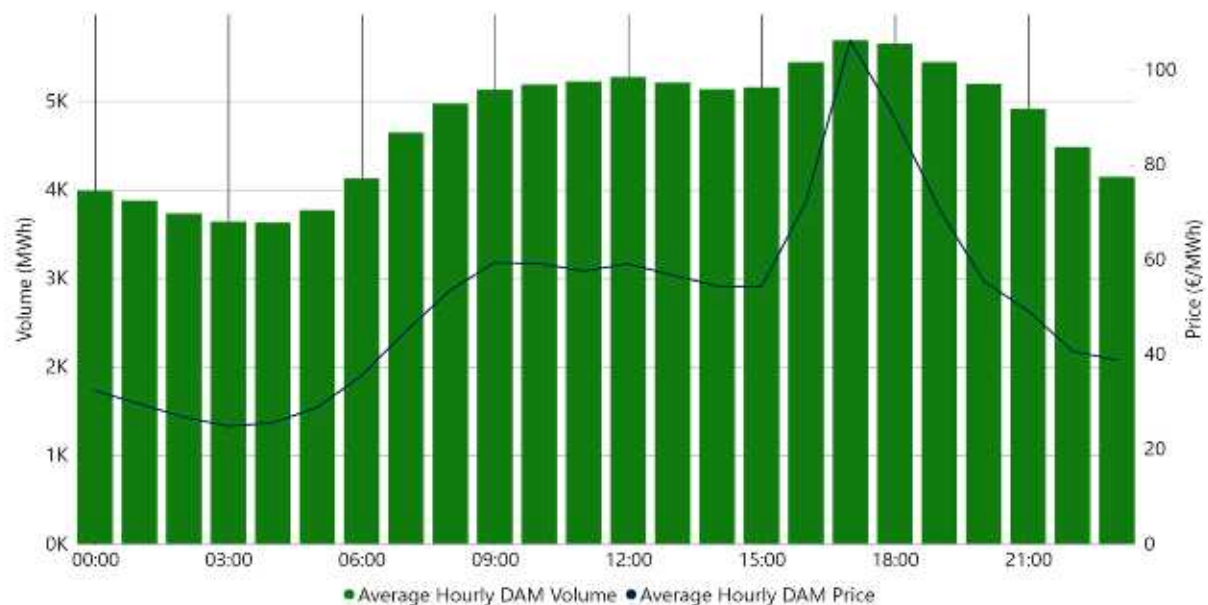
Over the period the DAM market has continued to operate effectively and efficiently in line with the expectations of the market design. The graph below shows the daily average DAM price and volume for the market in Q4 2020. In total the value of the DAM market during the period was €560.48M.



Graph 1 - DAM Market Volume and Average Daily DAM Price

The average daily price in the DAM was €50.97/MWh during the period, up from €37.02/MWh in Q3 2020. The lowest average daily price was €12.15/MWh with the highest average daily price €85.50/MWh. The lowest price recorded in an individual hourly period was (-) €31.25/MWh whilst the maximum price recorded in a single period was €378.12/MWh.

