



Single Electricity Market Performance

1 October 2018 – 31 January 2019

SEM Monitoring Report

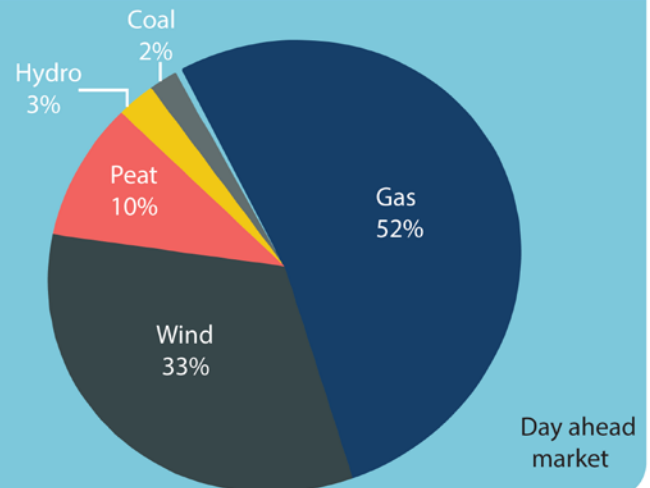
1 October 2018 - 31 January 2019

SEM
committee

Key Highlights

- ✓ Active engagement in the market from suppliers and generators
- ✓ Ex ante markets performing as expected - high liquidity concentrated in the day ahead
- ✓ Interconnectors flowing efficiently
- ✓ Increased wind generation putting a downward pressure on prices

Fuel Mix



CRM Auction



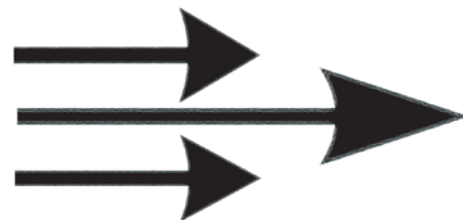
sufficient generation capacity secured to ensure security of supply



LOWER clearing price lower than first T-1 capacity auction clearing price.

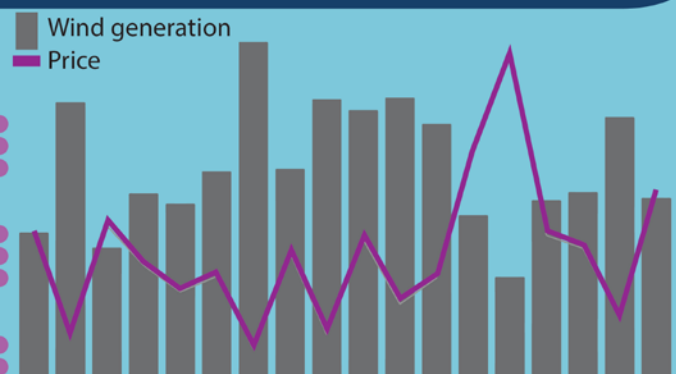
Interconnector Flows

Interconnectors are flowing efficiently, reflecting the price differentials between markets



Prices and impact of wind

- ✓ In periods of high wind, day ahead price dropped significantly
- ✓ Wholesale price of gas increased significantly compared to same period last year
- ✓ Demand increased by 7% over the year
- ✓ A significant number of unplanned outages contributed to higher prices
- ✓ As a consequence, prices have increased over the year



Average daily price in DAM €73.93
Lowest price in hourly period -€0.15
Highest price in hourly period €365.04

1 INTRODUCTION

The new 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 new market, in particular in relation to bidding controls in place and to the requirements of REMIT. It provides an overview of the performance of the new 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 purchasing forward contracts.

Participation in the DAM is through coupling with the European market and is not mandatory. Following the DAM the Intraday Market (IDM), 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 will buy and sell power from market participants to ensure that the demand and supply of power is exactly matched.

This report covers the first four months of the new market from 1 October 2018 to 31