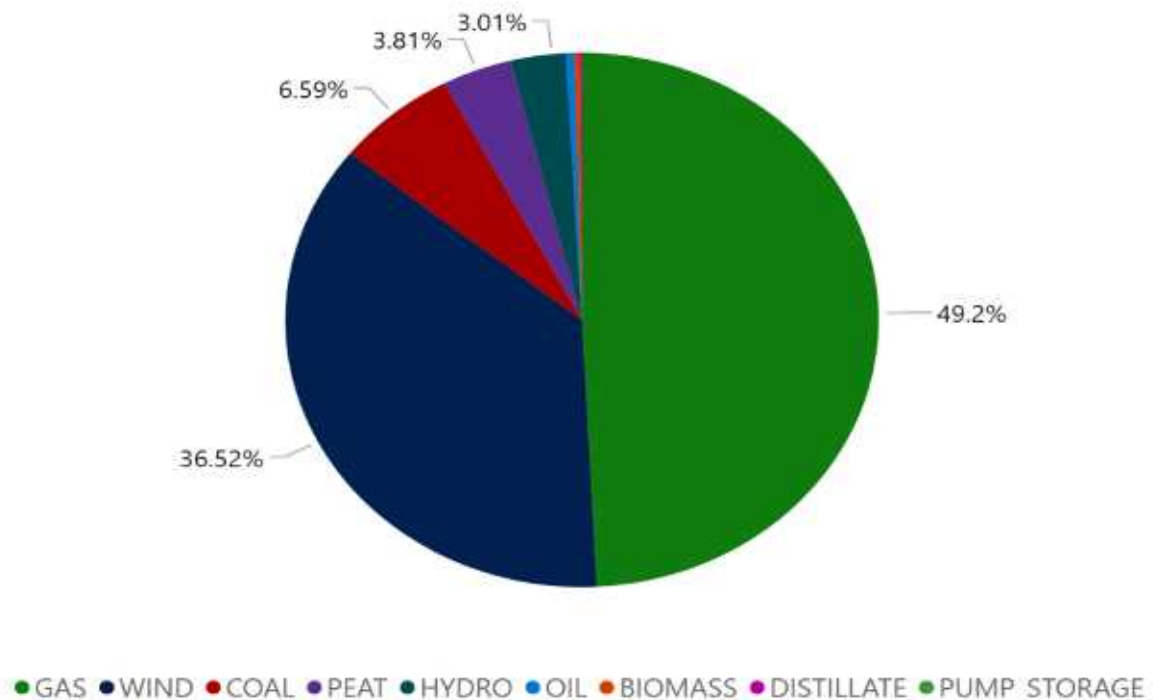
The below graph shows the average volume and price across each hourly period in the trading day.



Graph 2 – Average Volume and Price per Hourly Period

Prices in the DAM are higher than the equivalent period one year ago (increase of 10.54%) which can broadly be accounted for by an increase in gas prices and demand.

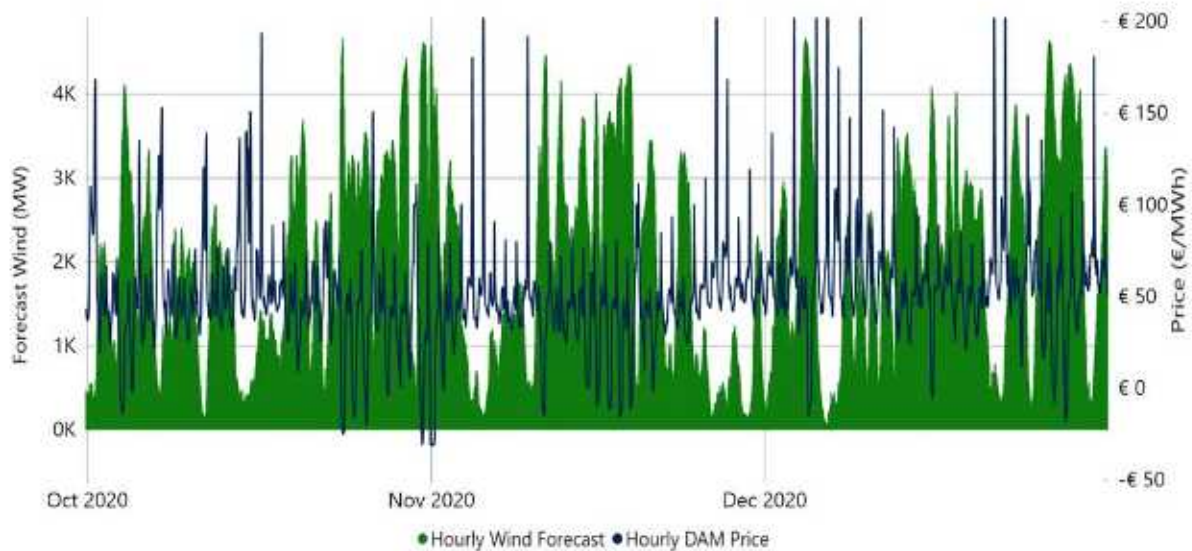
The share of DAM metered generation by fuel mix is shown in Graph 3 below.



Graph 3 – DAM Metered Generation by Fuel Mix

Gas represents 49.2%, Wind 36.52%, Coal 6.59% and Peat 3.81% with the remainder made up of Oil, Hydro, Biomass, Distillate and Pumped Storage.

DAM prices are significantly impacted by the level of wind in the system and the forecast of wind at the day ahead stage, with periods of high wind associated with a reduction in DAM prices. The highest prices continue to be associated with a low wind forecast while the lowest prices occurred during periods of much higher expected levels of wind.



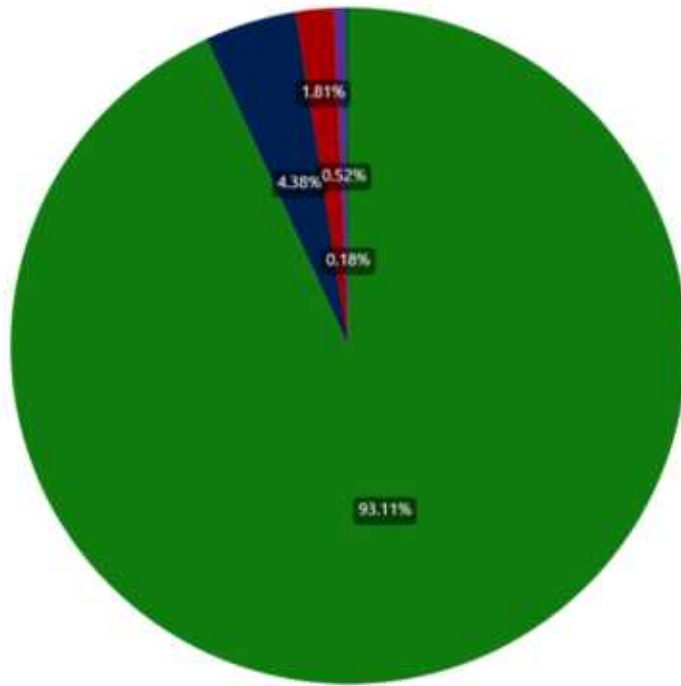
Graph 4 – Hourly Wind Forecast and Hourly DAM Price (Y-axis has been cropped to €200/MWh)

Table 1 below illustrates the relationship between prices and the forecast level of wind at day-ahead stage. It shows the highest prices over the period covered occurred during evening peak demand and the lowest prices occurring overnight.

High Price-Low Wind				Low Price-High Wind			
Date	Time	Price (€/MWh)	Wind Forecast (MW)	Date	Time	Price (€/MWh)	Wind Forecast (MW)
06/12/2020	17:00	378.12	60.64	01/11/2020	01:00	-31.25	4577.5
26/11/2020	17:00	336.24	327.37	01/11/2020	02:00	-31.25	4484.5
21/12/2020	17:00	255	688.22	01/11/2020	03:00	-31.25	4310.79
03/12/2020	17:00	245.17	1098.07	01/11/2020	04:00	-31.05	4065.98
05/12/2020	17:00	226.21	1632.16	01/11/2020	00:00	-30.99	4528.07

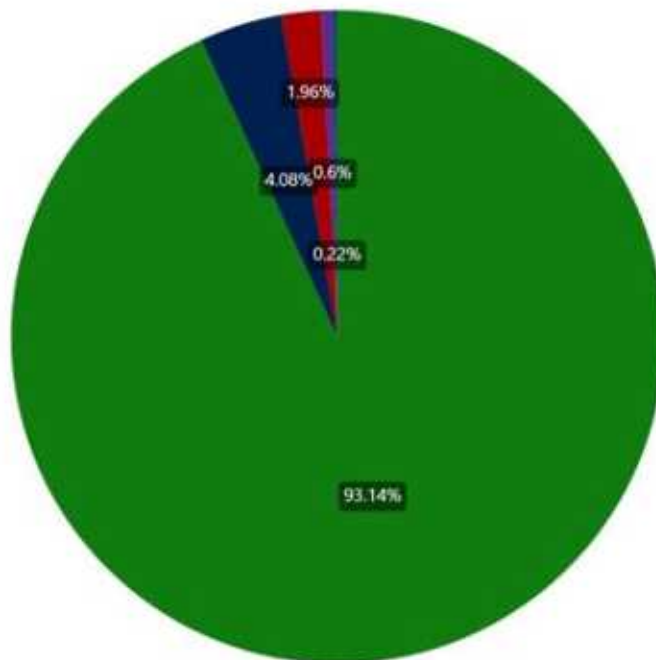
Table 1- DAM Price and Wind Forecast

The concentration of trading in the DAM is demonstrated in Graphs 5 and 6 below. Graph 5 shows that over 93.11% of ex-ante volumes are traded through the DAM. Suppliers of electricity to business and domestic customers continue to cover the majority of their demand in this market. Graph 5 also shows the relative value of each ex-ante market.