2 MARKET PERFORMANCE

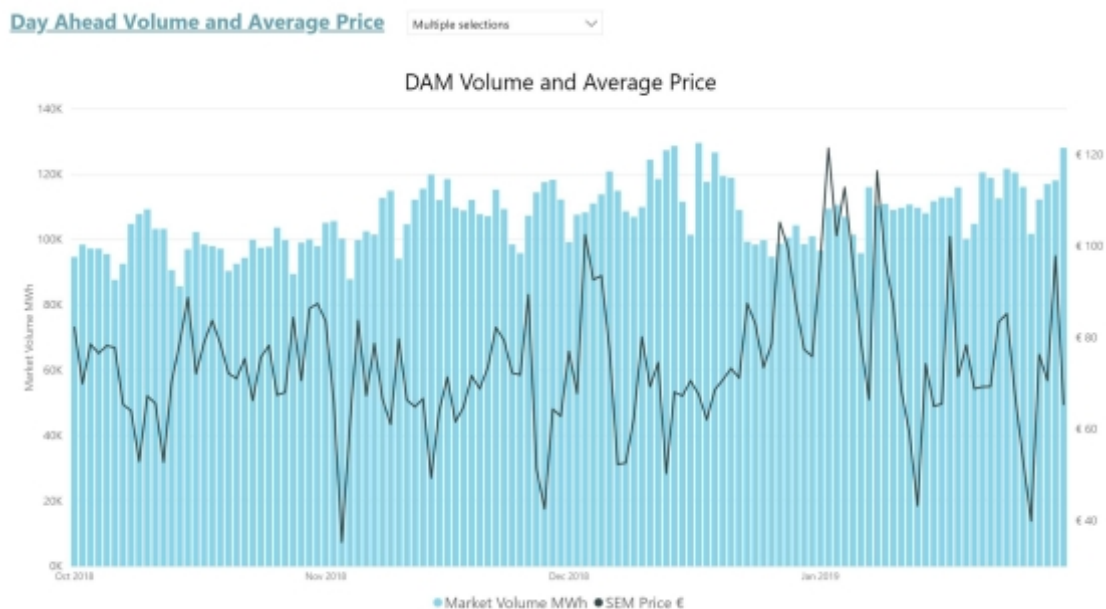
The SEM was designed to allow the efficient coupling of the wholesale market on the island of Ireland with the wholesale electricity market across Europe through a single marketplace and common rules. The trading arrangements have been designed to achieve this through a liquid DAM on the island coupled 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 Intra-day market timeframe and currently two auctions during this time link the SEM to the wholesale market in Great Britain. Finally 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.

2.1 DAY AHEAD MARKET

The DAM market has operated 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 first seventy days of the market. In total the value of the DAM market during the period was over €994m.

Graph 1 DAM

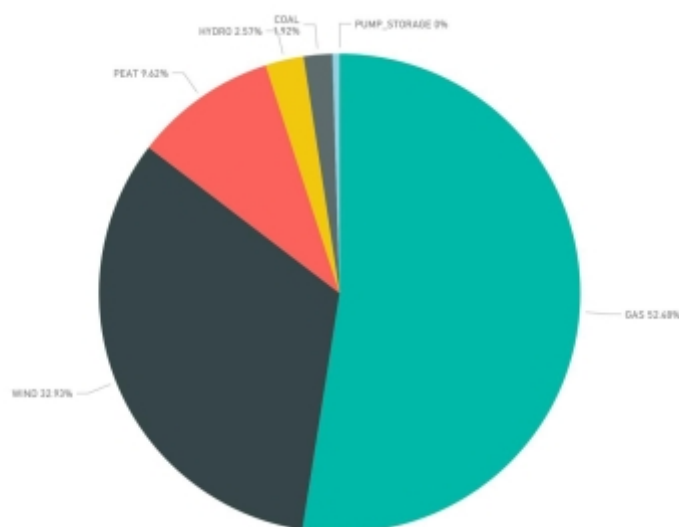


The average daily price in the DAM was €73.93 during the period with the lowest price recorded in an hourly period of -€0.15 and a maximum price in a single period of €365.04.

Prices in the DAM are higher than the equivalent period one year ago. This is accounted for by a significant increase in gas prices, with gas generation often setting the DAM price; by an increase in demand of 7 per cent over the year, and significant unplanned generation outages. These forced outages included Ballylumford, Great Island and Moneypoint generators, in addition to an outage on the East West Interconnector for three days during November.

The share of generation by fuel mix is shown in Figure 2 below.

Figure 2 DAM Generation by Fuel



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.

Table 1 below illustrates the relationship between prices and the forecast level of wind. It shows the highest prices during the Report period occurring at 17:00 - during evening peak demand - and lowest prices at this time. The highest prices are associated with a low wind forecast while the lowest prices occurred in periods of much higher expected levels of wind.

Table 1 DAM Price and Wind Forecast

| High Price-Low Wind | | | | Low Price-High Wind | | | |
|---------------------|-------|---------|------------------|---------------------|-------|---------|------------------|
| Date | Time | Price € | Wind Forecast MW | Date | Time | Price € | Wind Forecast MW |
| 02 January 2019 | 17:00 | 365.04 | 383.04 | 07 October 2018 | 17:00 | 65.55 | 2974.03 |
| 27 December 2018 | 17:00 | 298.65 | 402.41 | 02 November 2018 | 17:00 | 66.60 | 3064.47 |
| 28 December 2018 | 17:00 | 290 | 869.02 | 13 October 2018 | 17:00 | 70.06 | 1665.28 |
| 30 January 2019 | 17:00 | 285.00 | 143.80 | 31 January 2019 | 17:00 | 74.04 | 2223.14 |
| 03 December 2018 | 17:00 | 281.88 | 643.22 | 12 October 2018 | 17:00 | 74.36 | 2368.58 |

The concentration of trading in the DAM is demonstrated in Figure 3 below which shows that almost 92% of total volumes are traded through the DAM. Suppliers of electricity to business and domestic customers are in general seeking to cover their requirements in this market. Figure 3 also shows the relative value of each market.