● DAM ● IDA1 ● IDA2 ● IDA3 ● IDC

Graph 5 - Market Share by Volume



● DAM ● IDA1 ● IDA2 ● IDA3 ● IDC

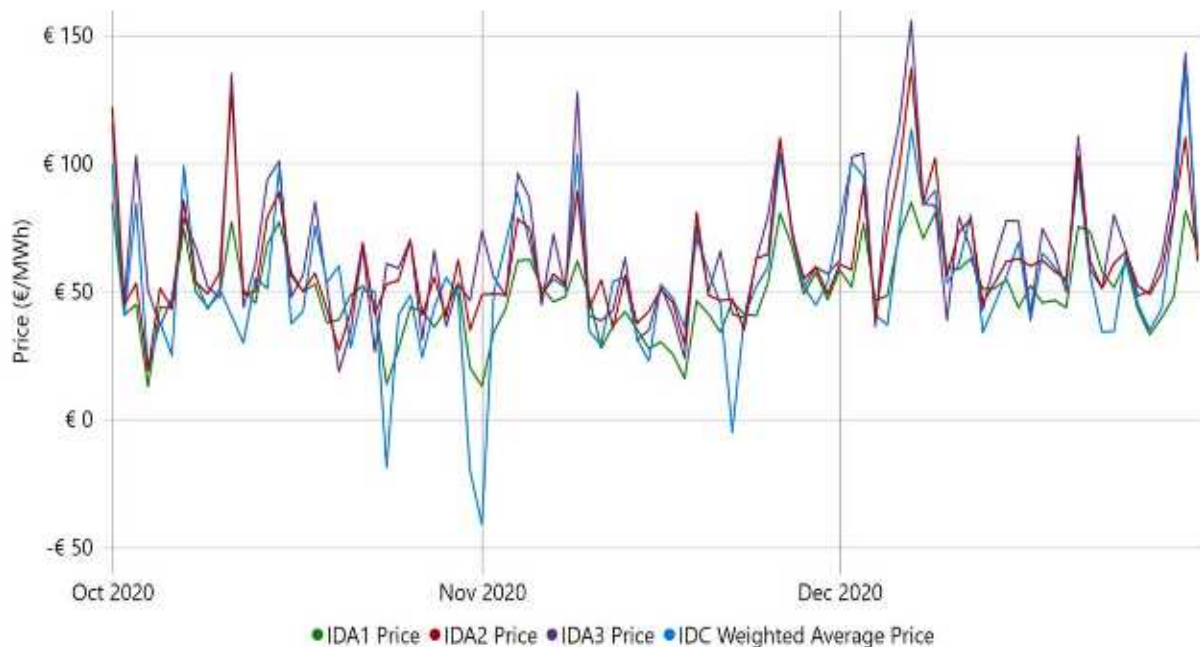
Graph 6 - Market Share by Value

2.2 INTRADAY MARKET

The intraday markets have allowed market participants to refine their market position by buying or selling closer to real time. Volumes however have been relatively low, and have generally declined through the IDA1, IDA2 and IDA3 auctions and the Intraday Continuous market (IDC). The IDA1 and IDA2 are coupled markets with GB while the IDA3 and IDC are local SEM-only markets. The IDA1 auction accounted for 4.38% of the total ex-ante market by volume; the IDA2 auction accounted for 1.81%, the IDA3 auction for 0.52% and the IDC for 0.18%.

Average prices show a tendency to rise during the intraday timeframe as it becomes closer to real time, with average prices in IDA1 being €49.79/MWh; IDA2 €61.00/MWh and IDA3 €65.41/MWh and the IDC market €55.96/MWh. The total value of these markets over the period was €24.55M in IDA1; €11.81M in IDA2; €3.59M in the IDA3 and €1.31M in the IDC market. The IDA2 and IDA3 auctions cover a smaller timeframe and are closer to peak hours (where prices are generally higher to meet the increased level of demand and thus the average prices would be expected to be higher).

Graph 7 below illustrates the generally lower prices in the IDA1 with the higher prices in IDA3 market. Prices in all markets generally move in a similar direction.

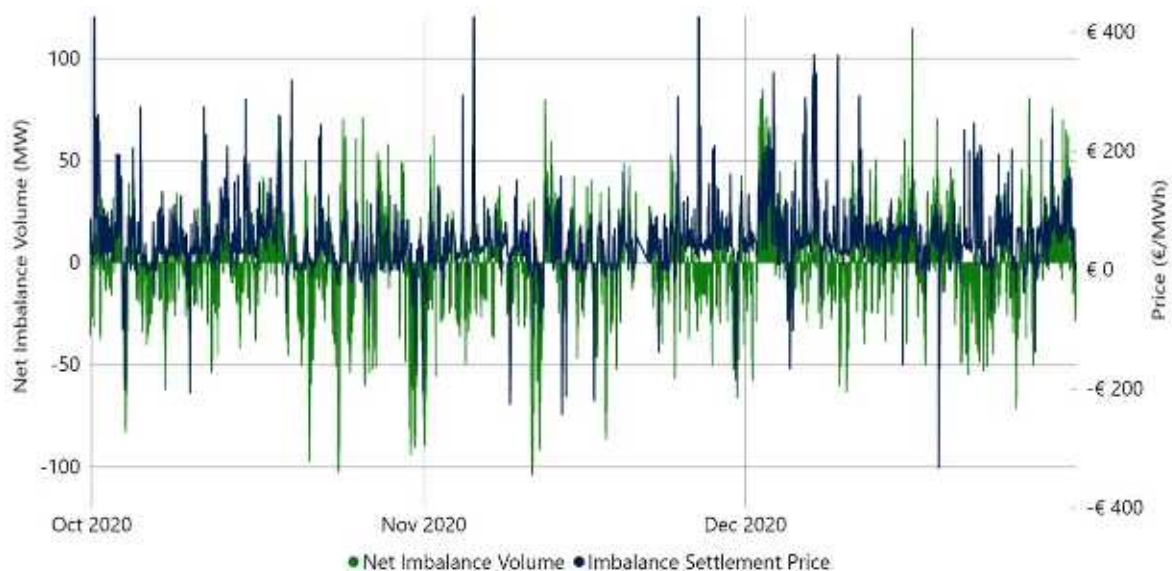


Graph 7 – Average Daily Intraday Prices

2.3 BALANCING MARKET RESULTS

Net Imbalance Settlement Volumes and Prices are set out below, showing relatively higher volatility in the market in both volumes and prices.

Graph 8 below shows the 30 Minute Net Imbalance Volumes and Imbalance Settlement Price for each 30 minute trading period over the quarter.

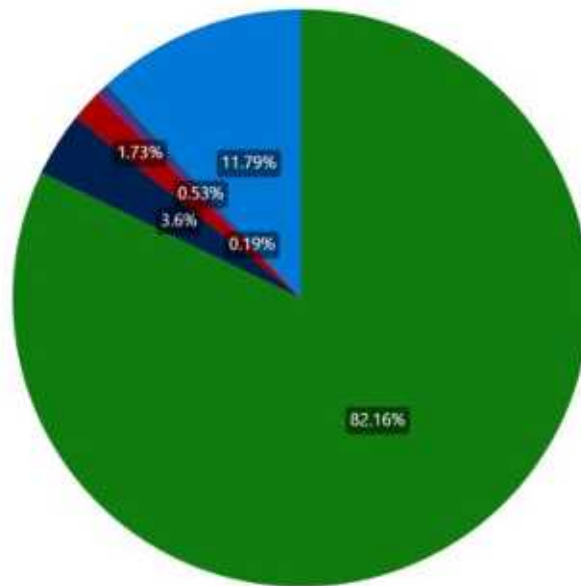


Graph 8 - 30 Minute Net Imbalance Volumes and Imbalance Settlement Prices (Y-axis has been cropped to +/-€400/MWh)

The highest settlement 30 minute Imbalance Settlement Price occurred on 26 November at 17:00 of €691.57/MWh and the lowest 30 minute Imbalance Settlement Price of (-)€333.33 occurred on 19 December at 03:00. The average Imbalance Settlement Price across the quarter was €49.96/MWh which brings it to a similar level to the ex-ante markets.

2.3.1 BALANCING MARKET COSTS

The balancing market is a complex market that determines the Imbalance Settlement Price for settlement of the TSO's balancing actions and any uninstructed deviations from a participant's notified ex ante position. It is made up of numerous energy/non energy actions, charge and payment components. Using these components to calculate the cost/value of balancing, we can show the market share of the Balancing Market in comparison to the ex-ante markets. This is illustrated in the graph below.