Figure 3 Market Shares by Value



It should be noted that there has been a number of plant outages observed during this period, that will have impacted upon prices. In particular, all three Moneypoint units have been on outage for the majority of the period, along with Great Island. In addition, other units have had limited outages such as Whitegate and Kilroot.

2.2 INTRA-DAY MARKET

The Intra-Day markets have allowed market participants to refine their market position by buying or selling nearer to real time. Volumes however have been relatively low, and have generally declined through the IDM1, IDM2 and IDM3 auctions and the Intra-Day Continuous market. The IDM1 and IDM2 are coupled markets with GB while the IDM3 and IDC are local SEM-only markets. The IDM1 auction accounted for almost 4% of the total ex-ante market by value; the IDM2 auction accounted for almost 2%, the IDM3 auction for 0.74% and the Intra-Day Continuous market (IDC) for 0.39%.

Average prices show a tendency to rise during the Intra-Day timeframe as it becomes closer to real time, with average prices in IDM1 being €72.29; IDM2 €84.40 and IDM3

€93.05 and the IDA Continuous market €75.53. The total value of these market over the period has been €42.8m in IDM1; over €21m in IDM2; €8m in the IDM3 and over €4m in the IDC market.

Graph 2 below illustrates the generally lower prices in the IDM 1 market and highest prices in IDM 3 market. Prices in all markets generally move in a similar direction with the IDM 3 market showing the largest movement.

Graph 2 IDM Prices

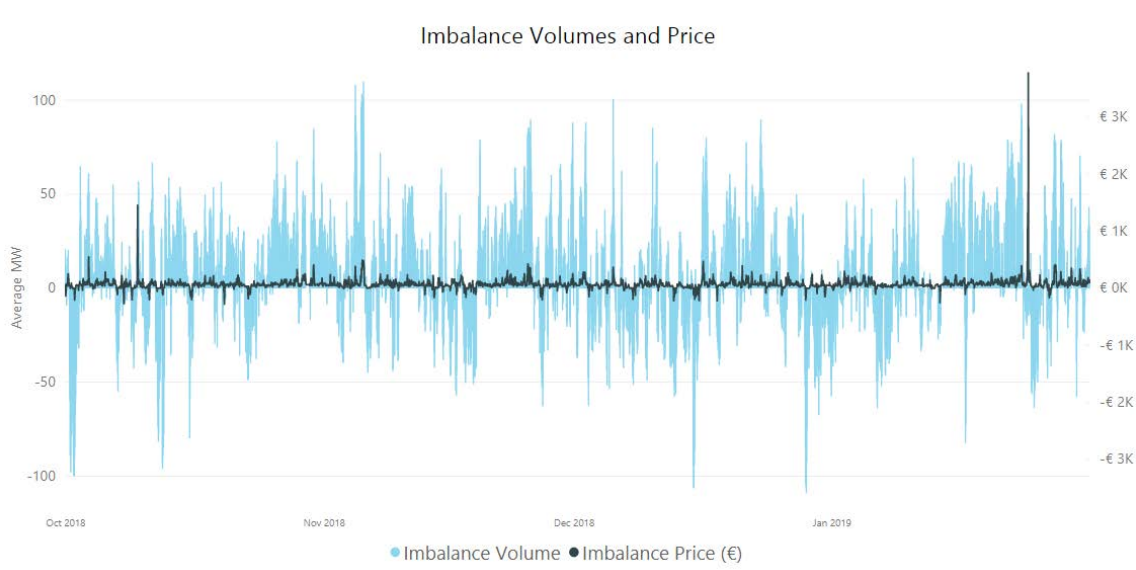


2.3 BALANCING MARKET RESULTS

Imbalance Settlement Volumes and Prices are set out below, showing relatively higher volatility in the market in both volumes and prices. It was anticipated that the balancing market would encourage liquidity in the DAM and balance responsibility and the design has appeared to have achieved these objectives

Graph 3 below shows Imbalance volumes and price for each 30 minute Imbalance Price Settlement Period.

Graph 3 Imbalance Volumes and Prices



The volatility of the balancing market is illustrated in the chart above. The highest prices can be observed on 24 January at €3,773.69 and the lowest price of €-281.16 observed on 20 October.