● DAM ● IDA1 ● IDA2 ● IDA3 ● IDC ● Balancing Market

Graph 9 - Market Share by Value (including Balancing Market)

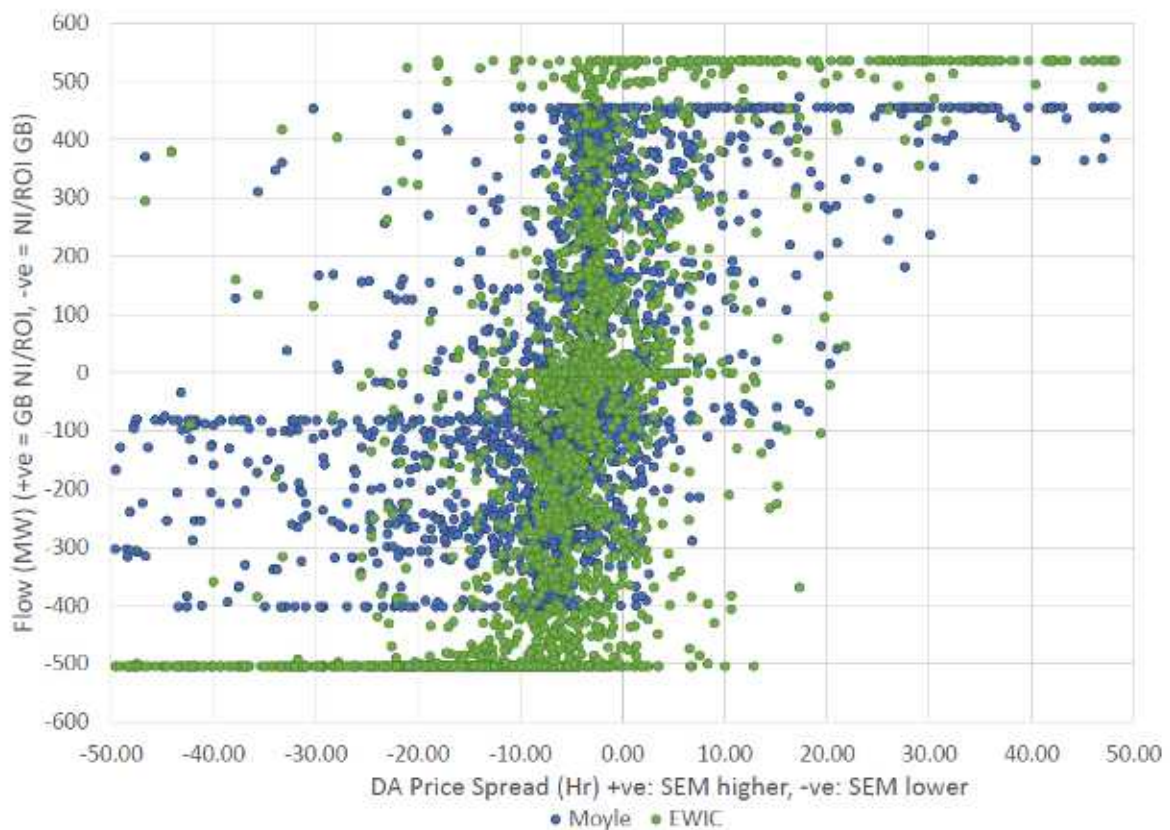
As the graph above shows, the DAM represents 82.16% of the market value, followed by the Balancing Market with 11.79%, IDA1 with 3.60%, IDA2 with 1.73%, IDA3 with 0.53% and IDC with 0.19%.

2.4 INTERCONNECTOR FLOWS

In the SEM, physical flows on Moyle and EWIC Interconnectors are linked to the SEM Day Ahead Market and the price difference between it and the DAM price in GB. From the 1st January 2021, to be reported in the next quarterly report, new market arrangements will see the physical flows of both interconnectors linked to Intraday Auctions 1 & 2 only. Where the DAM price in the SEM is higher than in GB, the interconnectors will import power into the SEM. Where the SEM price is lower, for example because there are high levels of wind on the island, the interconnectors will export power to GB unless GB is also experiencing high levels of wind.

A common means of graphing this relationship is presented in Graph 10 below. The X-axis shows the difference in DAM prices between the SEM and GB so that the positive price difference on the right of the graph is when the SEM price is higher than the GB price and the interconnector should be importing. The negative values on the left of the graph is when the SEM price is lower and the interconnectors should be exporting. The Y-axis shows the volume of the actual flow on the day and their direction so that in the upper half of the graph, in

which values are positive, the interconnectors are importing into the SEM from GB. In the lower half the negative values indicate an export.