As can be observed there was a spike in imbalance prices on the 24 January. During this period an Amber alert was issued for Northern Ireland. The alert was a consequence of plant outages at the Coolkeeragh site, coupled with low wind in Northern Ireland and exports on the Moyle Interconnector. These events led to the North South tie-lines flowing from South to North, to the point where such flows were maximized and all units in ROI were System Operator-flagged with a binding constraint. This meant that only NI generators could solve any marginal increase in load anywhere on the system and resulted in a high priced unit (which was being kept at minimum output) becoming marginal in the dispatch algorithm. As a result, some 5 minute prices were set at €5,636.62 for a number of Imbalance Pricing Periods. The impact of this event is still under investigation, however the impact on suppliers is thought to be small as they purchased the majority of their demand in the Day-Ahead Market for these periods.

Some issues that have arisen in the balancing timeframe over the level of volatility and resulting prices and the Regulatory Authorities' Market Monitoring Unit will continue to monitor the application of bidding controls in the Balancing Market and market outcomes more generally.

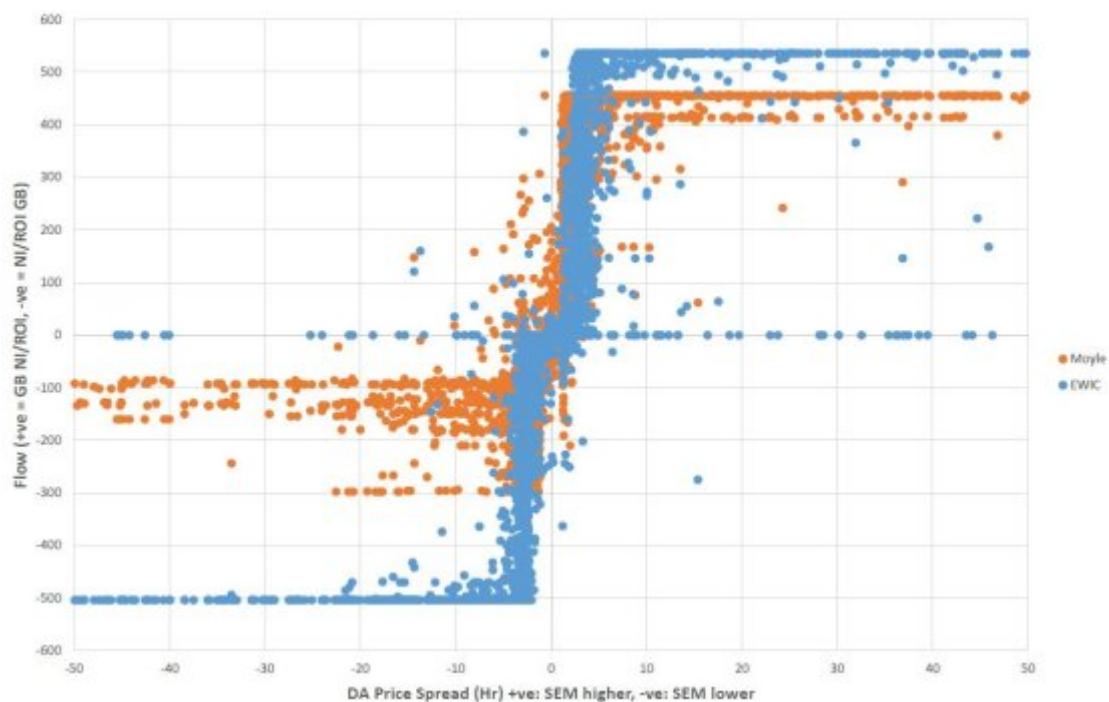
2.4 INTERCONNECTOR FLOWS

In the new 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. 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

A common means of graphing this relationship is presented in Figure 4 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 flow and its 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.

Figure 4 Interconnector Efficiency



For there to be evidence of efficient trading the scatter graph should show the periods of flow in the upper right of the graph and bottom left. 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 were a key objective of the SEM market design and the pattern shown on the graph shows that flows on Moyle (red) and EWIC (blue) are overwhelmingly in the correct direction.

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 reduced prices when the price level is higher in the SEM than in GB and higher exports and use of wind power when price in the SEM are lower than in GB.

3 SUMMARY

The new market has been introduced successfully and is exhibiting many of the features specified in the design, including a liquid Day Ahead Market and efficient interconnection. This facilitates the formation of efficient prices, a competitive market and the maximisation of renewable generation and its export to GB.

As expected with the implementation of a new market design a number of issues have arisen that are being addressed by the Single Electricity market Operator (SEMO) and the TSOs. These issues are generally focused on the operation of the Balancing Market. These include data issues that impinge on the timely and accurate publication of data and technical issues related to the operation of the new systems. Pricing and settlement issues have also arisen in a number of periods and the resolution of these has been discussed by the Market Operator with market participants and Regulatory Authorities.

The SEM Committee is encouraged by the performance of the new market and will continue to report on market performance in future reports.