Graph 10 - Interconnector Efficiency

For there to be evidence of efficient trading the scatter graph should show the periods of flow in the upper right quadrant of the graph and bottom left quadrant. In the upper right quadrant the SEM price is higher than the GB price and the interconnectors are importing. In the bottom left quadrant the SEM price is lower than the GB price and the interconnectors are exporting.

Efficient flows on the Interconnectors is a key objective of the SEM market design and the pattern shown on the graph shows that flows on Moyle and EWIC are overwhelmingly in the expected direction with limited exceptions in the bottom right and top left quadrants being accounted for due to the change in intraday scheduled flows compared to that of the day-ahead schedule, meaning the intraday price spread is different to that of the day-ahead price spread.

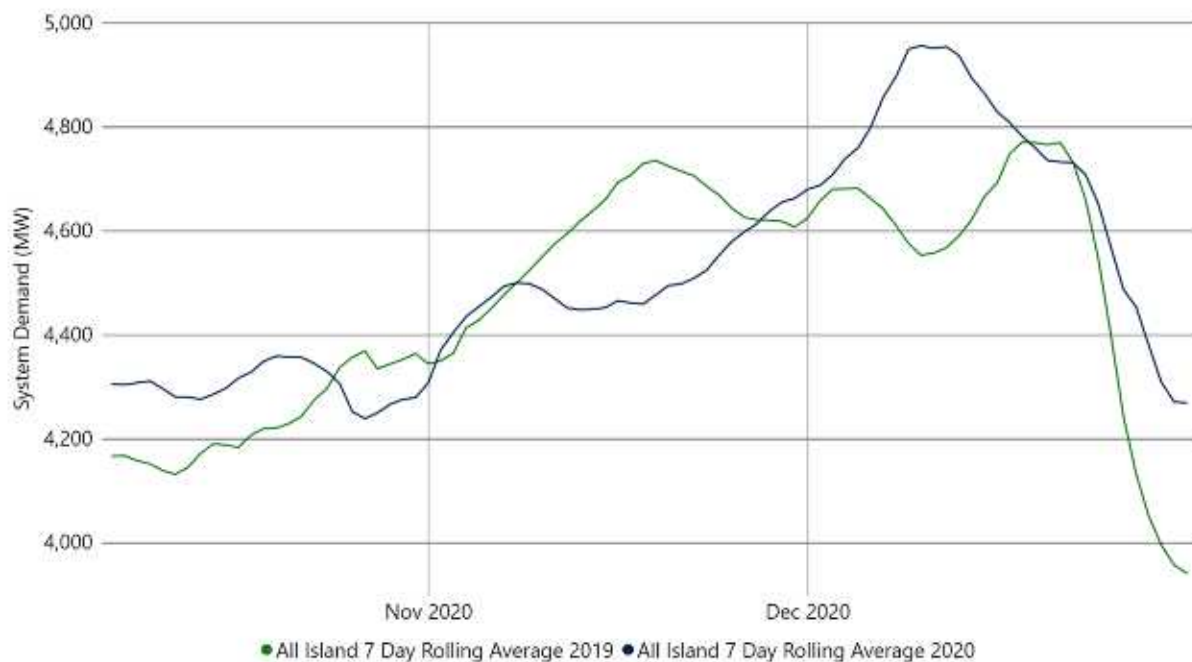
Ramping constraints, which limit the speed of change in the direction of flow, have not so far entailed significant flows in the wrong direction and market coupling has been successful in ensuring efficient interconnection between the SEM and GB markets. The benefits of these flows are to reduce prices in SEM when the price level is higher in the SEM than in GB and

higher when prices in the SEM are lower than in GB, which generally coincides with periods of high wind in the SEM

2.5 COVID-19 AND IMPACT ON DEMAND ACROSS THE SEM

COVID-19 has had a profound impact across all economies and countries, including Ireland, Northern Ireland and the SEM. One impact has been the resulting lower demand for electricity within the SEM. This has been highlighted in previous reports and the latest update is provided below. This section highlights changes observed in system demand over the period 01 October to 31 December.

The graph below shows the 7 day rolling average actual system demand on the island for the period comparing it to the same period in 2019.



Graph 11 - 7 Day Rolling Average of All Island System Demand (01 October – 31 December)

In a change to previous quarters, demand across the quarter has generally increased in both years with demand in 2020 above the levels seen in 2019 across large parts of December and while overall demand dropped slightly towards the end of the quarter it has remained above the levels seen in 2019. The SEM Committee will continue to monitor the overall market and further analysis will be carried out in the next Quarterly Update (covering the January 2021 – March 2021 period).

3 DIRECTED CONTRACTS Q4 2020

3.1 DIRECTED CONTRACTS Q4 2020 ROUND 13

The tables and figures below show the price and volume of Directed Contracts subscriptions for the latest DC Round 13, which was held in December 2020 and covers the period Q2 2021 to Q1 2022.

Quarters on offer	Q2 2021 to Q1 2022		
Primary subscription dates	8 th - 10 th December 2020		
Supplementary subscription date	17 th December 2020		
Volume sold	0.92 TWh		
% Volume Sold	100 %		
Average price / MWh	Baseload	Mid Merit	Peak
	€55.15	€61.95	N.A.

Table 2 - Round 13 Key Information

A breakdown of the volumes sold in the Round 13 Primary and Supplemental windows are shown in Table 2:

MW	Offered in Primary Window			Sold in Primary Window			% Sold in Primary Window		
	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak
Q2 2021	33	181	-	31	170	-	93%	94%	-
Q3 2021	-	63	-	-	59	-	-	94%	-
Q4 2021	64	94	-	60	88	-	93%	94%	-
Q1 2022	69	72	-	42	59	-	61%	82%	-
							83%	91%	-

MW	Offered in Supplemental Window			Sold in Supplemental Window			% Sold in Supplemental Window		
	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak
Q2 2021	2	11	-	2	11	-	100%	100%	-
Q3 2021	-	4	-	-	4	-	-	100%	-
Q4 2021	4	6	-	4	6	-	100%	100%	-
Q1 2022	27	13	-	27	13	-	100%	100%	-
							100%	100%	-

Table 3 - Primary and Supplemental Window volumes

During Round 13, 83 % of Baseload, 91 % of Mid-Merit product was sold in the Primary Subscription Window. The remaining volumes were taken up in the Supplementary Window.

DC Average Price per Quarter (€/MWh, 2016 - 2021)												
Year	Q1			Q2			Q3			Q4		
	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak
2016	€ 55.61	€ 62.31	€ 93.18	€ 47.85	€ 52.55		€ 41.91	€ 46.67		€ 44.25	€ 49.31	€ 67.30
2017	€ 44.09	€ 49.12	€ 70.73	€ 40.27	€ 43.65		€ 40.69	€ 44.12		€ 46.49	€ 52.16	-
2018	€ 54.51	€ 58.48	-	€ 46.30	€ 49.68		€ 48.20	€ 53.56		€ 55.90	€ 64.66	-
2019	€ 68.92	€ 80.20	-	€ 57.76	€ 63.94		€ 57.22	€ 63.73		€ 63.46	€ 72.44	-
2020	€ 66.72	€ 76.03	€ 102.60	€ 51.62	€ 56.74		€ 46.14	€ 51.18		€ 51.30	€ 58.25	€ 83.24
2021	€ 56.97	€ 66.42	€ 93.65	€ 45.62	€ 50.65		€ 44.55	€ 49.62		€ 58.14	€ 66.00	€ 88.54

Table 4 - Directed Contracts average price (€/MWh), 2016 – 2021



Graph 12 - Directed Contracts average price (€/MWh), 2016 - 2021

DC Volumes (GWh, 2016 - 2021)															
Year	Q1			Q2			Q3			Q4			Total		
	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak	Baseload	Mid-Merit	Peak
2016	875	10	47	1139	7	0	1249	3	0	957	7	0	4220	26	47
2017	851	27	12	1142	160	0	687	191	0	1020	172	0	3700	550	12
2018	1385	0	0	1960	322	0	781	574	0	722	656	0	4848	1552	0
2019	811	615	0	612	365	0	532	734	0	448	865	0	2403	2579	0
2020	1235	194	7	521	440	0	310	403	0	573	512	14	2639	1549	21
2021	635	225	1	229	698	0	256	364	0	255	275	1	1374	1561	2

Table 5 - Directed Contracts volumes (GWh), 2016 – 2021



Graph 13 - Directed Contracts volumes (GWh), 2016 - 2021